# HORTICULTURAL REPORT

## 2021 WEED CONTROL RESEARCH ON FRUIT & VEGETABLE CROPS

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**WEED CONTROL IN HORTICULTURAL CROPS – 2021**
**FOREWORD**

This report summarizes the results of weed control experiments on horticultural crops in Michigan in 2021. 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-leaved 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 9.2014.7, from Gylling Data Management, Inc. (RR 4 405 Martin Boulevard, Brookings, SD 57006). Unless otherwise specified, the experiments were laid out as randomized complete blocks. The data were subjected to analysis of variance and the means were compared with the LSD test at the 5% level. Since data transformations were not used, the coefficient of variation for skewed ratings or weed densities may be misleading. In some instances, yields for weeded check plots may be low because of severe early weed competition. In these cases, it may be more desirable to compare new herbicides with standard treatments.

**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.* |
| **COBU** | cocklebur | *Xanthium strumarium* L. |
| **COCW** | common chickweed | *Stellaria media* (L.) Cyrillo |
| **COGR** | common groundsel | *Senecio vulgaris* L. |
| **COLQ** | common lambsquarters | *Chenopodium album* L. |
| **COMA** | common mallow | *Malva neglecta Wallr.* |
| **COMU** | common mullein | *Verbascum Thapsus* L. |
| **COMW** | common milkweed | *Asclepias syriaca* L. |
| **COPU** | common purslane | *Portulaca oleracea* L. |
| **COPW** | common pokeweed | *Phytolacca americana* L. |
| **CORW** | common ragweed | *Ambrosia artemisiifolia* L. |
| **CRWS** | creeping woodsorrel | *Oxalis corniculata* L. |
| **CUDO** | curly dock | *Rumex crispus* L. |
| **CWBS** | catchweed bedstraw | *Galium aparine* L. |
| **DAND** | dandelion | *Taraxacum officinale* Weber |
| **DOBG** | downy bromegrass | *Bromus tectorum* L. |
| **EBNS** | eastern black nightshade | *Solanum ptycanthum* Dun. |
| **FAPA** | fall panicum | *Panicum dichotomiflorum* Michx. |
| **FIBW** | field bindweed | *Convolvulus arvensis* L. |
| **FIPA** | field pansy | *Viola rafinesquii* Greene |
| **FIPC** | field pennycress | *Thlaspi arvense* L. |
| **FISB** | field sandbur | *Cenchrus incertus* M.A.Curtis |
| **FIVI** | field violet | *Viola arvensis* Murray |
| **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. |
| **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. |
| **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 |
| tembotrione | Laudis | 3.5 SC | Bayer CropScience |
| terbacil | Sinbar | 80 WDG | TKI NovaSource |
| tolpyralate | Shieldex 400 SC | 3.33 L | Summit Agro USA |
| topramezone | Impact | 2.8 L | Amvac |
| triclopyr | Garlon | 3 SC | Corteva |
| trifloxysulfuron | Envoke | 75 WG | Syngenta |
| 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 | |
| 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 |
| **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
2021

| 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** | 36.4 | 23 | 0 | **1** | 70.5 | 27.2 | 0 | **1** | 76.5 | 44.9 | 0 |
| **2** | 45.9 | 17.1 | 0 | **2** | 82.9 | 61.9 | 0 | **2** | 75.4 | 46.7 | 0.05 |
| **3** | 64.1 | 26 | 0 | **3** | 68.7 | 55.4 | 0.06 | **3** | 81.8 | 58.5 | 0 |
| **4** | 68.2 | 29.7 | 0 | **4** | 62.5 | 47.3 | 0.04 | **4** | 87.9 | 60 | 0 |
| **5** | 62.2 | 44.2 | 0.15 | **5** | 57.6 | 39.5 | 0 | **5** | 89.1 | 67.5 | 0 |
| **6** | 78.4 | 42.6 | 0 | **6** | 49.3 | 34.5 | 0.07 | **6** | 90.3 | 69 | 0 |
| **7** | 80.7 | 49.8 | 0 | **7** | 55.6 | 34.8 | 0 | **7** | 81.8 | 70.1 | 0.54 |
| **8** | 74.5 | 56 | 0.27 | **8** | 55.4 | 32.4 | 0 | **8** | 83.4 | 65.2 | 0.01 |
| **9** | 70.1 | 49.3 | 0.02 | **9** | 52.6 | 35.6 | 0 | **9** | 88.1 | 65.5 | 0.03 |
| **10** | 73.5 | 40.7 | 0.5 | **10** | 55.3 | 30.6 | 0 | **10** | 87.6 | 64.9 | 0 |
| **11** | 59.1 | 43.3 | 0.21 | **11** | 54.1 | 31.5 | 0 | **11** | 90 | 61.6 | 0.08 |
| **12** | 60.8 | 42.8 | 0 | **12** | 63.9 | 28.6 | 0 | **12** | 87.5 | 61.9 | 0.16 |
| **13** | 60.3 | 33.7 | 0 | **13** | 68 | 30.2 | 0 | **13** | 82.2 | 60.5 | 0 |
| **14** | 49.7 | 31.3 | 0 | **14** | 71.5 | 31.9 | 0 | **14** | 76.8 | 56.5 | 0 |
| **15** | 46.3 | 34.3 | 0.05 | **15** | 72.3 | 35.6 | 0 | **15** | 75.3 | 53.5 | 0 |
| **16** | 57.1 | 36.4 | 0 | **16** | 70 | 49.6 | 0.03 | **16** | 76.1 | 43.6 | 0 |
| **17** | 59.1 | 32.1 | 0 | **17** | 77 | 46.2 | 0 | **17** | 83.8 | 46 | 0 |
| **18** | 59.7 | 32.7 | 0 | **18** | 79.2 | 44.1 | 0 | **18** | 81.2 | 62.5 | 0.46 |
| **19** | 57.8 | 37.2 | 0.05 | **19** | 83.7 | 54.7 | 0 | **19** | 72.6 | 62.1 | 0.08 |
| **20** | 38.4 | 31.6 | 0 | **20** | 86.7 | 61.5 | 0 | **20** | 83.6 | 57.6 | 0.23 |
| **21** | 41.5 | 25.5 | 0 | **21** | 87.6 | 57.1 | 0 | **21** | 71 | 50.2 | 0.67 |
| **22** | 48.3 | 20.8 | 0 | **22** | 86.9 | 60.8 | 0 | **22** | 66.8 | 39.8 | 0.01 |
| **23** | 62.3 | 27.5 | 0 | **23** | 84 | 51.9 | 0.01 | **23** | 71.9 | 44.7 | 0.15 |
| **24** | 54.3 | 32.8 | 0.03 | **24** | 81.7 | 52.1 | 0.01 | **24** | 76.2 | 59 | 0.35 |
| **25** | 51.3 | 35.4 | 0 | **25** | 90.2 | 66.1 | 0 | **25** | 74.5 | 64.9 | 1.31 |
| **26** | 56.4 | 33.5 | 0 | **26** | 75.4 | 57.2 | 0.21 | **26** | 80.8 | 65.8 | 1.93 |
| **27** | 80.5 | 45.4 | 0 | **27** | 62.3 | 40.7 | 0.05 | **27** | 84.2 | 70.2 | 0.11 |
| **28** | 71.3 | 51.6 | 0 | **28** | 45.5 | 39.6 | 0.48 | **28** | 85 | 65.3 | 0.37 |
| **29** | 53.2 | 46.1 | 0.16 | **29** | 62.5 | 36.9 | 0 | **29** | 84.3 | 68.7 | 0.41 |
| **30** | 54.6 | 36.3 | 0.04 | **30** | 68.5 | 32.5 | 0 | **30** | 81.6 | 68.2 | 0 |
| | | | | **31** | 71.2 | 42.8 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**MSU Horticulture Teaching and Research Center**

Recorded at
MSU Horticulture Teaching and Research Center (HTRC)
East Lansing, Michigan
2021

| JULY | | | | AUGUST | | | | SEPTEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. |
| **1** | 77.5 | 60.1 | 0 | **1** | 73.5 | 53.2 | 0.25 | **1** | 76.5 | 55.7 | 0 |
| **2** | 75.2 | 53.3 | 0 | **2** | 76.8 | 48.4 | 0 | **2** | 75.6 | 46.7 | 0 |
| **3** | 81.2 | 52.2 | 0 | **3** | 79.3 | 51.9 | 0 | **3** | 74.1 | 46.3 | 0 |
| **4** | 87.7 | 61.5 | 0 | **4** | 82.4 | 54.1 | 0 | **4** | 76.5 | 61.3 | 0.01 |
| **5** | 88.4 | 68.7 | 0 | **5** | 84 | 56 | 0 | **5** | 78.7 | 55.9 | 0.02 |
| **6** | 89.1 | 72.9 | 0.01 | **6** | 82.2 | 58.1 | 0.08 | **6** | 76.4 | 50.3 | 0.02 |
| **7** | 85.2 | 66.7 | 0.54 | **7** | 83.9 | 63.6 | 0 | **7** | 85.5 | 47.5 | 0.07 |
| **8** | 75.4 | 62.2 | 0.99 | **8** | 86.7 | 68.4 | 0.01 | **8** | 76.7 | 59 | 0 |
| **9** | 73.3 | 58 | 0 | **9** | 85.6 | 67.2 | 0 | **9** | 72.2 | 46.7 | 0 |
| **10** | 75.1 | 52.8 | 0 | **10** | 86.9 | 71 | 0.08 | **10** | 76 | 45 | 0 |
| **11** | 69.3 | 62.3 | 0.01 | **11** | 86.8 | 67.2 | 0.71 | **11** | 81.8 | 52.9 | 0 |
| **12** | 70 | 63 | 0.12 | **12** | 84.8 | 63.6 | 2.22 | **12** | 81.8 | 65.4 | 0.01 |
| **13** | 81.7 | 67.6 | 0.38 | **13** | 80.5 | 58.8 | 0 | **13** | 71.3 | 61.3 | 0.51 |
| **14** | 82.9 | 60.8 | 0.01 | **14** | 76.4 | 52.7 | 0 | **14** | 87.5 | 62.3 | 0.29 |
| **15** | 80.1 | 66.3 | 0 | **15** | 77.3 | 51.1 | 0 | **15** | 75.7 | 50.8 | 0 |
| **16** | 69.3 | 62.4 | 0.39 | **16** | 76 | 54.7 | 0 | **16** | 78.2 | 48.9 | 0 |
| **17** | 77.8 | 62.1 | 0.01 | **17** | 81.8 | 56.8 | 0 | **17** | 84.7 | 53 | 0 |
| **18** | 84 | 54.4 | 0 | **18** | 84.4 | 61.4 | 0 | **18** | 76.7 | 57.6 | 0 |
| **19** | 82.9 | 59.3 | 0 | **19** | 87.7 | 61.5 | 0 | **19** | 82.3 | 47.2 | 0 |
| **20** | 83.9 | 62.5 | 0 | **20** | 86.7 | 61.1 | 0 | **20** | 79.2 | 62.5 | 0.01 |
| **21** | 75.7 | 53.7 | 0 | **21** | 86.9 | 61.8 | 0 | **21** | 75.3 | 56.9 | 0.27 |
| **22** | 79.3 | 51.2 | 0 | **22** | 86.8 | 64.3 | 0.13 | **22** | 57.8 | 48.2 | 0.65 |
| **23** | 78.9 | 61 | 0.3 | **23** | 82.5 | 61.4 | 0 | **23** | 50.3 | 45.2 | 0.77 |
| **24** | 85.2 | 68.4 | 0.91 | **24** | 88.8 | 63.1 | 0.11 | **24** | 73.3 | 44 | 0 |
| **25** | 85.3 | 62.9 | 0 | **25** | 87.8 | 68.3 | 0 | **25** | 66 | 47.6 | 0.3 |
| **26** | 87.4 | 58 | 0 | **26** | 87.9 | 70.4 | 0 | **26** | 75.7 | 43.8 | 0 |
| **27** | 84.4 | 61.3 | 0 | **27** | 86.3 | 70.2 | 0 | **27** | 81.3 | 60.5 | 0 |
| **28** | 84.6 | 60.2 | 0 | **28** | 90.1 | 68.9 | 0 | **28** | 68.5 | 48.4 | 0 |
| **29** | 85.6 | 68.1 | 0.01 | **29** | 89.1 | 69.4 | 0.19 | **29** | 74.2 | 45 | 0 |
| **30** | 75 | 56.7 | 0 | **30** | 81.6 | 60.5 | 0 | **30** | 74.2 | 42.9 | 0 |
| **31** | 76.9 | 50.5 | 0 | **31** | 78.5 | 54.1 | 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
2021

| | 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** | 36.4 | 23 | 0 | **1** | 70.5 | 27.2 | 0 | **1** | 76.5 | 44.9 | 0 |
| **2** | 45.9 | 17.1 | 0 | **2** | 82.9 | 61.9 | 0 | **2** | 75.4 | 46.7 | 0.05 |
| **3** | 64.1 | 26 | 0 | **3** | 68.7 | 55.4 | 0.06 | **3** | 81.8 | 58.5 | 0 |
| **4** | 68.2 | 29.7 | 0 | **4** | 62.5 | 47.3 | 0.04 | **4** | 87.9 | 60 | 0 |
| **5** | 62.2 | 44.2 | 0.15 | **5** | 57.6 | 39.5 | 0 | **5** | 89.1 | 67.5 | 0 |
| **6** | 78.4 | 42.6 | 0 | **6** | 49.3 | 34.5 | 0.07 | **6** | 90.3 | 69 | 0 |
| **7** | 80.7 | 49.8 | 0 | **7** | 55.6 | 34.8 | 0 | **7** | 81.8 | 70.1 | 0.54 |
| **8** | 74.5 | 56 | 0.27 | **8** | 55.4 | 32.4 | 0 | **8** | 83.4 | 65.2 | 0.01 |
| **9** | 70.1 | 49.3 | 0.02 | **9** | 52.6 | 35.6 | 0 | **9** | 88.1 | 65.5 | 0.03 |
| **10** | 73.5 | 40.7 | 0.5 | **10** | 55.3 | 30.6 | 0 | **10** | 87.6 | 64.9 | 0 |
| **11** | 59.1 | 43.3 | 0.21 | **11** | 54.1 | 31.5 | 0 | **11** | 90 | 61.6 | 0.08 |
| **12** | 60.8 | 42.8 | 0 | **12** | 63.9 | 28.6 | 0 | **12** | 87.5 | 61.9 | 0.16 |
| **13** | 60.3 | 33.7 | 0 | **13** | 68 | 30.2 | 0 | **13** | 82.2 | 60.5 | 0 |
| **14** | 49.7 | 31.3 | 0 | **14** | 71.5 | 31.9 | 0 | **14** | 76.8 | 56.5 | 0 |
| **15** | 46.3 | 34.3 | 0.05 | **15** | 72.3 | 35.6 | 0 | **15** | 75.3 | 53.5 | 0 |
| **16** | 57.1 | 36.4 | 0 | **16** | 70 | 49.6 | 0.03 | **16** | 76.1 | 43.6 | 0 |
| **17** | 59.1 | 32.1 | 0 | **17** | 77 | 46.2 | 0 | **17** | 83.8 | 46 | 0 |
| **18** | 59.7 | 32.7 | 0 | **18** | 79.2 | 44.1 | 0 | **18** | 81.2 | 62.5 | 0.46 |
| **19** | 57.8 | 37.2 | 0.05 | **19** | 83.7 | 54.7 | 0 | **19** | 72.6 | 62.1 | 0.08 |
| **20** | 38.4 | 31.6 | 0 | **20** | 86.7 | 61.5 | 0 | **20** | 83.6 | 57.6 | 0.23 |
| **21** | 41.5 | 25.5 | 0 | **21** | 87.6 | 57.1 | 0 | **21** | 71 | 50.2 | 0.67 |
| **22** | 48.3 | 20.8 | 0 | **22** | 86.9 | 60.8 | 0 | **22** | 66.8 | 39.8 | 0.01 |
| **23** | 62.3 | 27.5 | 0 | **23** | 84 | 51.9 | 0.01 | **23** | 71.9 | 44.7 | 0.15 |
| **24** | 54.3 | 32.8 | 0.03 | **24** | 81.7 | 52.1 | 0.01 | **24** | 76.2 | 59 | 0.35 |
| **25** | 51.3 | 35.4 | 0 | **25** | 90.2 | 66.1 | 0 | **25** | 74.5 | 64.9 | 1.31 |
| **26** | 56.4 | 33.5 | 0 | **26** | 75.4 | 57.2 | 0.21 | **26** | 80.8 | 65.8 | 1.93 |
| **27** | 80.5 | 45.4 | 0 | **27** | 62.3 | 40.7 | 0.05 | **27** | 84.2 | 70.2 | 0.11 |
| **28** | 71.3 | 51.6 | 0 | **28** | 45.5 | 39.6 | 0.48 | **28** | 85 | 65.3 | 0.37 |
| **29** | 53.2 | 46.1 | 0.16 | **29** | 62.5 | 36.9 | 0 | **29** | 84.3 | 68.7 | 0.41 |
| **30** | 54.6 | 36.3 | 0.04 | **30** | 68.5 | 32.5 | 0 | **30** | 81.6 | 68.2 | 0 |
| | | | | **31** | 71.2 | 42.8 | 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
2021

| JULY | | | | AUGUST | | | | SEPTEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. |
| **1** | 77.5 | 60.1 | 0 | **1** | 73.5 | 53.2 | 0.25 | **1** | 76.5 | 55.7 | 0 |
| **2** | 75.2 | 53.3 | 0 | **2** | 76.8 | 48.4 | 0 | **2** | 75.6 | 46.7 | 0 |
| **3** | 81.2 | 52.2 | 0 | **3** | 79.3 | 51.9 | 0 | **3** | 74.1 | 46.3 | 0 |
| **4** | 87.7 | 61.5 | 0 | **4** | 82.4 | 54.1 | 0 | **4** | 76.5 | 61.3 | 0.01 |
| **5** | 88.4 | 68.7 | 0 | **5** | 84 | 56 | 0 | **5** | 78.7 | 55.9 | 0.02 |
| **6** | 89.1 | 72.9 | 0.01 | **6** | 82.2 | 58.1 | 0.08 | **6** | 76.4 | 50.3 | 0.02 |
| **7** | 85.2 | 66.7 | 0.54 | **7** | 83.9 | 63.6 | 0 | **7** | 85.5 | 47.5 | 0.07 |
| **8** | 75.4 | 62.2 | 0.99 | **8** | 86.7 | 68.4 | 0.01 | **8** | 76.7 | 59 | 0 |
| **9** | 73.3 | 58 | 0 | **9** | 85.6 | 67.2 | 0 | **9** | 72.2 | 46.7 | 0 |
| **10** | 75.1 | 52.8 | 0 | **10** | 86.9 | 71 | 0.08 | **10** | 76 | 45 | 0 |
| **11** | 69.3 | 62.3 | 0.01 | **11** | 86.8 | 67.2 | 0.71 | **11** | 81.8 | 52.9 | 0 |
| **12** | 70 | 63 | 0.12 | **12** | 84.8 | 63.6 | 2.22 | **12** | 81.8 | 65.4 | 0.01 |
| **13** | 81.7 | 67.6 | 0.38 | **13** | 80.5 | 58.8 | 0 | **13** | 71.3 | 61.3 | 0.51 |
| **14** | 82.9 | 60.8 | 0.01 | **14** | 76.4 | 52.7 | 0 | **14** | 87.5 | 62.3 | 0.29 |
| **15** | 80.1 | 66.3 | 0 | **15** | 77.3 | 51.1 | 0 | **15** | 75.7 | 50.8 | 0 |
| **16** | 69.3 | 62.4 | 0.39 | **16** | 76 | 54.7 | 0 | **16** | 78.2 | 48.9 | 0 |
| **17** | 77.8 | 62.1 | 0.01 | **17** | 81.8 | 56.8 | 0 | **17** | 84.7 | 53 | 0 |
| **18** | 84 | 54.4 | 0 | **18** | 84.4 | 61.4 | 0 | **18** | 76.7 | 57.6 | 0 |
| **19** | 82.9 | 59.3 | 0 | **19** | 87.7 | 61.5 | 0 | **19** | 82.3 | 47.2 | 0 |
| **20** | 83.9 | 62.5 | 0 | **20** | 86.7 | 61.1 | 0 | **20** | 79.2 | 62.5 | 0.01 |
| **21** | 75.7 | 53.7 | 0 | **21** | 86.9 | 61.8 | 0 | **21** | 75.3 | 56.9 | 0.27 |
| **22** | 79.3 | 51.2 | 0 | **22** | 86.8 | 64.3 | 0.13 | **22** | 57.8 | 48.2 | 0.65 |
| **23** | 78.9 | 61 | 0.3 | **23** | 82.5 | 61.4 | 0 | **23** | 50.3 | 45.2 | 0.77 |
| **24** | 85.2 | 68.4 | 0.91 | **24** | 88.8 | 63.1 | 0.11 | **24** | 73.3 | 44 | 0 |
| **25** | 85.3 | 62.9 | 0 | **25** | 87.8 | 68.3 | 0 | **25** | 66 | 47.6 | 0.3 |
| **26** | 87.4 | 58 | 0 | **26** | 87.9 | 70.4 | 0 | **26** | 75.7 | 43.8 | 0 |
| **27** | 84.4 | 61.3 | 0 | **27** | 86.3 | 70.2 | 0 | **27** | 81.3 | 60.5 | 0 |
| **28** | 84.6 | 60.2 | 0 | **28** | 90.1 | 68.9 | 0 | **28** | 68.5 | 48.4 | 0 |
| **29** | 85.6 | 68.1 | 0.01 | **29** | 89.1 | 69.4 | 0.19 | **29** | 74.2 | 45 | 0 |
| **30** | 75 | 56.7 | 0 | **30** | 81.6 | 60.5 | 0 | **30** | 74.2 | 42.9 | 0 |
| **31** | 76.9 | 50.5 | 0 | **31** | 78.5 | 54.1 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Decatur**

Recorded at
Bartley Farms
Dowagiac, Michigan
2021

| 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** | 35.8 | 22.6 | 0.01 | **1** | 75 | 28.5 | 0 | **1** | 80.1 | 44.2 | 0 |
| **2** | 48.7 | 16 | 0 | **2** | 82.1 | 60.3 | 0 | **2** | 78.4 | 47.1 | 0 |
| **3** | 66.9 | 31 | 0 | **3** | 68.1 | 55.5 | 0.07 | **3** | 84.5 | 49.8 | 0 |
| **4** | 74 | 33.5 | 0 | **4** | 63.1 | 42.7 | 0.07 | **4** | 88.1 | 64.5 | 0 |
| **5** | 72 | 53.5 | 0 | **5** | 53.7 | 34.2 | 0 | **5** | 89.7 | 63.4 | 0 |
| **6** | 80.1 | 50.3 | 0 | **6** | 48.8 | 33.7 | 0.07 | **6** | 89 | 65.2 | 0 |
| **7** | 79.3 | 50.3 | 0 | **7** | 55.2 | 29.6 | 0 | **7** | 81.3 | 68.2 | 0.31 |
| **8** | 72.8 | 47.9 | 0.24 | **8** | 53.8 | 30.6 | 0 | **8** | 87.7 | 66.9 | 0.01 |
| **9** | 66.8 | 46.7 | 0 | **9** | 56.4 | 36.6 | 0.16 | **9** | 90.3 | 65.9 | 1.04 |
| **10** | 68.8 | 40.7 | 0.34 | **10** | 54.4 | 34 | 0 | **10** | 89.9 | 65.7 | 0 |
| **11** | 57.9 | 43.4 | 0 | **11** | 52.1 | 28 | 0 | **11** | 92.8 | 66.3 | 0 |
| **12** | 62.4 | 40.4 | 0 | **12** | 62.4 | 27.4 | 0 | **12** | 92.3 | 64.1 | 0 |
| **13** | 54.6 | 35 | 0 | **13** | 68.1 | 28.6 | 0 | **13** | 84.2 | 59.3 | 0 |
| **14** | 46.8 | 32.5 | 0 | **14** | 71.6 | 42.6 | 0 | **14** | 78.1 | 57.9 | 0 |
| **15** | 46.2 | 33.4 | 0 | **15** | 70.3 | 37.3 | 0 | **15** | 77.3 | 53 | 0 |
| **16** | 49.2 | 30.6 | 0 | **16** | 76.6 | 50.9 | 0 | **16** | 81.1 | 47.9 | 0 |
| **17** | 60.1 | 29.4 | 0 | **17** | 73.6 | 49.1 | 0 | **17** | 87.8 | 43.1 | 0 |
| **18** | 61.2 | 27.7 | 0 | **18** | 79.6 | 50.3 | 0 | **18** | 83.2 | 64 | 0.43 |
| **19** | 53.2 | 38.4 | 0.24 | **19** | 80.5 | 61.5 | 0 | **19** | 84.5 | 62.6 | 0.29 |
| **20** | 39.2 | 32.5 | 0.01 | **20** | 88.3 | 59.8 | 0 | **20** | 85.7 | 63.3 | 0.76 |
| **21** | 45.3 | 26.2 | 0 | **21** | 87.3 | 58.4 | 0 | **21** | 70.3 | 52.6 | 0.77 |
| **22** | 52.6 | 24.4 | 0 | **22** | 86 | 62.2 | 0 | **22** | 70.2 | 42.9 | 0 |
| **23** | 61.8 | 34.3 | 0 | **23** | 77.7 | 59.2 | 0 | **23** | 74.8 | 53.9 | 0.03 |
| **24** | 54.9 | 38.3 | 0.05 | **24** | 88.9 | 61.7 | 0 | **24** | 81.7 | 61.4 | 0 |
| **25** | 48.5 | 32.6 | 0.04 | **25** | 86.3 | 64.4 | 0 | **25** | 76.9 | 67.3 | 0.95 |
| **26** | 72.9 | 35.2 | 0 | **26** | 78.4 | 55.7 | 0.26 | **26** | 82.6 | 68.6 | 1.62 |
| **27** | 84.2 | 56.9 | 0 | **27** | 73.1 | 49.1 | 0.02 | **27** | 83.6 | 66.8 | 0.03 |
| **28** | 72.7 | 43.6 | 0.04 | **28** | 58.3 | 41.3 | 0.22 | **28** | 86.7 | 64.3 | 0.53 |
| **29** | 57.7 | 43.1 | 0.09 | **29** | 68.1 | 36 | 0 | **29** | 87.2 | 67.6 | 0.29 |
| **30** | 54.4 | 32.9 | 0 | **30** | 71.8 | 34.1 | 0 | **30** | 81.4 | 68.3 | 0.05 |
| | | | | **31** | 71.1 | 48 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Decatur**

Recorded at
Bartley Farms
Dowagiac, Michigan
2021

| 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** | 81.7 | 58.9 | 0 | **1** | 76 | 57.2 | 0 | **1** | 81.7 | 57.9 | 0 |
| **2** | 77 | 55.2 | 0 | **2** | 79.7 | 50.1 | 0 | **2** | 83.2 | 49.8 | 0 |
| **3** | 81.1 | 54.3 | 0 | **3** | 83.1 | 49.8 | 0 | **3** | 79 | 50.8 | 0 |
| **4** | 86.1 | 68.3 | 0 | **4** | 87.5 | 52.6 | 0 | **4** | 74.1 | 62.7 | 0.01 |
| **5** | 89.2 | 69.3 | 0 | **5** | 85.8 | 55.4 | 0 | **5** | 79.7 | 55.3 | 0 |
| **6** | 89.9 | 72.5 | 0 | **6** | 82.7 | 58 | 1.12 | **6** | 80.1 | 53 | 0 |
| **7** | 84.3 | 60.9 | 0.28 | **7** | 86.1 | 65.4 | 0.22 | **7** | 86.3 | 51.9 | 2.86 |
| **8** | 70.4 | 60.4 | 0 | **8** | 87.5 | 68.8 | 0 | **8** | 76.7 | 54.5 | 0 |
| **9** | 78.2 | 57.7 | 0 | **9** | 81.8 | 71.7 | 0 | **9** | 75.1 | 50.1 | 0.01 |
| **10** | 76.4 | 53 | 0.01 | **10** | 91.1 | 69.2 | 1.57 | **10** | 81 | 48.2 | 0 |
| **11** | 72.8 | 64.6 | 0.02 | **11** | 84.6 | 68.3 | 0.03 | **11** | 83.2 | 54.1 | 0 |
| **12** | 80.6 | 65.1 | 0 | **12** | 85.3 | 69.9 | 0.04 | **12** | 85.4 | 68.8 | 0 |
| **13** | 76.5 | 65.8 | 0.85 | **13** | 82.8 | 59.3 | 0 | **13** | 87.6 | 66.2 | 0 |
| **14** | 83.4 | 64.1 | 0 | **14** | 82.4 | 55.2 | 0 | **14** | 87 | 63.4 | 0 |
| **15** | 79.2 | 67.9 | 0 | **15** | 80.8 | 51 | 0 | **15** | 78.3 | 51.6 | 0 |
| **16** | 78.4 | 66.1 | 0.91 | **16** | 84.2 | 52.3 | 0 | **16** | 82.5 | 46.4 | 0 |
| **17** | 83.3 | 65.2 | 0.03 | **17** | 85.6 | 59.3 | 0 | **17** | 87.8 | 53.4 | 0 |
| **18** | 85.1 | 60 | 0 | **18** | 88.3 | 65.4 | 0 | **18** | 86.8 | 60.1 | 0 |
| **19** | 84.8 | 57.9 | 0 | **19** | 92.9 | 63.8 | 0 | **19** | 89.4 | 59.4 | 0 |
| **20** | 83.9 | 57.6 | 0 | **20** | 90.4 | 64.5 | 0 | **20** | 80.2 | 65.5 | 0.17 |
| **21** | 82.8 | 60.4 | 0 | **21** | 88.9 | 64.9 | 0 | **21** | 72.7 | 57.1 | 0.46 |
| **22** | 82.8 | 56.7 | 0 | **22** | 86.6 | 63.3 | 0 | **22** | 60.6 | 52.8 | 0.14 |
| **23** | 87.5 | 67.9 | 0.82 | **23** | 88 | 58 | 0 | **23** | 56 | 46.1 | 0.44 |
| **24** | 88.2 | 71.8 | 0 | **24** | 93.7 | 66.7 | 1.21 | **24** | 76.3 | 46.2 | 0 |
| **25** | 89.8 | 64.8 | 0 | **25** | 93.1 | 67 | 0.08 | **25** | 67 | 49 | 0.4 |
| **26** | 93.2 | 59.3 | 0 | **26** | 89.2 | 68.9 | 0.13 | **26** | 80.3 | 52.5 | 0 |
| **27** | 89.8 | 61.6 | 0 | **27** | 92.5 | 67.4 | 0 | **27** | 82.7 | 59.7 | 0 |
| **28** | 90.4 | 65.2 | 0 | **28** | 91.3 | 70.2 | 0 | **28** | 79.3 | 49.5 | 0 |
| **29** | 82.2 | 67.4 | 0.46 | **29** | 89.5 | 70.4 | 0.04 | **29** | 83.9 | 45.5 | 0 |
| **30** | 75.7 | 57 | 0 | **30** | 86.6 | 59.6 | 0 | **30** | 79.4 | 45.8 | 0 |
| **31** | 77.9 | 51.4 | 0 | **31** | 85.5 | 55.7 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Fennville & Hamilton**

Recorded at
MSU Trevor Nichols Research Center
Fennville, Michigan
2021

| 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** | 34.2 | 25.1 | 0 | **1** | 74.3 | 30 | 0 | **1** | 71.5 | 43.3 | 0 |
| **2** | 43.4 | 16.2 | 0 | **2** | 79.1 | 63.8 | 0 | **2** | 79.4 | 46.9 | 0 |
| **3** | 61.9 | 30 | 0 | **3** | 65.7 | 56.7 | 0.05 | **3** | 78.3 | 49.1 | 0 |
| **4** | 71.5 | 32.3 | 0 | **4** | 62.3 | 41.3 | 0.03 | **4** | 83.3 | 62.3 | 0 |
| **5** | 68.8 | 52.3 | 0.05 | **5** | 48.7 | 35.9 | 0 | **5** | 84.7 | 69.8 | 0 |
| **6** | 75.7 | 52.5 | 0 | **6** | 46.4 | 34 | 0.32 | **6** | 85.9 | 70.7 | 0 |
| **7** | 77.5 | 53.3 | 0 | **7** | 49.8 | 30.6 | 0 | **7** | 75.5 | 66.1 | 0.1 |
| **8** | 71.9 | 48.5 | 0.71 | **8** | 49.9 | 33.4 | 0 | **8** | 84.3 | 63.3 | 0 |
| **9** | 64.9 | 46.5 | 0.03 | **9** | 55.8 | 36.5 | 0 | **9** | 84.7 | 64.9 | 0 |
| **10** | 67.3 | 40.5 | 0.59 | **10** | 47.7 | 36.7 | 0 | **10** | 87.5 | 66.5 | 0 |
| **11** | 55.7 | 43.7 | 0.01 | **11** | 49.6 | 32.1 | 0 | **11** | 87.9 | 64.6 | 0 |
| **12** | 58.5 | 40.6 | 0 | **12** | 58.7 | 28.6 | 0 | **12** | 87.5 | 62 | 0 |
| **13** | 50.5 | 34.1 | 0 | **13** | 61.7 | 29.6 | 0 | **13** | 82.1 | 59.6 | 0 |
| **14** | 43.4 | 35.1 | 0 | **14** | 65.4 | 32.9 | 0 | **14** | 74.3 | 58.9 | 0 |
| **15** | 43.3 | 36.3 | 0.01 | **15** | 68.8 | 40.2 | 0.02 | **15** | 72 | 54.2 | 0 |
| **16** | 41.9 | 32.3 | 0 | **16** | 68.6 | 50.3 | 0 | **16** | 74.6 | 47.1 | 0 |
| **17** | 51.1 | 29.1 | 0 | **17** | 70.1 | 46.7 | 0 | **17** | 82.3 | 42.7 | 0 |
| **18** | 57.1 | 28.9 | 0 | **18** | 79.9 | 47 | 0 | **18** | 78.5 | 62.9 | 1.12 |
| **19** | 51.3 | 39.2 | 0.13 | **19** | 77.9 | 61.2 | 0.02 | **19** | 79.6 | 59.7 | 0.57 |
| **20** | 39.6 | 30.9 | 0 | **20** | 82 | 60.4 | 0 | **20** | 81.3 | 56.2 | 0.27 |
| **21** | 40.8 | 24.7 | 0 | **21** | 82.4 | 60.6 | 0 | **21** | 67.5 | 48.6 | 0.25 |
| **22** | 46.9 | 25.2 | 0 | **22** | 80.9 | 61.4 | 0 | **22** | 67.1 | 41.1 | 0 |
| **23** | 57.1 | 35 | 0 | **23** | 73.9 | 60.8 | 0 | **23** | 70.7 | 52.4 | 0.01 |
| **24** | 53.7 | 40 | 0 | **24** | 82.6 | 55.1 | 0 | **24** | 74.9 | 60.7 | 1.86 |
| **25** | 47.3 | 35.2 | 0 | **25** | 82.2 | 65.9 | 0 | **25** | 73 | 66 | 0.73 |
| **26** | 68.5 | 35.2 | 0 | **26** | 72.3 | 55.1 | 1.03 | **26** | 76.2 | 66 | 3.94 |
| **27** | 75.6 | 53.8 | 0 | **27** | 61.8 | 44.7 | 0.11 | **27** | 78.7 | 62.5 | 0 |
| **28** | 66.3 | 41.1 | 0 | **28** | 51.2 | 40.6 | 0.04 | **28** | 81.7 | 60.7 | 0.48 |
| **29** | 54 | 41.8 | 0.19 | **29** | 65.5 | 35.7 | 0 | **29** | 78.4 | 68.8 | 0.1 |
| **30** | 49.1 | 32.7 | 0 | **30** | 63.8 | 34.1 | 0 | **30** | 76.7 | 65.7 | 0 |
| | | | | **31** | 68.1 | 44.9 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Fennville & Hamilton**

Recorded at
MSU Trevor Nichols Research Center
Fennville, Michigan
2021

| 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** | 74.5 | 60.2 | 0.01 | **1** | 71.1 | 59.3 | 0 | **1** | 81.4 | 57.5 | 0 |
| **2** | 70.6 | 54.2 | 0 | **2** | 74.2 | 50.5 | 0 | **2** | 79.6 | 48.5 | 0 |
| **3** | 74.8 | 53.4 | 0 | **3** | 76.3 | 50.3 | 0 | **3** | 78.9 | 53 | 0 |
| **4** | 78.9 | 66.1 | 0 | **4** | 79.3 | 54.4 | 0 | **4** | 72.4 | 64.5 | 0.07 |
| **5** | 85.2 | 72 | 0 | **5** | 81.1 | 56.1 | 0 | **5** | 76.4 | 57 | 0 |
| **6** | 84.2 | 75.8 | 0 | **6** | 78.7 | 60.6 | 0.56 | **6** | 74.5 | 52.7 | 0 |
| **7** | 82 | 67.1 | 0.02 | **7** | 81.1 | 65.5 | 0 | **7** | 83.9 | 52.8 | 0 |
| **8** | 67.7 | 61 | 0.01 | **8** | 87.6 | 69.2 | 0.01 | **8** | 73.8 | 59.2 | 0.01 |
| **9** | 73.9 | 56.1 | 0 | **9** | 80.7 | 69.8 | 0.23 | **9** | 71.7 | 48.8 | 0 |
| **10** | 77.7 | 51.4 | 0.01 | **10** | 88.4 | 70.1 | 0.31 | **10** | 75.2 | 48.2 | 0 |
| **11** | 72.4 | 64.2 | 0 | **11** | 85.2 | 67.6 | 0.68 | **11** | 82.2 | 55.5 | 0 |
| **12** | 75.8 | 63.9 | 0 | **12** | 81.9 | 70.3 | 0.23 | **12** | 77.7 | 66.8 | 0 |
| **13** | 73.1 | 65.8 | 0 | **13** | 79 | 60.9 | 0 | **13** | 76.7 | 63.2 | 0 |
| **14** | 80 | 65.8 | 0 | **14** | 81.2 | 54.9 | 0 | **14** | 83.1 | 63.8 | 0 |
| **15** | 77.5 | 62.1 | 0 | **15** | 81.8 | 51.2 | 0 | **15** | 75.1 | 51.1 | 0 |
| **16** | 73.6 | 60.9 | 0.01 | **16** | 80.4 | 52.9 | 0 | **16** | 79.4 | 46.9 | 0 |
| **17** | 80.4 | 61.8 | 0 | **17** | 82.9 | 58.9 | 0 | **17** | 82.8 | 56.8 | 0 |
| **18** | 84 | 56 | 0 | **18** | 88.5 | 62 | 0 | **18** | 84.5 | 61.2 | 0 |
| **19** | 79.8 | 57 | 0 | **19** | 87.5 | 63.8 | 0 | **19** | 87.3 | 57.9 | 0 |
| **20** | 77.7 | 60.4 | 0 | **20** | 86.4 | 63.4 | 0 | **20** | 78.7 | 66.2 | 0 |
| **21** | 77.8 | 58.6 | 0 | **21** | 88.4 | 67.9 | 0 | **21** | 72.6 | 56.9 | 0.13 |
| **22** | 77.7 | 56.1 | 0 | **22** | 84.6 | 62.1 | 0 | **22** | 62.7 | 52.9 | 0.07 |
| **23** | 82.7 | 68.4 | 0.44 | **23** | 83.5 | 58.4 | 0 | **23** | 55.5 | 47.4 | 0.28 |
| **24** | 85.7 | 68.4 | 0.03 | **24** | 88.9 | 66.2 | 0.31 | **24** | 74 | 43.2 | 0 |
| **25** | 82.5 | 62.7 | 0 | **25** | 84.5 | 68.1 | 0 | **25** | 67.9 | 50.7 | 0.27 |
| **26** | 84.9 | 59.8 | 0 | **26** | 88.3 | 68.4 | 0 | **26** | 75.9 | 49.5 | 0 |
| **27** | 81.1 | 65.5 | 0 | **27** | 88.2 | 68.3 | 0 | **27** | 74 | 59.8 | 0 |
| **28** | 87.8 | 65 | 0 | **28** | 89.3 | 70.8 | 0 | **28** | 73.8 | 50.8 | 0 |
| **29** | 79 | 66 | 0.28 | **29** | 88 | 71.4 | 0 | **29** | 77.5 | 46.5 | 0 |
| **30** | 74.2 | 55.8 | 0 | **30** | 80.1 | 59.7 | 0 | **30** | 76.2 | 47.9 | 0 |
| **31** | 73.1 | 49.2 | 0 | **31** | 84 | 55.2 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Hart**

Recorded at
MSU Asparagus Research Farm
Hart, Michigan
2021

| APRIL | | | | MAY | | | | JUNE | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. |
| **1** | 33.9 | 18 | 0 | **1** | 68.6 | 29.9 | 0 | **1** | 71.5 | 44.9 | 0 |
| **2** | 42.4 | 15.3 | 0 | **2** | 77.3 | 57.9 | 0.17 | **2** | 76.7 | 50.1 | 0 |
| **3** | 57.4 | 29.9 | 0 | **3** | 60.9 | 50.3 | 1.03 | **3** | 78.4 | 47.4 | 0 |
| **4** | 70.2 | 33 | 0 | **4** | 52.6 | 42.1 | 0.27 | **4** | 82.8 | 62.2 | 0 |
| **5** | 68.8 | 46.7 | 0.61 | **5** | 52.7 | 38.7 | 0 | **5** | 83.4 | 66 | 0 |
| **6** | 76.2 | 57.1 | 0.01 | **6** | 53.3 | 35.1 | 0.12 | **6** | 84.1 | 66.5 | 0 |
| **7** | 75.8 | 56.1 | 0 | **7** | 47.4 | 32.2 | 0 | **7** | 76.8 | 69.2 | 0 |
| **8** | 73.7 | 52.1 | 0.71 | **8** | 49 | 28.4 | 0 | **8** | 84.5 | 66.2 | 0.77 |
| **9** | 56.5 | 47.4 | 0 | **9** | 57.9 | 30.9 | 0 | **9** | 86.4 | 64.8 | 0 |
| **10** | 64.8 | 41.5 | 0.46 | **10** | 49.4 | 29.2 | 0 | **10** | 86.3 | 64.9 | 0 |
| **11** | 57.3 | 43.6 | 0.32 | **11** | 52.4 | 32.2 | 0 | **11** | 85.5 | 62.5 | 0 |
| **12** | 58.6 | 38.7 | 0 | **12** | 57.5 | 27.4 | 0 | **12** | 81.5 | 60.7 | 0 |
| **13** | 49.4 | 38.1 | 0 | **13** | 64.1 | 28.6 | 0 | **13** | 81.1 | 55.5 | 0 |
| **14** | 41.3 | 35.5 | 0 | **14** | 68.3 | 35.8 | 0 | **14** | 73.8 | 55.2 | 0 |
| **15** | 42.2 | 35.9 | 0.05 | **15** | 68 | 44.6 | 0 | **15** | 74.5 | 51.8 | 0 |
| **16** | 47.5 | 33.6 | 0 | **16** | 65.6 | 46.2 | 0 | **16** | 70.7 | 41 | 0 |
| **17** | 48.7 | 27.9 | 0 | **17** | 74.6 | 43.9 | 0 | **17** | 80.3 | 44.7 | 0 |
| **18** | 56.2 | 26.4 | 0 | **18** | 74.8 | 60 | 0.08 | **18** | 81.6 | 62 | 0.51 |
| **19** | 49.6 | 33.8 | 0.22 | **19** | 73.9 | 60.1 | 0.1 | **19** | 72.8 | 56.1 | 0.27 |
| **20** | 39.2 | 27.6 | 0 | **20** | 80.9 | 61 | 0 | **20** | 78.8 | 52.8 | 0 |
| **21** | 40 | 21.7 | 0 | **21** | 79.9 | 62.9 | 0 | **21** | 68.5 | 43.1 | 0 |
| **22** | 46.8 | 27.1 | 0 | **22** | 80.3 | 64.7 | 0.25 | **22** | 66.8 | 39.8 | 0 |
| **23** | 58.9 | 37.3 | 0 | **23** | 69.1 | 54.3 | 0.02 | **23** | 71.2 | 49.2 | 0 |
| **24** | 57.4 | 36.7 | 0 | **24** | 78.8 | 49.6 | 0.3 | **24** | 70.1 | 60.2 | 0.55 |
| **25** | 43.2 | 31.8 | 0 | **25** | 80 | 64.8 | 0 | **25** | 73.3 | 65 | 1.42 |
| **26** | 55.4 | 36.1 | 0 | **26** | 69.4 | 48.9 | 0.73 | **26** | 77.3 | 65.7 | 0.21 |
| **27** | 70.8 | 49.1 | 0 | **27** | 52.6 | 37.9 | 0.39 | **27** | 74.8 | 59.7 | 0.26 |
| **28** | 57.4 | 42.9 | 0 | **28** | 58.2 | 39.9 | 0.12 | **28** | 79.2 | 58.7 | 0 |
| **29** | 58.7 | 44.9 | 0.07 | **29** | 63.8 | 32.8 | 0 | **29** | 76.7 | 65.7 | 0.01 |
| **30** | 50.5 | 33 | 0.04 | **30** | 65.7 | 35.7 | 0 | **30** | 78.1 | 64.7 | 0 |
| | | | | **31** | 70 | 48 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Hart**

Recorded at
MSU Asparagus Research Farm
Hart, Michigan
2021

| JULY | | | | AUGUST | | | | SEPTEMBER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. |
| **1** | 75.4 | 56.9 | 0 | **1** | 72.2 | 54.8 | 0 | **1** | 77.2 | 54.5 | 0 |
| **2** | 69.5 | 50.1 | 0 | **2** | 73.9 | 48.5 | 0 | **2** | 74.3 | 47 | 0 |
| **3** | 82.3 | 52 | 0 | **3** | 79 | 53.4 | 0 | **3** | 71.9 | 55.1 | 0.04 |
| **4** | 85 | 62.8 | 0 | **4** | 81.2 | 55.8 | 0 | **4** | 70.4 | 61.2 | 0.05 |
| **5** | 84.2 | 69.7 | 0.02 | **5** | 81.9 | 57.8 | 0 | **5** | 73.5 | 57.4 | 0.01 |
| **6** | 89.1 | 66.3 | 0.06 | **6** | 78.6 | 64.6 | 0 | **6** | 70.2 | 51 | 0 |
| **7** | 73.1 | 65.4 | 0.02 | **7** | 82.9 | 61.5 | 0.13 | **7** | 76.7 | 52.6 | 0.26 |
| **8** | 66.1 | 59 | 0 | **8** | 83.8 | 67.1 | 0.85 | **8** | 68.8 | 53.8 | 0 |
| **9** | 72.2 | 46.3 | 0 | **9** | 77.8 | 69.3 | 1.12 | **9** | 69.8 | 51.9 | 0 |
| **10** | 77.2 | 45 | 0 | **10** | 83.3 | 68.1 | 0.35 | **10** | 75.8 | 51.1 | 0 |
| **11** | 76.9 | 55.3 | 0 | **11** | 84.7 | 66.7 | 0.09 | **11** | 76.6 | 57.6 | 0 |
| **12** | 79.6 | 55.7 | 0 | **12** | 81.9 | 65.1 | 0 | **12** | 72.7 | 59.2 | 0.33 |
| **13** | 75.4 | 64.1 | 2.07 | **13** | 78.2 | 62.2 | 0 | **13** | 68.1 | 56.2 | 0.21 |
| **14** | 82 | 64 | 0.09 | **14** | 75.7 | 51.3 | 0 | **14** | 77.7 | 62.2 | 0 |
| **15** | 73.2 | 60.7 | 0.29 | **15** | 77.2 | 53.7 | 0 | **15** | 70.4 | 51.8 | 0 |
| **16** | 76.8 | 56.9 | 0 | **16** | 81 | 54.7 | 0 | **16** | 75.9 | 49.4 | 0 |
| **17** | 80.9 | 56.1 | 0 | **17** | 80.5 | 53.9 | 0 | **17** | 80.3 | 56.3 | 0 |
| **18** | 80.7 | 57 | 0 | **18** | 84.8 | 60.3 | 0 | **18** | 76.2 | 48.8 | 0 |
| **19** | 80 | 57.7 | 0 | **19** | 84.5 | 60.3 | 0 | **19** | 81.9 | 52.5 | 0 |
| **20** | 76.4 | 62.4 | 0 | **20** | 85.4 | 60.6 | 0 | **20** | 76.4 | 64.1 | 0.02 |
| **21** | 75.9 | 55.3 | 0 | **21** | 86.3 | 68.3 | 0 | **21** | 73.9 | 56 | 0.22 |
| **22** | 78.9 | 55.1 | 0 | **22** | 79.2 | 58.7 | 0 | **22** | 63.8 | 52.8 | 0 |
| **23** | 83.8 | 64.8 | 2.08 | **23** | 83.8 | 54.1 | 0 | **23** | 54.8 | 48.8 | 0.41 |
| **24** | 81 | 69.9 | 0.01 | **24** | 88.3 | 64 | 0.9 | **24** | 70.7 | 43.3 | 0.17 |
| **25** | 83.6 | 60.8 | 0 | **25** | 85.6 | 67.5 | 0 | **25** | 64.3 | 48.4 | 0.19 |
| **26** | 85 | 60.5 | 0 | **26** | 84.5 | 66.6 | 0 | **26** | 71.7 | 47.8 | 0 |
| **27** | 81.1 | 66.4 | 0 | **27** | 83.6 | 67.2 | 0.88 | **27** | 74.4 | 52.4 | 0 |
| **28** | 83.1 | 60.2 | 0.01 | **28** | 85.4 | 68.8 | 0.13 | **28** | 70.4 | 43 | 0 |
| **29** | 80.9 | 63.3 | 0.1 | **29** | 83.3 | 70.1 | 0.06 | **29** | 73.7 | 47.3 | 0 |
| **30** | 71.2 | 51.8 | 0 | **30** | 78.4 | 61.1 | 0 | **30** | 76.5 | 49.9 | 0 |
| **31** | 75.9 | 50.3 | 0 | **31** | 75.2 | 59.7 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Hudsonville**

Recorded at
Michigan Celery Cooperative
Hudsonville, Michigan
2021

| 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** | 40.8 | 22.5 | 0 | **1** | 75 | 31.1 | 0 | **1** | 75.5 | 47.8 | 0 |
| **2** | 45.8 | 14.9 | 0 | **2** | 80.4 | 62.8 | 0 | **2** | 79.1 | 48.2 | 0 |
| **3** | 62.3 | 33.4 | 0 | **3** | 67 | 57.1 | 0.09 | **3** | 81.1 | 49.6 | 0 |
| **4** | 71.4 | 31.4 | 0 | **4** | 62.2 | 41.5 | 0.06 | **4** | 86 | 63.8 | 0 |
| **5** | 68.6 | 48.7 | 0.08 | **5** | 55.5 | 38.3 | 0 | **5** | 86.7 | 67.9 | 0 |
| **6** | 77.7 | 54.6 | 0.01 | **6** | 48.3 | 33.8 | 0.21 | **6** | 87.8 | 70.4 | 0 |
| **7** | 79.2 | 55.1 | 0.04 | **7** | 51.9 | 29.7 | 0 | **7** | 78 | 66.8 | 0.22 |
| **8** | 72.4 | 50.9 | 0.59 | **8** | 52.3 | 28.8 | 0 | **8** | 86.2 | 64.5 | 0.37 |
| **9** | 64.9 | 48.2 | 0 | **9** | 61.8 | 33 | 0 | **9** | 87.3 | 68.8 | 1.04 |
| **10** | 69.1 | 41.4 | 1.01 | **10** | 52.6 | 35.1 | 0 | **10** | 87.6 | 67 | 0.01 |
| **11** | 58.4 | 45.6 | 0.03 | **11** | 56.5 | 28 | 0 | **11** | 89.3 | 67.6 | 0 |
| **12** | 59.2 | 41.1 | 0 | **12** | 62.2 | 27.7 | 0 | **12** | 89.6 | 64.7 | 0 |
| **13** | 52.6 | 35.7 | 0 | **13** | 66.2 | 28.6 | 0 | **13** | 82.2 | 62.4 | 0 |
| **14** | 46.1 | 30.6 | 0 | **14** | 71.1 | 32.5 | 0 | **14** | 79.3 | 58.4 | 0 |
| **15** | 44.9 | 30.6 | 0.02 | **15** | 70.6 | 40.3 | 0.17 | **15** | 78.7 | 52.1 | 0 |
| **16** | 51.1 | 34.4 | 0 | **16** | 72.1 | 50.4 | 0.03 | **16** | 76.4 | 46.3 | 0 |
| **17** | 57.1 | 29.9 | 0 | **17** | 76.5 | 47.3 | 0 | **17** | 82.8 | 45.4 | 0 |
| **18** | 59.3 | 28.4 | 0 | **18** | 77.6 | 63.4 | 0.11 | **18** | 80.6 | 63.6 | 0.98 |
| **19** | 51.4 | 38 | 0.14 | **19** | 78.4 | 64 | 0.03 | **19** | 74.2 | 62.1 | 0.26 |
| **20** | 40.7 | 30.1 | 0 | **20** | 86.1 | 61.1 | 0 | **20** | 82.1 | 57.1 | 0.06 |
| **21** | 43.6 | 25.8 | 0 | **21** | 85 | 62.4 | 0 | **21** | 67.9 | 47.6 | 0.21 |
| **22** | 47.2 | 23 | 0 | **22** | 84.1 | 63.2 | 0 | **22** | 67.5 | 40.8 | 0 |
| **23** | 60.1 | 32.4 | 0 | **23** | 74.2 | 53.8 | 0.05 | **23** | 71.7 | 49.8 | 0.05 |
| **24** | 54.5 | 39.5 | 0 | **24** | 83.9 | 52.8 | 0 | **24** | 71.6 | 62.6 | 1.23 |
| **25** | 49.3 | 34.4 | 0 | **25** | 84.4 | 67.3 | 0 | **25** | 72.5 | 66.3 | 0.98 |
| **26** | 64.8 | 37.1 | 0 | **26** | 73.5 | 57.3 | 0.88 | **26** | 76.9 | 66 | 1.94 |
| **27** | 75.1 | 50.8 | 0 | **27** | 59.4 | 44.6 | 0.07 | **27** | 79 | 62.9 | 0 |
| **28** | 64.5 | 43.2 | 0 | **28** | 52.3 | 39.3 | 0.1 | **28** | 81.8 | 60.2 | 0.61 |
| **29** | 59.5 | 43.4 | 0.06 | **29** | 65 | 32.6 | 0 | **29** | 80.8 | 69.5 | 0.02 |
| **30** | 54.5 | 34.1 | 0.01 | **30** | 68.6 | 34.7 | 0 | **30** | 79.3 | 65.8 | 0 |
| | | | | **31** | 71.8 | 44.8 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Hudsonville**

Recorded at
Michigan Celery Cooperative
Hudsonville, Michigan
2021

| 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** | 80.5 | 61.3 | 0 | **1** | 75.8 | 56.9 | 0.09 | **1** | 80.4 | 57.4 | 0 |
| **2** | 76.3 | 53 | 0 | **2** | 77.3 | 51.3 | 0 | **2** | 80.1 | 48.4 | 0 |
| **3** | 78.9 | 53 | 0 | **3** | 79.1 | 50.8 | 0 | **3** | 78.2 | 51.9 | 0 |
| **4** | 83.1 | 63.4 | 0 | **4** | 81.6 | 57.1 | 0 | **4** | 74 | 64.8 | 0 |
| **5** | 86.1 | 66.9 | 0 | **5** | 82.1 | 55.2 | 0 | **5** | 79.7 | 53.2 | 0.09 |
| **6** | 85.9 | 70.6 | 0 | **6** | 79.6 | 64.5 | 0.52 | **6** | 75 | 52.4 | 0.08 |
| **7** | 83.8 | 68.6 | 0 | **7** | 83.8 | 62.9 | 0 | **7** | 85.6 | 51.3 | 0.05 |
| **8** | 72.9 | 62.7 | 0.11 | **8** | 87.8 | 68.6 | 0.04 | **8** | 75.2 | 54.6 | 0 |
| **9** | 77.1 | 55.7 | 0 | **9** | 81.6 | 70.6 | 0.04 | **9** | 75.3 | 48.5 | 0 |
| **10** | 77.2 | 50 | 0 | **10** | 86.9 | 69.8 | 0.39 | **10** | 78.8 | 48.5 | 0 |
| **11** | 74.5 | 65.5 | 0 | **11** | 83.9 | 67.7 | 0.82 | **11** | 83 | 58.7 | 0 |
| **12** | 73.5 | 63.9 | 0 | **12** | 83.8 | 69 | 0 | **12** | 81.9 | 65.1 | 0 |
| **13** | 77.3 | 65.4 | 0.06 | **13** | 80.2 | 60.5 | 0 | **13** | 71.9 | 60.6 | 0.85 |
| **14** | 81.8 | 63.9 | 0 | **14** | 80.8 | 53 | 0 | **14** | 83.5 | 58.6 | 0.24 |
| **15** | 77.4 | 61.8 | 0.07 | **15** | 80.3 | 51.8 | 0 | **15** | 76.8 | 54.1 | 0 |
| **16** | 73.8 | 59.1 | 0.03 | **16** | 79 | 53.8 | 0 | **16** | 80.4 | 49.5 | 0 |
| **17** | 81.9 | 61.3 | 0 | **17** | 83.8 | 57.9 | 0 | **17** | 84.1 | 58 | 0 |
| **18** | 85.2 | 54.5 | 0 | **18** | 86.7 | 62.8 | 0 | **18** | 79.5 | 63 | 0 |
| **19** | 82.6 | 57.7 | 0 | **19** | 88.9 | 63.6 | 0 | **19** | 85.9 | 55.3 | 0 |
| **20** | 82.6 | 59.9 | 0 | **20** | 87.6 | 63.2 | 0 | **20** | 78.4 | 66.6 | 0.01 |
| **21** | 80 | 59.8 | 0 | **21** | 88.2 | 68.5 | 0 | **21** | 73.2 | 56 | 0.21 |
| **22** | 81.1 | 56.5 | 0 | **22** | 85.2 | 63.1 | 0 | **22** | 62.6 | 52.4 | 0.04 |
| **23** | 84.8 | 67.3 | 1.28 | **23** | 82.9 | 57.3 | 0 | **23** | 55.8 | 46.5 | 0.73 |
| **24** | 86.7 | 69.4 | 0.8 | **24** | 90.6 | 65.3 | 0.06 | **24** | 73.9 | 44.2 | 0 |
| **25** | 84.3 | 63.3 | 0 | **25** | 87 | 65.4 | 0 | **25** | 67.7 | 49.6 | 0.15 |
| **26** | 86.2 | 59.9 | 0 | **26** | 90.2 | 67.5 | 0 | **26** | 76.3 | 48.6 | 0 |
| **27** | 83 | 65.8 | 0 | **27** | 87.7 | 68.5 | 0 | **27** | 77.2 | 58.2 | 0 |
| **28** | 87 | 63.8 | 0 | **28** | 91.2 | 73.5 | 0 | **28** | 73.3 | 49.8 | 0 |
| **29** | 84.2 | 67 | 0.16 | **29** | 89.3 | 72 | 0 | **29** | 79.2 | 48.2 | 0 |
| **30** | 75.3 | 55.2 | 0 | **30** | 83.4 | 60.4 | 0 | **30** | 77.8 | 48 | 0 |
| **31** | 75.2 | 49.9 | 0 | **31** | 82.7 | 56.6 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Momence**

Recorded at
Stelle, Illinois Climate Network Station
Stelle, Illinois
2021

| 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** | 41.4 | 20.8 | 0 | **1** | 82.8 | 39.9 | 0 | **1** | 75.5 | 44.6 | 0 |
| **2** | 50.7 | 17.8 | 0 | **2** | 80.8 | 53.7 | 0.01 | **2** | 77.1 | 55.9 | 0 |
| **3** | 70.9 | 29.3 | 0 | **3** | 70 | 57.2 | 0.1 | **3** | 84.9 | 52.8 | 0 |
| **4** | 75.7 | 37.1 | 0 | **4** | 60.4 | 44.8 | 0 | **4** | 88.6 | 64.2 | 0 |
| **5** | 79.8 | 50.9 | 0 | **5** | 63.4 | 41.7 | 0 | **5** | 90.1 | 58.2 | 0 |
| **6** | 80.8 | 47.6 | 0 | **6** | 56.2 | 40.1 | 0.06 | **6** | 86 | 60.6 | 0 |
| **7** | 79.9 | 49.1 | 0.02 | **7** | 65.1 | 33.5 | 0 | **7** | 80.1 | 66.4 | 2.06 |
| **8** | 62.6 | 49.6 | 0.43 | **8** | 57.7 | 30.7 | 0.36 | **8** | 85.4 | 63.1 | 0.02 |
| **9** | 67.8 | 48.6 | 0 | **9** | 53.4 | 36.5 | 1.59 | **9** | 85.9 | 65 | 0 |
| **10** | 63.8 | 44.5 | 0.44 | **10** | 60.9 | 32.9 | 0.35 | **10** | 87.7 | 67.8 | 0 |
| **11** | 55.3 | 44.5 | 0.12 | **11** | 57.1 | 38.1 | 0 | **11** | 90.4 | 68 | 0 |
| **12** | 61 | 38.2 | 0 | **12** | 60.7 | 35.7 | 0 | **12** | 93.5 | 67.6 | 0.71 |
| **13** | 56.6 | 37.6 | 0 | **13** | 67.2 | 34.8 | 0 | **13** | 85.2 | 65.6 | 0 |
| **14** | 53 | 30.7 | 0 | **14** | 70.3 | 42.7 | 0 | **14** | 81.1 | 58.6 | 0 |
| **15** | 58 | 34.4 | 0 | **15** | 63.1 | 46.2 | 0.02 | **15** | 81.1 | 55.9 | 0 |
| **16** | 62 | 30.8 | 0 | **16** | 70.1 | 51.7 | 0.02 | **16** | 80.8 | 53.5 | 0 |
| **17** | 59.9 | 36.3 | 0 | **17** | 63.8 | 56.2 | 0.31 | **17** | 87.2 | 53.3 | 0 |
| **18** | 63.4 | 32.4 | 0 | **18** | 69.9 | 57.2 | 0.12 | **18** | 89.4 | 69.4 | 0.01 |
| **19** | 57.6 | 37.8 | 0 | **19** | 73.5 | 62 | 0.09 | **19** | 83.7 | 66.3 | 0.4 |
| **20** | 39 | 32.1 | 0.4 | **20** | 82.7 | 63.8 | 0 | **20** | 85.6 | 65.1 | 0.18 |
| **21** | 47.7 | 29.7 | 0 | **21** | 84.5 | 59.9 | 0 | **21** | 70.9 | 51.9 | 0.06 |
| **22** | 58.1 | 28.2 | 0 | **22** | 85.1 | 62.4 | 0 | **22** | 74.4 | 45.4 | 0 |
| **23** | 59.1 | 32.6 | 0 | **23** | 81.3 | 64.9 | 0.01 | **23** | 78.4 | 57.4 | 0.17 |
| **24** | 57.4 | 46.9 | 0.17 | **24** | 88.7 | 61 | 0 | **24** | 75.9 | 59.7 | 2 |
| **25** | 58.9 | 37.5 | 0 | **25** | 86 | 64.5 | 0.03 | **25** | 82.2 | 69.3 | 1.7 |
| **26** | 77.4 | 33.8 | 0 | **26** | 80.7 | 61.5 | 0.48 | **26** | 83.3 | 69.3 | 1.32 |
| **27** | 85.2 | 49.3 | 0 | **27** | 72.2 | 55.2 | 0.15 | **27** | 83.9 | 70.7 | 0.03 |
| **28** | 72.1 | 47.6 | 0.82 | **28** | 55.6 | 45.6 | 0.71 | **28** | 87.7 | 68.4 | 0.16 |
| **29** | 67.3 | 47 | 0.06 | **29** | 60.8 | 43 | 0 | **29** | 87.1 | 68.4 | 0.05 |
| **30** | 61.1 | 39.7 | 0 | **30** | 73 | 39.6 | 0 | **30** | 80 | 68.5 | 0.95 |
| | | | | **31** | 68.1 | 51.9 | 0 | | | | |

**TEMPERATURE AND PRECIPITATION DATA**

**Momence**

Recorded at
Stelle, Illinois Climate Network Station
Stelle, Illinois
2021

| | JULY | | | | AUGUST | | | | SEPTEMBER | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. | Date | High Temp F | Low Temp F | Total Prec. in. |
| **1** | 79.4 | 58.1 | 0 | **1** | 79.3 | 54.6 | 0 | **1** | 77.6 | 58.6 | 0 |
| **2** | 75.2 | 55.6 | 0 | **2** | 80.2 | 53.9 | 0 | **2** | 77.8 | 56.4 | 0 |
| **3** | 80.7 | 53.4 | 0 | **3** | 81.5 | 55.6 | 0 | **3** | 73.5 | 56.4 | 0 |
| **4** | 85.7 | 63.5 | 0 | **4** | 83.9 | 56.2 | 0 | **4** | 70.4 | 61.5 | 0.01 |
| **5** | 87 | 66.2 | 0 | **5** | 83.1 | 54.8 | 0 | **5** | 82.1 | 56.9 | 0 |
| **6** | 86.5 | 67.3 | 0 | **6** | 84.1 | 63.9 | 0.01 | **6** | 84.9 | 56.5 | 0 |
| **7** | 86.1 | 67.8 | 1.11 | **7** | 88 | 63.8 | 0 | **7** | 88.6 | 60.7 | 1.97 |
| **8** | 70.6 | 62.6 | 0.07 | **8** | 88.6 | 68 | 0.67 | **8** | 79.6 | 54.4 | 0 |
| **9** | 74.4 | 59.9 | 0 | **9** | 79.5 | 67.5 | 0.01 | **9** | 76.3 | 52.3 | 0 |
| **10** | 71 | 63 | 0.27 | **10** | 90.7 | 69.4 | 0.52 | **10** | 78.1 | 49.5 | 0 |
| **11** | 69.4 | 65.4 | 0.11 | **11** | 86.8 | 70.7 | 0.16 | **11** | 85.2 | 58.4 | 0 |
| **12** | 77.9 | 65.1 | 0.81 | **12** | 81.8 | 66.1 | 1.03 | **12** | 87.9 | 65.2 | 0 |
| **13** | 79.2 | 65.2 | 0 | **13** | 80.3 | 60.3 | 0.01 | **13** | 88.1 | 64.6 | 0 |
| **14** | 82.9 | 64 | 0 | **14** | 80.4 | 56.5 | 0 | **14** | NA | NA | NA |
| **15** | 80.7 | 67.6 | 0.08 | **15** | 77.2 | 58.6 | 0 | **15** | NA | NA | NA |
| **16** | 75.3 | 64.3 | 0.2 | **16** | 80 | 60.5 | 0 | **16** | 81.7 | 58.7 | 0 |
| **17** | 79.7 | 62.3 | 0 | **17** | 83.2 | 62.6 | 0 | **17** | 88.4 | 58.3 | 0 |
| **18** | 83 | 62.9 | 0.03 | **18** | 88.4 | 67.9 | 0 | **18** | 87.7 | 65.3 | 0 |
| **19** | 84.3 | 62.7 | 0 | **19** | 88.1 | 63.4 | 0 | **19** | 89.6 | 61.8 | 0 |
| **20** | 82.6 | 63.2 | 0 | **20** | 86.3 | 62.7 | 0 | **20** | 81.7 | 68.3 | 0.56 |
| **21** | 78.6 | 63.5 | 0 | **21** | 84.8 | 67.1 | 0.47 | **21** | 73.1 | 57.8 | 0.5 |
| **22** | 85.5 | 62.9 | 0 | **22** | 86.5 | 66.7 | 0 | **22** | 62.4 | 54.1 | 0.23 |
| **23** | 87.1 | 67.7 | 0 | **23** | 84.7 | 62.9 | 0 | **23** | 69 | 44.6 | 0 |
| **24** | 89.7 | 67.6 | 0.67 | **24** | 91.2 | 67.8 | 0.76 | **24** | 78.9 | 44.5 | 0.08 |
| **25** | 85.8 | 66.2 | 0 | **25** | 91.9 | 67.1 | 0.06 | **25** | 70.8 | 45.6 | 0.05 |
| **26** | 89 | 64 | 0 | **26** | 87.1 | 68.2 | 0 | **26** | 81.8 | 46 | 0 |
| **27** | 84.8 | 62.6 | 0 | **27** | 89.7 | 66.8 | 0 | **27** | 88 | 59.7 | 0 |
| **28** | 87 | 66.6 | 0 | **28** | 89.1 | 68 | 0 | **28** | 81.5 | 56.5 | 0 |
| **29** | 87.1 | 66.7 | 0.02 | **29** | 87.7 | 69.8 | 0.05 | **29** | 87 | 56.2 | 0 |
| **30** | 76.8 | 62.9 | 0 | **30** | 85.8 | 66.7 | 0 | **30** | 87.9 | 57.3 | 0 |
| **31** | 76.5 | 60.4 | 0 | **31** | 82.8 | 61.9 | 0 | | | | |

## Impact of Fall Application of Indaziflam on Rye Cover Crop Establishment and Asparagus Crop Safety – 2020-2021

**Project Code: 120-21-1** **Location: Hart, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, & Monique Hemker Mose**
**Crop: Asparagus** **Variety: Guelph Millennium**
**Planting Method: NA** **Planting Date: April 2019**
**Harvest Date: 24 harvests between 5/7/21 – 6/8/21**
**Plant Spacing: 9″** **Row Spacing: 4.5′**
**Tillage Type: NA** **Study Design: RCB** **Replications: 4**
**Plot Size: 5.3 ft wide x 25 ft long**

**Soil Type: Remus Fine Sandy Loam** **OM: 2.1%** **pH: 6.4**
**Sand: 81%** **Silt: 10%** **Clay: 10%** **CEC: 12.1**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| EPRE | 11/05/20 | 11AM-12PM | 63/58 F | Moist | 6 mph | 48% | 40 % | No |

**Crop and Weed Information at Application**

| | | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 11/05/20 | ASPA = Asparagus | Mowed at 10″ | | |
| 11/05/20 | Ryegrass | 2-4″ | | Moderate |
| 11/05/20 | CUDO – Curly Dock | 4–5″/8-10″ dia | | Few |
| 11/05/21 | DAND = Dandelion | 4-5″/8-10″ dia | | Few |
| 11/05/21 | SHPU = Shepherd′s Purse | 10-12″ | Seed head | Few |

**Additional Weeds Observed Throughout Season**

CEPR = Common Evening Primrose
POAM = Powell Amaranth
HOWE = Horseweed
SFGE = Smallflower Geranium
GRASSES = Sandbur, Quackgrass, and Large Crabgrass
TOTAL BL = include overall control of all broadleaf spp.
TOTAL WC = overall control of broadleaves, sedges, and 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. Rye cover crop planted on 09/03/2021 at 168 lb/ac; Fern Mowed on 11/3/2021
4. Poor stand of ryegrass due to late summer application of Solicam.
5. Before first harvest, on 4/26/2021, all the plots were sprayed with glyphosate (2 lb ai/ac), and non-treated plot sprayed with glyphosate (1 lb ai/ac) + Karmex (3 lb ai/ac) + Prowl H2O (3 lb ai/ac).
6. No maintenance herbicide application made after harvest.

# Michigan State University

**Impact of fall application of indaziflam on rye-cover crop establishment and asparagus crop safety-2020-2021**

Trial ID: 120-21-1 Location: Hart, MI Trial Year: 2021

Protocol ID: 120-21-1 Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | % RYE | DAND | CEPR | HOWE | SFGE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | | | | | |
| Rating Date | | | | | | | 20Apr2021 | 20Apr2021 | 20Apr2021 | 20Apr2021 | 20Apr2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Handweeded Check | | | | | | 51 | 14 | 13 | 15 | 8 |
| 2 | Karmex 80WP | 80 | WP | 3 | lb ai/a | FALL | 0 | 38 | 68 | 33 | 71 |
| | Tricor | 75 | DF | 1 | lb ai/a | | | | | | |
| 3 | Alion 200 | 1.67 | SC | 0.011 | lb ai/a | FALL | 65 | 24 | 21 | 33 | 38 |
| 4 | Alion 200 | 1.67 | SC | 0.022 | lb ai/a | FALL | 18 | 40 | 33 | 45 | 38 |
| 5 | Alion 200 | 1.67 | SC | 0.045 | lb ai/a | FALL | 5 | 36 | 38 | 65 | 31 |
| 6 | Alion 200 | 1.67 | SC | 0.067 | lb ai/a | FALL | 1 | 45 | 49 | 79 | 58 |
| 7 | Alion 200 | 1.67 | SC | 0.090 | lb ai/a | FALL | 0 | 40 | 40 | 83 | 29 |
| LSD (P=.05) | | | | | | | 32.83 | 25.78 | 19.84 | 28.93 | 49.96 |
| Standard Deviation | | | | | | | 22.10 | 17.28 | 13.35 | 19.47 | 32.42 |
| CV | | | | | | | 110.5 | 50.98 | 35.95 | 38.81 | 83.57 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | TOTAL WC | TOTAL BL | GRASSES |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | |
| Crop Name | | | | | | | | | |
| Rating Date | | | | | | | 20Apr2021 | 27May2021 | 27May2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | MH, CG | MH, CG |
| 1 | Handweeded Check | | | | | | 10 | 86 | 100 |
| 2 | Karmex 80WP | 80 | WP | 3 | lb ai/a | FALL | 84 | 86 | 99 |
| | Tricor | 75 | DF | 1 | lb ai/a | | | | |
| 3 | Alion 200 | 1.67 | SC | 0.011 | lb ai/a | FALL | 38 | 93 | 100 |
| 4 | Alion 200 | 1.67 | SC | 0.022 | lb ai/a | FALL | 64 | 95 | 100 |
| 5 | Alion 200 | 1.67 | SC | 0.045 | lb ai/a | FALL | 63 | 88 | 100 |
| 6 | Alion 200 | 1.67 | SC | 0.067 | lb ai/a | FALL | 75 | 89 | 99 |
| 7 | Alion 200 | 1.67 | SC | 0.090 | lb ai/a | FALL | 60 | 93 | 100 |
| LSD (P=.05) | | | | | | | 20.49 | 11.15 | 1.81 |
| Standard Deviation | | | | | | | 13.79 | 7.51 | 1.22 |
| CV | | | | | | | 24.61 | 8.36 | 1.22 |

# Impact of Fall Application of Indaziflam on Rye Cover Crop Establishment and Asparagus Crop Safety – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | POAM | TOTAL WC |
| Crop Name | | | | | | | ASPA | | |
| Rating Date | | | | | | | 16Jun2021 | 16Jun2021 | 16Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH, CG | MH, CG | MH, CG |
| 1 | Handweeded Check | | | | | | 0 | 0 | 0 |
| 2 | Karmex 80WP | 80 | WP | 3 | lb ai/a | FALL | 0 | 8 | 19 |
| | Tricor | 75 | DF | 1 | lb ai/a | | | | |
| 3 | Alion 200 | 1.67 | SC | 0.011 | lb ai/a | FALL | 3 | 89 | 86 |
| 4 | Alion 200 | 1.67 | SC | 0.022 | lb ai/a | FALL | 3 | 94 | 90 |
| 5 | Alion 200 | 1.67 | SC | 0.045 | lb ai/a | FALL | 5 | 95 | 90 |
| 6 | Alion 200 | 1.67 | SC | 0.067 | lb ai/a | FALL | 1 | 99 | 91 |
| 7 | Alion 200 | 1.67 | SC | 0.090 | lb ai/a | FALL | 5 | 99 | 93 |
| LSD (P=.05) | | | | | | | 5.71 | 9.43 | 18.53 |
| Standard Deviation | | | | | | | 3.84 | 6.35 | 12.47 |
| CV | | | | | | | 165.62 | 9.21 | 18.63 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | |
| Crop Name | | | | | | | ASPA | ASPA | ASPA | ASPA |
| Rating Date | | | | | | | 07May-08Jun21 | 07May-08Jun21 | 07May-08Jun21 | 07May-08Jun21 |
| Rating Type | | | | | | | TOTAL GOOD | TOTAL GOOD | TOTAL CULL | TOTAL CULL |
| Rating Unit | | | | | | | NO./PLOT | KG/PLOT | NO./PLOT | KG/PLOT |
| Assessed By | | | | | | | | | | |
| 1 | Handweeded Check | | | | | | 63.5 | 1.94 | 3.3 | 0.071 |
| 2 | Karmex 80WP | 80 | WP | 3 | lb ai/a | FALL | 70.5 | 2.11 | 7.0 | 0.087 |
| | Tricor | 75 | DF | 1 | lb ai/a | | | | | |
| 3 | Alion 200 | 1.67 | SC | 0.011 | lb ai/a | FALL | 77.8 | 2.31 | 4.8 | 0.076 |
| 4 | Alion 200 | 1.67 | SC | 0.022 | lb ai/a | FALL | 72.8 | 2.15 | 4.5 | 0.091 |
| 5 | Alion 200 | 1.67 | SC | 0.045 | lb ai/a | FALL | 66.0 | 2.11 | 5.8 | 0.107 |
| 6 | Alion 200 | 1.67 | SC | 0.067 | lb ai/a | FALL | 85.0 | 2.54 | 7.5 | 0.116 |
| 7 | Alion 200 | 1.67 | SC | 0.090 | lb ai/a | FALL | 76.5 | 2.27 | 7.5 | 0.113 |
| LSD (P=.05) | | | | | | | 20.59 | 0.53486 | 3.00 | 0.06098 |
| Standard Deviation | | | | | | | 13.86 | 0.36002 | 2.02 | 0.04105 |
| CV | | | | | | | 18.95 | 16.34 | 35.13 | 43.53 |

## Performance of Indaziflam on Asparagus – IR4 – HTRC - 2021

**Project Code:** 120-21-2 **Location:** Holt, MI
**Block:** 115

**Personnel:** Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, & Monique Hemker Mose
**Crop:** Asparagus **Variety:** Millennium
**Planting Method:** Transplant **Planting Date:** 2009
**Harvest Date:** 22 harvests from 5/3/21 to 6/16/21
**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:** Conover 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 | 4/6/21 | 9:40-10:30am | 56/45 F | Moist | 3-5 mph | 72% | 35% | No |
| PRE | 4/20/21 | 9:45-10:30am | 34/38 F | Moist | 3-4 mph | 53% | 100% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 4/6/21 | ASPA = Asparagus | Preemergence | | |
| 4/6/21 | QUGR = Quackgrass | 1-3″ | Vegetative | Patches |
| 4/6/21 | Other Grasses | 1-2″ | Vegetative | Few |
| 4/6/21 | MECR = Mouseear Cress | 1-2″ | Vegetative & seed set | Few |
| 4/6/21 | WICA = Wild Carrot | 0.5-2″ | Vegetative | Few-moderate |
| 4/20/21 | ASPA | 1-5″ | Vegetative | 10% emergence |
| 4/20/21 | QUGR | 1-3″ | Vegetative | Few |
| 4/20/21 | Other Grasses | 1-3″ | Vegetative | Few-patches |
| 4/20/21 | MECR | 1-3″ | Vegetative & seed set | Few |
| 4/20/21 | WICA | 0.5-2″ | Vegetative | Few |

**Additional Weeds Observed Throughout Season**

CATH = Canada Thistle
COLQ = Common Lambsquarters
COMW = Common Milkweed
HOWE = Horseweed
PEST = Perennial Sowthistle

**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. EPRE application made on 4/6/2021; the rest of asparagus area treated with Command (1 lb ai/a) + Spartan (0.375 lb ai/a) + Roundup PowerMax (1 lb ai/a).
4. Applied 400 lbs/ac of 19-19-19 fertilizer on 4/7/21.
5. Immediately after last harvest, removed any leftover spears and applied a tank mix of Embed-extra (1.5 qt/ac), Stinger (10.7 fl oz/ac), Karmex (3 lb/ac) and Fusilade (1.5 pt/ac) on 06/16/2021.
6. Untreated plots received glyphosate application at PRE application timing.

# Michigan State University

**Performance of Indaziflam on Asparagus - IR4 - HTRC - 2021**

Trial ID:120-21-2 Location:Holt, MI Trial Year:2021

Protocol ID:120-21-2 Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | COLQ | HOWE | WICA | |
| Crop Code | | | | | | | ASPA | | | | ASPA |
| Rating Date | | | | | | | 10May2021 | 10May2021 | 10May2021 | 10May2021 | 21May2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | BZ | BZ | BZ | BZ | SC |
| 1 | Untreated Weed-Free | | | | | PRE | 10 | 33 | 64 | 40 | 3 |
| 2 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 17 | 100 | 100 | 100 | 8 |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | EPRE | | | | | |
| 3 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 13 | 100 | 100 | 100 | 3 |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | EPRE | | | | | |
| 4 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 20 | 100 | 100 | 83 | 13 |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | PRE | | | | | |
| 5 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 20 | 100 | 100 | 100 | 20 |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | PRE | | | | | |
| 6 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 13 | 100 | 100 | 100 | 5 |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | EPRE | | | | | |
| 7 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 3 | 100 | 100 | 100 | 10 |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | EPRE | | | | | |
| 8 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 7 | 100 | 100 | 93 | 10 |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | PRE | | | | | |
| 9 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 17 | 100 | 100 | 100 | 13 |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | PRE | | | | | |
| 10 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 27 | 100 | 100 | 100 | 15 |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | EPRE | | | | | |
| 11 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 23 | 100 | 100 | 100 | 20 |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | EPRE | | | | | |
| 12 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 20 | 100 | 100 | 100 | 10 |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | PRE | | | | | |
| 13 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 30 | 100 | 100 | 100 | 25 |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | PRE | | | | | |
| 14 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 17 | 100 | 100 | 100 | 10 |
| | 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 | 13 | 100 | 100 | 100 | 10 |
| | Command | 3 | ME | 1 | lb ai/a | EPRE | | | | | |
| | Spartan | 4 | F | 0.375 | lb ai/a | EPRE | | | | | |
| 16 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 10 | 100 | 100 | 100 | 7 |
| | Sinbar | 80 | WDG | 1 | lb ai/a | PRE | | | | | |
| | Callisto | 4 | SC | 0.241 | lb ai/a | PRE | | | | | |
| LSD (P=.05) | | | | | | | 15.98 | 24.07 | 22.72 | 19.41 | 19.17 |
| Standard Deviation | | | | | | | 9.58 | 14.43 | 13.63 | 11.64 | 11.50 |
| CV | | | | | | | 58.96 | 15.06 | 13.94 | 12.28 | 100.37 |

# Performance of Indaziflam on Asparagus – IR4 – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | COLQ | COMW | HOWE | PEST | WICA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Code | | | | | | | | | | | |
| Rating Date | | | | | | | 21May2021 | 21May2021 | 21May2021 | 21May2021 | 21May2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Untreated Weed-Free | | | | | PRE | 13 | 10 | 33 | 0 | 23 |
| 2 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 99 | 43 | 100 | 100 | 100 |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | EPRE | | | | | |
| 3 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 96 | 57 | 100 | 90 | 83 |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | EPRE | | | | | |
| 4 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 93 | 33 | 100 | 50 | 100 |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | PRE | | | | | |
| 5 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 91 | 33 | 100 | 100 | 100 |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | PRE | | | | | |
| 6 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 92 | 47 | 100 | 100 | 100 |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | EPRE | | | | | |
| 7 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 91 | 32 | 100 | 100 | 100 |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | EPRE | | | | | |
| 8 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 99 | 13 | 100 | 100 | 100 |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | PRE | | | | | |
| 9 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 99 | 50 | 100 | 100 | 100 |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | PRE | | | | | |
| 10 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 99 | 35 | 100 | 95 | 97 |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | EPRE | | | | | |
| 11 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 100 | 70 | 100 | 100 | 100 |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | EPRE | | | | | |
| 12 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 100 | 63 | 100 | 85 | 100 |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | PRE | | | | | |
| 13 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 100 | 37 | 100 | 100 | 100 |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | PRE | | | | | |
| 14 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 99 | 0 | 100 | 100 | 93 |
| | 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 | 100 | 33 | 100 | 100 | 100 |
| | Command | 3 | ME | 1 | lb ai/a | EPRE | | | | | |
| | Spartan | 4 | F | 0.375 | lb ai/a | EPRE | | | | | |
| 16 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 98 | 7 | 100 | 90 | 100 |
| | Sinbar | 80 | WDG | 1 | lb ai/a | PRE | | | | | |
| | Callisto | 4 | SC | 0.241 | lb ai/a | PRE | | | | | |
| LSD (P=.05) | | | | | | | 25.06 | 59.93 | 24.07 | 41.13 | 18.80 |
| Standard Deviation | | | | | | | 15.03 | 35.94 | 14.43 | 19.30 | 11.27 |
| CV | | | | | | | 19.19 | 102.09 | 15.06 | 21.9 | 12.05 |

# Performance of Indaziflam on Asparagus – IR4 – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | COLQ | COMW | WICA | PEST |
| Crop Code | | | | | | | ASPA | | | | |
| Rating Date | | | | | | | 07Jun2021 | 07Jun2021 | 07Jun2021 | 07Jun2021 | 07Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | BZ | BZ | BZ | BZ | BZ |
| 1 | Untreated Weed-Free | | | | | PRE | 3 | 17 | 20 | 10 | 100 |
| 2 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 3 | 80 | 67 | 93 | |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | EPRE | | | | | |
| 3 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 3 | 80 | 80 | 53 | |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | EPRE | | | | | |
| 4 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 10 | 73 | 67 | 90 | |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | PRE | | | | | |
| 5 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 7 | 40 | 57 | 100 | 100 |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | PRE | | | | | |
| 6 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 3 | 13 | 37 | 73 | |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | EPRE | | | | | |
| 7 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 0 | 33 | 43 | 97 | |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | EPRE | | | | | |
| 8 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 3 | 73 | 10 | 77 | 100 |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | PRE | | | | | |
| 9 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 13 | 73 | 63 | 97 | |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | PRE | | | | | |
| 10 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 10 | 60 | 23 | 40 | |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | EPRE | | | | | |
| 11 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 10 | 97 | 63 | 67 | 90 |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | EPRE | | | | | |
| 12 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 10 | 67 | 77 | 93 | |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | PRE | | | | | |
| 13 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 3 | 77 | 40 | 100 | |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | PRE | | | | | |
| 14 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 7 | 97 | 10 | 77 | |
| | 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 | 7 | 100 | 67 | 70 | |
| | Command | 3 | ME | 1 | lb ai/a | EPRE | | | | | |
| | Spartan | 4 | F | 0.375 | lb ai/a | EPRE | | | | | |
| 16 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 3 | 100 | 10 | 100 | |
| | Sinbar | 80 | WDG | 1 | lb ai/a | PRE | | | | | |
| | Callisto | 4 | SC | 0.241 | lb ai/a | PRE | | | | | |
| LSD (P=.05) | | | | | | | 16.16 | 47.87 | 51.66 | 47.18 | |
| Standard Deviation | | | | | | | 9.69 | 28.71 | 30.98 | 28.30 | |
| CV | | | | | | | 160.38 | 42.53 | 67.6 | 36.61 | |

# Performance of Indaziflam on Asparagus – IR4 – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | CATH | COLQ | COMW | WICA |
| Crop Code | | | | | | | ASPA | | | | |
| Rating Date | | | | | | | 15Jun2021 | 15Jun2021 | 15Jun2021 | 15Jun2021 | 15Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | BZ | BZ | BZ | BZ | BZ |
| 1 | Untreated Weed-Free | | | | | PRE | 17 | 100 | 3 | 33 | 0 |
| 2 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 13 | 100 | 83 | 70 | 100 |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | EPRE | | | | | |
| 3 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 13 | 90 | 80 | 73 | 40 |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | EPRE | | | | | |
| 4 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 23 | 77 | 63 | 50 | 97 |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | PRE | | | | | |
| 5 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 7 | 100 | 53 | 53 | 100 |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | PRE | | | | | |
| 6 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 13 | 100 | 33 | 33 | 87 |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | EPRE | | | | | |
| 7 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 30 | 67 | 63 | 57 | 100 |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | EPRE | | | | | |
| 8 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 7 | 100 | 83 | 13 | 67 |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | PRE | | | | | |
| 9 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 7 | 100 | 73 | 60 | 100 |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | PRE | | | | | |
| 10 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 10 | 67 | 63 | 17 | 37 |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | EPRE | | | | | |
| 11 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 0 | 100 | 93 | 40 | 63 |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | EPRE | | | | | |
| 12 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 3 | 100 | 87 | 77 | 93 |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | PRE | | | | | |
| 13 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 7 | 100 | 90 | 37 | 100 |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | PRE | | | | | |
| 14 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 33 | 67 | 97 | 13 | 33 |
| | 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 | 13 | 100 | 100 | 33 | 73 |
| | Command | 3 | ME | 1 | lb ai/a | EPRE | | | | | |
| | Spartan | 4 | F | 0.375 | lb ai/a | EPRE | | | | | |
| 16 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 10 | 93 | 100 | 0 | 100 |
| | Sinbar | 80 | WDG | 1 | lb ai/a | PRE | | | | | |
| | Callisto | 4 | SC | 0.241 | lb ai/a | PRE | | | | | |
| LSD (P=.05) | | | | | | | 32.42 | 42.88 | 41.16 | 48.01 | 48.58 |
| Standard Deviation | | | | | | | 19.45 | 25.72 | 24.69 | 28.79 | 29.14 |
| CV | | | | | | | 150.56 | 28.19 | 33.86 | 69.8 | 39.18 |

# Performance of Indaziflam on Asparagus – IR4 – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | ASPA TOTAL GOOD NO./PLOT | ASPA TOTAL GOOD KG/PLOT | ASPA TOTAL CULL NO./PLOT | ASPA TOTAL CULL KG/PLOT |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Untreated Weed-Free | | | | | PRE | 479.0 | 11.2153 | 37.7 | 0.8453 |
| 2 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 477.3 | 10.9200 | 43.0 | 0.9500 |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | EPRE | | | | |
| 3 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 493.0 | 11.7777 | 30.3 | 0.7417 |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | EPRE | | | | |
| 4 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 498.0 | 11.4960 | 34.0 | 0.7590 |
| | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | PRE | | | | |
| 5 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 463.3 | 10.5367 | 36.3 | 0.7823 |
| | Alion 200 | 1.67 | SC | 0.13 | lb ai/a | PRE | | | | |
| 6 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 504.3 | 11.2530 | 37.7 | 0.8340 |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | EPRE | | | | |
| 7 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 507.3 | 11.5383 | 31.3 | 0.6860 |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | EPRE | | | | |
| 8 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 563.3 | 13.0567 | 42.3 | 1.0177 |
| | Zidua | 4.17 | SC | 0.106 | lb ai/a | PRE | | | | |
| 9 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 517.7 | 11.8290 | 33.7 | 0.7473 |
| | Zidua | 4.17 | SC | 0.267 | lb ai/a | PRE | | | | |
| 10 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 450.7 | 10.4640 | 28.7 | 0.6363 |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | EPRE | | | | |
| 11 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 493.3 | 10.8110 | 29.7 | 0.6683 |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | EPRE | | | | |
| 12 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 462.0 | 10.8967 | 53.0 | 1.2020 |
| | Chateau SW | 51 | WDG | 0.128 | lb ai/a | PRE | | | | |
| 13 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 380.0 | 9.0323 | 41.0 | 0.8963 |
| | Chateau SW | 51 | WDG | 0.192 | lb ai/a | PRE | | | | |
| 14 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | EPRE | 439.3 | 9.5693 | 22.3 | 0.4743 |
| | 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 | 533.3 | 12.0080 | 36.3 | 0.7363 |
| | Command | 3 | ME | 1 | lb ai/a | EPRE | | | | |
| | Spartan | 4 | F | 0.375 | lb ai/a | EPRE | | | | |
| 16 | Roundup PowerMax | 5.5 | L | 1 | lb ai/a | PRE | 515.7 | 11.8567 | 37.7 | 0.7900 |
| | Sinbar | 80 | WDG | 1 | lb ai/a | PRE | | | | |
| | Callisto | 4 | SC | 0.241 | lb ai/a | PRE | | | | |
| LSD (P=.05) | | | | | | | 131.43 | 2.67237 | 13.07 | 0.29772 |
| Standard Deviation | | | | | | | 78.83 | 1.60283 | 7.84 | 0.17856 |
| CV | | | | | | | 16.22 | 14.39 | 21.81 | 22.38 |

# Weed Control in Red Beet and Sugar Beet – HTRC - 2021

**Project Code: 109-21-1** **Location: Holt, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Red beets & sugar beets** **Variety: Ruby Queen, Crystal G515 RP, 29 RR**
**Planting Method: Seeded** **Planting Date: 5/18/21**
**Harvest Date: 9/27/2021**
**Plant Spacing: 3″** **Row Spacing: 14″; 1 row each variety/plot**
**Tillage Type: Conventional** **Study Design: RCB** **Replications: 3**
**Plot Size: 5.3 ft wide x 30 ft long**

**Soil Type: Marlette Fine Loamy Sand** **OM: 3.5%** **pH: 6.2**
**Sand: 60%** **Silt: 21%** **Clay: 19%** **CEC: 9.4**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PRE | 5/20/21 | 8:00-8:30 AM | 67/63 F | Dry | SE 1-3 mph | 75% | 90% | No |
| PO1 | 6/24/21 | 8:30-9:30 AM | 67/58 F | Moist | 5-8 mph | 61% | 5% | No |
| PO2 | 7/9/21 | 1:00-2:PM | 70/65 F | Moist | 1-2 mph | 60% | 25% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 5/20/21 | No Crop or Weeds | | | |
| 6/24/21 | REBE = Red beet | 6-8″ | 7-8 LS | Good-Fair |
| 6/24/21 | SUBE = Sugar beet | 8-10″ | 6-8 LS | Good |
| 6/24/21 | COLQ = Common Lambsquarters | 2-8″ | Vegetative | Moderate |
| 6/24/21 | PRLE = Prickly Lettuce | 2-8″ | Vegetative | Moderate |
| 6/24/21 | WIRA = Wild Radish | 5-12″ | Vegetative-Flower | Moderate |
| 6/24/21 | YENS = Yellow Nutsedge | 3-10″ | Vegetative | Few |
| 6/24/21 | DAND = Dandelion | 4-10″ | Vegetative-Flower | Few |
| 6/24/21 | Grasses | 5-10″ | Vegetative | Few |
| 6/24/21 | COGR = Common Groundsel | 6-12″ | Flower | few |
| 7/9/21 | Red beet | 4-5″ | 6-8 LS | Good |
| 7/9/21 | Sugar beet | 5-7″ | veg | Good |

**Additional Weeds Observed Throughout Season**

RRPW = Redroot Pigweed

**Notes and Comments**

1. PRE application applied with 4 nozzle tractor boom. FF11002, 20 gpa, 30 psi, 3.2 mph. Postemergence applications 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. SUBE1 = Crystal G515 RP & SUBE2 = 29 RR

# Michigan State University

**Weed Control in Red Beet and Sugar Beet - HTRC - 2021**

Trial ID:109-21-1 Location:East Lansing, MI Trial Year:2021

Protocol ID:109-21-1 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | REBE | CRYSTAL SUBE1 | 29 RR SUBE2 | COLQ | REBE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | REBE | SUBE1 | SUBE2 | | REBE |
| Rating Date | | | | | | | 28-Jun-2021 | 28-Jun-2021 | 28-Jun-2021 | 28-Jun-2021 | 2-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | BZ | BZ | BZ | BZ | BZ |
| 1 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE, PO1 | 3.3 | 0.0 | 3.3 | 96.7 | 6.7 |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 26.7 | 10.0 | 16.7 | 73.3 | 23.3 |
| | Outlook | 6 | EC | 0.4 | lb ai/a | PO1 | | | | | |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 10.0 | 6.7 | 10.0 | 90.0 | 16.7 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 33.3 | 6.7 | 16.7 | 93.3 | 23.3 |
| | Nortron | 4 | SC | 1 | lb ai/a | PO1 | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 23.3 | 6.7 | 13.3 | 93.3 | 3.3 |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 30.0 | 6.7 | 20.0 | 86.7 | 26.7 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO2 | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 23.3 | 13.3 | 13.3 | 96.7 | 23.3 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 36.7 | 10.0 | 13.3 | 80.0 | 36.7 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 23.3 | 13.3 | 16.7 | 86.7 | 23.3 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.125 | lb ai/a | PO1 | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 10 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 20.0 | 13.3 | 13.3 | 90.0 | 26.7 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.125 | lb ai/a | PO1 | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO2 | | | | | |
| 11 | Dual Magnum | 7.62 | EC | 1.2 | lb ai/a | PRE | | | | | |
| | BASF-1 | 3.13 | SC | 0.022 | lb ai/a | PO2 | | | | | |
| LSD P=.05 | | | | | | | 30.86 | 19.05 | 19.42 | 22.80 | 33.65 |
| Standard Deviation | | | | | | | 17.99 | 11.11 | 11.32 | 13.29 | 19.62 |

# Weed Control in Red Beet and Sugar Beet – HTRC - 2021

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CV | | | | | | | 78.23 | 128.14 | 82.83 | 14.99 | 93.41 | |
| Pest Code | | | | | | | CRYSTAL | 29 RR | COLQ | WIRA | RRPW | |
| Crop Name | | | | | | | SUBE1 | SUBE2 | | | | REBE |
| Rating Date | | | | | | | 2-Jul-2021 | 2-Jul-2021 | 2-Jul-2021 | 2-Jul-2021 | 2-Jul-2021 | 12-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | BZ | BZ | BZ | BZ | BZ | BZ |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | | |
| 1 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE, PO1 | 6.7 | 10.0 | 93.3 | 90.0 | 80.0 | 16.7 |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | | |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 13.3 | 16.7 | 66.7 | 20.0 | 66.7 | 10.0 |
| | Outlook | 6 | EC | 0.4 | lb ai/a | PO1 | | | | | | |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | | |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 6.7 | 26.7 | 90.0 | 100.0 | 90.0 | 20.0 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 6.7 | 26.7 | 86.7 | 60.0 | 66.7 | 16.7 |
| | Nortron | 4 | SC | 1 | lb ai/a | PO1 | | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 3.3 | 10.0 | 60.0 | 76.7 | 83.3 | 23.3 |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 6.7 | 10.0 | 50.0 | 26.7 | 36.7 | 26.7 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO2 | | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 23.3 | 20.0 | 96.7 | 50.0 | 63.3 | 13.3 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 23.3 | 33.3 | 96.7 | 60.0 | 60.0 | 33.3 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 20.0 | 26.7 | 76.7 | 100.0 | 46.7 | 30.0 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | | |
| | Stinger | 3 | L | 0.125 | lb ai/a | PO1 | | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | | |
| 10 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 23.3 | 20.0 | 50.0 | 90.0 | 63.3 | 36.7 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | | |
| | Stinger | 3 | L | 0.125 | lb ai/a | PO1 | | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO2 | | | | | | |
| 11 | Dual Magnum | 7.62 | EC | 1.2 | lb ai/a | PRE | | | | | | 50.0 |
| | BASF-1 | 3 | SC | 0.022 | lb ai/a | PO2 | | | | | | |
| LSD P=.05 | | | | | | | 26.68 | 26.18 | 49.05 | 48.19 | 36.21 | 32.65 |
| Standard Deviation | | | | | | | 15.55 | 15.26 | 28.59 | 28.09 | 21.11 | 19.17 |
| CV | | | | | | | 116.64 | 76.32 | 37.29 | 41.72 | 32.14 | 76.23 |

# Weed Control in Red Beet and Sugar Beet – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CRYSTAL SUBE1 | 29 RR SUBE2 | COLQ | WIRA | RRPW |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | | | | | |
| Rating Date | | | | | | | 12-Jul-2021 | 12-Jul-2021 | 12-Jul-2021 | 12-Jul-2021 | 12-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | BZ | BZ | BZ | BZ | BZ |
| 1 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE, PO1 | 10.0 | 10.0 | 70.0 | 83.3 | 46.7 |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 13.3 | 16.7 | 53.3 | 33.3 | 63.3 |
| | Outlook | 6 | EC | 0.4 | lb ai/a | PO1 | | | | | |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 10.0 | 13.3 | 80.0 | 100.0 | 70.0 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 13.3 | 16.7 | 96.7 | 43.3 | 56.7 |
| | Nortron | 4 | SC | 1 | lb ai/a | PO1 | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 10.0 | 10.0 | 93.3 | 76.7 | 63.3 |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 10.0 | 13.3 | 70.0 | 50.0 | 63.3 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO2 | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 20.0 | 23.3 | 66.7 | 40.0 | 33.3 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 30.0 | 30.0 | 93.3 | 63.3 | 40.0 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 26.7 | 26.7 | 90.0 | 73.3 | 36.7 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.125 | lb ai/a | PO1 | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 10 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 36.7 | 36.7 | 60.0 | 73.3 | 63.3 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.125 | lb ai/a | PO1 | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO2 | | | | | |
| 11 | Dual Magnum | 7.62 | EC | 1.2 | lb ai/a | PRE | 56.7 | 60.0 | 73.3 | 90.0 | 100.0 |
| | BASF-1 | 3 | SC | 0.022 | lb ai/a | PO2 | | | | | |
| LSD P=.05 | | | | | | | 24.74 | 27.34 | 46.01 | 69.97 | 31.91 |
| Standard Deviation | | | | | | | 14.52 | 16.05 | 27.01 | 41.08 | 18.73 |
| CV | | | | | | | 67.5 | 68.78 | 35.1 | 62.19 | 32.37 |

# Weed Control in Red Beet and Sugar Beet – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | REBE 13-Aug-2021 HARVEST NO./PLOT NS | REBE 13-Aug-2021 HRVT-ROOT KG /PLOT NS | REBE 13-Aug-2021 HRVT-PLANT KG/PLOT NS | ALL SUBE 27-Sep-2021 HARVEST NO./PLOT NS | ALL SUBE 27-Sep-2021 HARVEST KG/PLOT NS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE, PO1 | 37.7 | 5.03 | 2.32 | 79.3 | 50.63 |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 36.0 | 5.63 | 2.59 | 79.0 | 51.28 |
| | Outlook | 6 | EC | 0.4 | lb ai/a | PO1 | | | | | |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 36.0 | 5.43 | 2.23 | 77.0 | 48.32 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 37.0 | 4.71 | 1.91 | 75.0 | 45.58 |
| | Nortron | 4 | SC | 1 | lb ai/a | PO1 | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 40.3 | 4.91 | 1.86 | 83.0 | 48.77 |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 38.3 | 5.32 | 2.25 | 83.0 | 48.93 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO2 | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 38.3 | 5.91 | 2.26 | 77.0 | 42.25 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 29.3 | 3.15 | 1.47 | 72.7 | 33.65 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| | Spin-Aid | 1.3 | L | 0.488 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 41.0 | 4.59 | 2.05 | 65.0 | 33.56 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.125 | lb ai/a | PO1 | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO1 | | | | | |
| 10 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRE | 37.3 | 4.21 | 2.06 | 76.0 | 38.22 |
| | Nortron | 4 | SC | 0.33 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.125 | lb ai/a | PO1 | | | | | |
| | Upbeet | 50 | WDG | 0.0156 | lb ai/a | PO1 | | | | | |
| | Betamix | 1.3 | EC | 0.488 | lb ai/a | PO2 | | | | | |
| | Select Max | 0.97 | EC | 0.12 | lb ai/a | PO2 | | | | | |
| 11 | Dual Magnum | 7.62 | EC | 1.2 | lb ai/a | PRE | 10.7 | 0.30 | 0.13 | 29.3 | 6.91 |
| | BASF-1 | 3.13 | SC | 0.022 | lb ai/a | PO2 | | | | | |
| LSD P=.05 | | | | | | | 14.28 | 1.987 | 0.746 | 22.51 | 16.578 |
| Standard Deviation | | | | | | | 8.38 | 1.166 | 0.438 | 13.22 | 9.733 |
| CV | | | | | | | 24.14 | 26.10 | 22.81 | 18.26 | 23.89 |

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

**Project Code: 107-21-2** **Location: Hart, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Carrot** **Variety: Canberra**
**Planting Method: Seeded** **Planting Date: 4/22/2021**
**Harvest Date: 10/29/2021**
**Plant Spacing: 1″** **Row Spacing: 18 inches, 3 rows/plot**
**Tillage Type: Conventional** **Study Design: RCB Replications: 3**
**Plot Size: 5.4 ft wide x 30 ft long**

**Soil Type: Pipestone Fine Sand** **OM: 3.3%** **pH: 6.9**
**Sand: 59%** **Silt: 20%** **Clay: 21%** **CEC: 9.4**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PO1 | 5/27/21 | 10:00-11:00am | 52/58 F | Moist | NE 3-4mph | 58% | 70% | No |
| PO2 | 6/8/21 | 1:40-2:40pm | 80/83 F | Dry | 7-9mph | 61% | 30% | No |
| PO3 | 6/16/21 | 11am-12:00pm | 69/74 F | Dry | 3-9mph | 34% | <10% | No |
| PO4 | 6/22/21 | 10:45-11:30am | 64/62 F | Slightly Moist | W 7-11mph | 64% | 95% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 5/27/21 | Carrot | 2-3″ | 1-3 LS | 100% |
| 5/27/21 | RRPW = Redroot Pigweed | 2-3″ | 2-6 LS | 20% |
| 5/27/21 | COLQ = Common Lambsquarters | 1-4″ | 2-6 LS | 10% |
| 6/8/21 | Carrot | 3-5″ | 5 LS | 100% |
| 6/8/21 | RRPW | 2-7″ | 7-10 LS | 25% |
| 6/8/21 | COLQ | 3-6″ | | Few |
| 6/16/21 | Carrot | 5-7″ | 6-7 LS | 100% |
| 6/16/21 | RRPW | 2-10″ | Vegetative | Moderate |
| 6/16/21 | LACG = Large Crabgrass | 3-6″ | Vegetative | Few |
| 6/22/21 | Carrot | 6-8″ | 7-8 LS | 100% |

**Additional Weed Observed Throughout Season**

**TUPW = Tumble Pigweed**
**COPU = Common Purslane**

**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. The whole trial was hand-weeded during first week of July.**
**4. Plot # 7 to 11 in all three reps were harvested earlier due to miscommunication; therefore, the yield from those plots (15 plots; 107-111, 207-211, and 307-311) were not included in data analysis.**
**5. For yield data, 10 feet of the middle row was harvested from each plot.**

# Michigan State University

**Micro-rate Application Timings for Weed Control in carrot- 2021**

Trial ID:107-21-3 Location:Hart, MI Trial Year:2021

Protocol ID:107-21-2 Investigator:Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | RRPW | LACG | COPU | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | CARROT | | | | CARROT |
| Rating Date | | | | | | | 16-Jun-2021 | 16-Jun-2021 | 16-Jun-2021 | 16-Jun-2021 | 28-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG/MS | CG/MS | CG/MS | CG/MS | CG |
| 1 | Untreated Weedy | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Lorox | 50 | DF | 0.25 | lb ai/a | PO1 | 0.0 | 90.0 | 56.7 | 100.0 | 0.0 |
| | Lorox | 50 | DF | 0.25 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.25 | lb ai/a | PO3 | | | | | |
| | Lorox | 50 | DF | 0.25 | lb ai/a | PO4 | | | | | |
| 3 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 0.0 | 83.3 | 35.0 | 100.0 | 0.0 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO3 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO4 | | | | | |
| 4 | Lorox | 50 | DF | 0.75 | lb ai/a | PO1 | 0.0 | 70.0 | 36.7 | 100.0 | 0.0 |
| | Lorox | 50 | DF | 0.75 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.75 | lb ai/a | PO3 | | | | | |
| | Lorox | 50 | DF | 0.75 | lb ai/a | PO4 | | | | | |
| 5 | Lorox | 50 | DF | 0.25 | lb ai/a | PO1 | 0.0 | 63.3 | 46.7 | 100.0 | 0.0 |
| | Lorox | 50 | DF | 0.25 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO3 | | | | | |
| | Lorox | 50 | DF | 1 | lb ai/a | PO4 | | | | | |
| 6 | Caparol | 4 | L | 0.25 | lb ai/a | PO1 | 0.0 | 41.7 | 33.3 | 100.0 | 0.0 |
| | Caparol | 4 | L | 0.25 | lb ai/a | PO2 | | | | | |
| | Caparol | 4 | L | 0.25 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.25 | lb ai/a | PO4 | | | | | |
| 7 | Caparol | 4 | L | 0.5 | lb ai/a | PO1 | 0.0 | 88.3 | 86.7 | 100.0 | 0.0 |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO2 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 8 | Tricor | 75 | DF | 0.125 | lb ai/a | PO1 | 0.0 | 86.7 | 96.7 | 100.0 | 0.0 |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO3 | | | | | |
| | Tricor | 75 | DF | 0.125 | 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 | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | RRPW | LACG | COPU | |
| Crop Name | | | | | | | CARROT | | | | CARROT |
| Rating Date | | | | | | | 16-Jun-2021 | 16-Jun-2021 | 16-Jun-2021 | 16-Jun-2021 | 28-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG/MS | CG/MS | CG/MS | CG/MS | CG |
| 9 | Tricor | 75 | DF | 0.25 | lb ai/a | PO1 | 0.0 | 78.3 | 100.0 | 100.0 | 0.0 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PO3 | | | | | |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PO4 | | | | | |
| 10 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 0.0 | 41.7 | 56.7 | 100.0 | 0.0 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO3 | | | | | |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PO4 | | | | | |
| 11 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 0.0 | 88.3 | 48.3 | 96.7 | 0.0 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Caparol | 4 | L | 0.25 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 12 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 0.0 | 60.0 | 63.3 | 100.0 | 0.0 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 13 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 0.0 | 66.7 | 40.0 | 100.0 | 0.0 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 0.96 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 14 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 0.0 | 41.7 | 56.7 | 100.0 | 0.0 |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 0.96 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 15 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 0.0 | 95.0 | 73.3 | 100.0 | 0.0 |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO2 | | | | | |
| | Prowl H20 | 3.8 | CS | 0.95 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| LSD P=.05 | | | | | | | 0.00 | 44.76 | 69.73 | 2.49 | 0.00 |
| Standard Deviation | | | | | | | 0.00 | 26.77 | 41.70 | 1.49 | 0.00 |
| CV | | | | | | | 0.0 | 40.35 | 75.36 | 1.6 | 0.0 |

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

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | RRPW | LACG | TUPW | CARROT | CARROT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | RRPW | LACG | TUPW | | |
| Crop Name | | | | | | | | | | CARROT | CARROT |
| Rating Date | | | | | | | 28-Jun-2021 | 28-Jun-2021 | 28-Jun-2021 | 17-Jul-2021 | 22-Oct-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | KG/10 FT |
| Assessed By | | | | | | | CG | CG | CG | CG | NS |
| 1 | Untreated Weedy | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 13.5 |
| 2 | Lorox | 50 | DF | 0.25 | lb ai/a | PO1 | 58.3 | 75.0 | 100.0 | 1.7 | 14.1 |
| | Lorox | 50 | DF | 0.25 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.25 | lb ai/a | PO3 | | | | | |
| | Lorox | 50 | DF | 0.25 | lb ai/a | PO4 | | | | | |
| 3 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 53.3 | 65.0 | 100.0 | 0.0 | 12.3 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO3 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO4 | | | | | |
| 4 | Lorox | 50 | DF | 0.75 | lb ai/a | PO1 | 35.0 | 91.7 | 100.0 | 0.0 | 13.9 |
| | Lorox | 50 | DF | 0.75 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.75 | lb ai/a | PO3 | | | | | |
| | Lorox | 50 | DF | 0.75 | lb ai/a | PO4 | | | | | |
| 5 | Lorox | 50 | DF | 0.25 | lb ai/a | PO1 | 16.7 | 93.3 | 100.0 | 0.0 | 11.7 |
| | Lorox | 50 | DF | 0.25 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO3 | | | | | |
| | Lorox | 50 | DF | 1 | lb ai/a | PO4 | | | | | |
| 6 | Caparol | 4 | L | 0.25 | lb ai/a | PO1 | 28.3 | 61.7 | 100.0 | 3.3 | 14.8 |
| | Caparol | 4 | L | 0.25 | lb ai/a | PO2 | | | | | |
| | Caparol | 4 | L | 0.25 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.25 | lb ai/a | PO4 | | | | | |
| 7 | Caparol | 4 | L | 0.5 | lb ai/a | PO1 | 50.0 | 96.7 | 100.0 | 1.7 | 12.9 |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO2 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 8 | Tricor | 75 | DF | 0.125 | lb ai/a | PO1 | 63.3 | 100.0 | 100.0 | 1.7 | 12.5 |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO3 | | | | | |
| | Tricor | 75 | DF | 0.125 | 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 | Growth Stage | RRPW | LACG | TUPW | CARROT | CARROT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | RRPW | LACG | TUPW | | |
| Crop Name | | | | | | | | | | CARROT | CARROT |
| Rating Date | | | | | | | 28-Jun-2021 | 28-Jun-2021 | 28-Jun-2021 | 17-Jul-2021 | 22-Oct-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | KG/10 FT |
| Assessed By | | | | | | | CG | CG | CG | CG | NS |
| 9 | Tricor | 75 | DF | 0.25 | lb ai/a | PO1 | 73.3 | 100.0 | 100.0 | 0.0 | 11.4 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PO3 | | | | | |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PO4 | | | | | |
| 10 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 68.3 | 100.0 | 100.0 | 0.0 | 14.7 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO3 | | | | | |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PO4 | | | | | |
| 11 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 48.3 | 93.3 | 100.0 | 0.0 | 12.5 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Caparol | 4 | L | 0.25 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 12 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 45.0 | 93.3 | 100.0 | 0.0 | 13.5 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 13 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 60.0 | 93.3 | 100.0 | 0.0 | 12.8 |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 0.96 | lb ai/a | PO2 | | | | | |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 14 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 25.0 | 95.0 | 100.0 | 1.7 | 13.8 |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 0.96 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| 15 | Lorox | 50 | DF | 0.5 | lb ai/a | PO1 | 81.7 | 100.0 | 100.0 | 1.7 | 12.3 |
| | Tricor | 75 | DF | 0.125 | lb ai/a | PO2 | | | | | |
| | Prowl H20 | 3.8 | CS | 0.95 | lb ai/a | PO2 | | | | | |
| | Lorox | 50 | DF | 0.5 | lb ai/a | PO3 | | | | | |
| | Caparol | 4 | L | 0.5 | lb ai/a | PO4 | | | | | |
| LSD P=.05 | | | | | | | 59.88 | 38.41 | 0.00 | 2.92 | 3.5 |
| Standard Deviation | | | | | | | 35.81 | 22.97 | 0.00 | 1.75 | 1.9 |
| CV | | | | | | | 76.01 | 27.38 | 0.0 | 224.74 | 15.1 |

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

**Project Code: 113-21-1** **Location: Decatur, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Celery** **Variety: Stalker, CR-1**
**Planting Method: Transplanted** **Planting Date: 5/14/21**
**Harvest Date: 8/11/21**
**Plant Spacing: 6″** **Row Spacing: 30″ 1 row of each variety/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%** **pH: 7.8**
**Sand: 20%** **Silt: 26%** **Clay: 2%** **CEC: NA**

**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 |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 5/14/21 | No Crop or weeds | | | |
| 5/21/21 | Celery | 4″ | | Good |
| 5/21/21 | No weeds | | | |

**Additional Weeds Observed Throughout Season**

COPU = Common Purslane
RRPW = Redroot Pigweed
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. There was no celery meltdown symptoms reported until mid-July. Meltdown symptoms started showing after one heavy rain event in early August. CR-1 showed higher symptoms than stalker (very few plant). 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 major impact on development of celery meltdown, and CR-1 reported more susceptible than Stalker.
4. For yield data, 10 feet of each variety was harvested from each plot.

# Michigan State University

**To Investigate the Effect of S-metolachlor and Flumioxazin Application Methods on Celery Plant 'Meltdown' - De Young - 2021**

Trial ID:113-21-1 Location:Decatur, MI Trial Year:2021

Protocol ID:113-21-1 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | COPU | RRPW |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | |
| Crop Code | | | | | | | | | |
| Crop Name | | | | | | | CELERY | | |
| Rating Date | | | | | | | 3-Jun-2021 | 3-Jun-2021 | 3-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC,CG | SC,CG | SC,CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PRTP | 8.3 | 98.3 | 98.3 |
| 3 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PPI | 10.0 | 96.7 | 100.0 |
| 4 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PRTP | 10.0 | 91.7 | 93.3 |
| 5 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PPI | 6.7 | 95.0 | 98.3 |
| 6 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PRTP | 3.3 | 100.0 | 100.0 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PRTP | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PPI | 8.3 | 95.0 | 93.3 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PPI | | | |
| 8 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 8.3 | 96.7 | 96.7 |
| 9 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 13.3 | 98.3 | 98.3 |
| 10 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 48.3 | 100.0 | 100.0 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | |
| LSD P=.05 | | | | | | | 12.56 | 6.02 | 4.40 |
| Standard Deviation | | | | | | | 7.32 | 3.51 | 2.56 |
| CV | | | | | | | 62.76 | 4.03 | 2.92 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | RRPW | COPU |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | |
| Crop Code | | | | | | | | | |
| Crop Name | | | | | | | CELERY | | |
| Rating Date | | | | | | | 17-Jun-2021 | 17-Jun-2021 | 17-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC,CG | SC,CG | SC,CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PRTP | 1.7 | 98.3 | 81.7 |
| 3 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PPI | 0.0 | 86.7 | 51.7 |
| 4 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PRTP | 0.0 | 61.7 | 66.7 |
| 5 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PPI | 6.7 | 80.0 | 80.0 |
| 6 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PRTP | 3.3 | 93.3 | 91.7 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PRTP | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PPI | 8.3 | 86.7 | 81.7 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PPI | | | |
| 8 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 5.0 | 85.0 | 85.0 |
| 9 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 11.7 | 100.0 | 95.0 |
| 10 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 30.0 | 100.0 | 96.7 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | |
| LSD P=.05 | | | | | | | 8.78 | 20.10 | 17.69 |
| Standard Deviation | | | | | | | 5.12 | 11.72 | 10.31 |
| CV | | | | | | | 76.78 | 14.8 | 14.13 |

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

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | TOTAL WC | | |
| Crop Code | | | | | | | CELERY | CELERY | | CELERY | CELERY |
| Crop Name | | | | | | | STALKER | CR-1 | | CR-1 | STALKER |
| Rating Date | | | | | | | 4-Jul-2021 | 4-Jul-2021 | 4-Jul-2021 | 11-Aug-2021 | 11-Aug-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | MELTDOWN | MELTDOWN |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | NO./PLOT | NO./PLOT |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 22.7 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PRTP | 0.0 | 0.0 | 31.7 | 24.7 | 1.0 |
| 3 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PPI | 0.0 | 0.0 | 36.7 | 28.3 | 1.0 |
| 4 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PRTP | 0.0 | 0.0 | 45.0 | 24.0 | 0.0 |
| 5 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PPI | 0.0 | 0.0 | 50.0 | 28.0 | 0.0 |
| 6 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PRTP | 0.0 | 0.0 | 73.3 | 29.0 | 0.3 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PRTP | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PPI | 0.0 | 0.0 | 73.3 | 32.0 | 0.3 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PPI | | | | | |
| 8 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 0.0 | 0.0 | 55.0 | 30.0 | 0.3 |
| 9 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 0.0 | 0.0 | 63.3 | 24.7 | 0.0 |
| 10 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 0.0 | 0.0 | 76.7 | 30.3 | 0.7 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| LSD P=.05 | | | | | | | 0.00 | 0.00 | 15.10 | 9.12 | 1.42 |
| Standard Deviation | | | | | | | 0.00 | 0.00 | 8.80 | 5.32 | 0.83 |
| CV | | | | | | | 0.0 | 0.0 | 17.43 | 19.43 | 226.36 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | |
| Crop Code | | | | | | | CELERY | CELERY | CELERY | CELERY |
| Crop Name | | | | | | | CR-1 | CR-1 | STALKER | STALKER |
| Rating Date | | | | | | | 11-Aug-2021 | 11-Aug-2021 | 11-Aug-2021 | 11-Aug-2021 |
| Rating Type | | | | | | | HARVEST | HARVEST | HARVEST | HARVEST |
| Rating Unit | | | | | | | NO./PLOT | KG/PLOT | NO./PLOT | KG/PLOT |
| Assessed By | | | | | | | MH | MH | MH | MH |
| 1 | Non-treated | | | | | | 16.3 | 9.61 | 22.3 | 23.19 |
| 2 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PRTP | 13.7 | 8.60 | 20.0 | 20.71 |
| 3 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PPI | 16.3 | 9.45 | 23.7 | 22.57 |
| 4 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PRTP | 15.7 | 5.75 | 22.7 | 20.22 |
| 5 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PPI | 17.3 | 12.00 | 23.3 | 24.57 |
| 6 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PRTP | 21.0 | 14.03 | 22.7 | 23.21 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PRTP | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | PPI | 19.0 | 7.90 | 26.0 | 32.00 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | PPI | | | | |
| 8 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 15.7 | 8.78 | 28.3 | 26.59 |
| 9 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 14.0 | 9.30 | 21.3 | 24.03 |
| 10 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 14.0 | 10.22 | 26.3 | 27.56 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | |
| LSD P=.05 | | | | | | | 4.40 | 4.62 | 5.04 | 7.02 |
| Standard Deviation | | | | | | | 2.57 | 2.69 | 2.94 | 4.09 |
| CV | | | | | | | 15.75 | 28.13 | 12.41 | 16.73 |

## Weed Control Programs with Pyroxasulfone and Pendimethalin in Celery – Schreur - 2021

**Project Code: 113-21-2** **Location: Hudsonville, MI**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Celery** **Variety:CR-1**
**Planting Method: Transplanted** **Planting Date: 5/24/21**
**Harvest Date: 8/10/21**
**Plant Spacing: 6″; 2 rows/plot** **Row Spacing: 18″**
**Tillage Type: Conventional** **Study Design: RCB** **Replications: 3**
**Plot Size: 2.7 ft wide x 30 ft long**

**Soil Type: Carlisle Muck** **OM: 60%** **pH: 6.3**
**Sand: 16%** **Silt: 21%** **Clay: 2%** **CEC: NA**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| POTP | 6/2/21 | 12:45-1:50pm | 76/65 F | Dry | SE 4-6mph | 34% | 60% | No |
| PO1 | 7/1/21 | 11:40am-12:00pm | 76/73 F | Moist | N 1-2mph | 63% | 20% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/2/21 | Celery | 4-5″ | 3-5 LS | Good |
| 6/2/21 | No Weeds | | | |
| 7/1/21 | Celery | 6-8″ | 8-10 LS | Good |
| | AMARANTH = Purple & Powell | 0.5-4″ | Vegetative | Low |

**Additional Weeds Observed Throughout Season**

COPU = Common Purslane
LACG = Large Crabgrass
YENS = Yellow Nutsedge
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. Maintenance application (PO1) applied by grower to control Yellow Nutsedge mid-season (last week of June) that application included Caparol 2 lb ai/ac for all plots. On 7/1/21, Only GoalTender was applied.
4. For yield data, 10 feet of two rows/plot were harvested (total of 20 feet).

# Michigan State University

**Weed Control Programs with Pyroxasulfone and Pendimethalin in Celery - Schreur - 2021**

Trial ID:113-21-2 Location:Hudsonville, MI Trial Year:2021
Protocol ID:113-21-2 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | AMARANTH | COPU | YENS | |
| Crop Name | | | | | | | CELERY | | | | CELERY |
| Rating Date | | | | | | | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 | 18-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC/CG | SC/CG | SC/CG | SC/CG | SC/CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Caparol | 4 | L | 1 | lb ai/a | POTP,PO1 | 0.0 | 93.3 | 93.3 | 30.0 | 0.0 |
| 3 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 23.3 | 93.3 | 93.3 | 26.7 | 20.0 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 8.3 | 91.7 | 88.3 | 50.0 | 3.3 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 5 | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | 1.7 | 91.7 | 93.3 | 33.3 | 5.0 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 6 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 5.0 | 88.3 | 90.0 | 33.3 | 5.0 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 7 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 18.3 | 96.7 | 96.7 | 40.0 | 18.3 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 8 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 5.0 | 93.3 | 93.3 | 40.0 | 3.3 |
| | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 9 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 8.3 | 96.7 | 95.0 | 23.3 | 8.3 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | 3.3 | 91.7 | 90.0 | 46.7 | 3.3 |
| | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 11 | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | 23.3 | 95.0 | 95.0 | 50.0 | 18.3 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 12 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 25.0 | 98.3 | 98.3 | 36.7 | 25.0 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 13 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 56.7 | 100.0 | 100.0 | 70.0 | 43.3 |
| | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 14 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 3.3 | 88.3 | 88.3 | 23.3 | 3.3 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | | |
| | Caparol | 4 | L | 1 | lb ai/a | PO1 | | | | | |
| LSD P=.05 | | | | | | | 13.71 | 8.51 | 9.65 | 22.89 | 13.21 |
| Standard Deviation | | | | | | | 8.17 | 5.07 | 5.75 | 13.63 | 7.87 |
| CV | | | | | | | 62.94 | 5.82 | 6.62 | 37.92 | 70.34 |

# Weed Control Programs with Pyroxasulfone and Pendimethalin in Celery – Schreur - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | COPU | AMARANTH | TOTAL WC | CELERY | TOTAL WC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | COPU | AMARANTH | TOTAL WC | | TOTAL WC |
| Crop Name | | | | | | | | | | CELERY | |
| Rating Date | | | | | | | 18-Jun-2021 | 18-Jun-2021 | 18-Jun-2021 | 1-Jul-2021 | 1-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC/CG | SC/CG | SC/CG | CG/MS | CG/MS |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Caparol | 4 | L | 1 | lb ai/a | POTP,PO1 | 80.0 | 78.3 | 76.7 | 0.0 | 100.0 |
| 3 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 86.7 | 85.0 | 85.0 | 0.0 | 100.0 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 76.7 | 76.7 | 75.0 | 0.0 | 98.3 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 5 | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | 81.7 | 78.3 | 78.3 | 0.0 | 98.3 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 6 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 75.0 | 76.7 | 80.0 | 0.0 | 100.0 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 7 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 86.7 | 88.3 | 85.0 | 0.0 | 100.0 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 8 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 81.3 | 86.7 | 88.3 | 0.0 | 100.0 |
| | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 9 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 89.7 | 88.3 | 90.0 | 0.0 | 100.0 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | 80.0 | 81.7 | 85.0 | 0.0 | 100.0 |
| | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 11 | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | 85.0 | 90.0 | 86.7 | 0.0 | 100.0 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 12 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 86.7 | 88.3 | 88.3 | 0.0 | 100.0 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 13 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 96.3 | 96.7 | 96.7 | 20.0 | 100.0 |
| | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 14 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 70.0 | 70.0 | 68.3 | 0.0 | 96.7 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | | |
| | Caparol | 4 | L | 1 | lb ai/a | PO1 | | | | | |
| LSD P=.05 | | | | | | | 9.92 | 11.40 | 9.69 | 0.00 | 2.30 |
| Standard Deviation | | | | | | | 5.91 | 6.79 | 5.77 | 0.00 | 1.37 |
| CV | | | | | | | 7.69 | 8.76 | 7.46 | 0.0 | 1.48 |

# Weed Control Programs with Pyroxasulfone and Pendimethalin in Celery – Schreur - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | AMARANTH | LACG | | |
| Crop Name | | | | | | | CELERY | | | CELERY | CELERY |
| Rating Date | | | | | | | 10-Aug-2021 | 10-Aug-2021 | 10-Aug-2021 | 10-Aug-2021 | 10-Aug-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | HARVEST | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | NO/20 FT | KG/20 FT |
| Assessed By | | | | | | | MH | MH | MH | NS | NS |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 35.7 | 38.21 |
| 2 | Caparol | 4 | L | 1 | lb ai/a | POTP,PO1 | 0.0 | 100.0 | 100.0 | 41.0 | 42.75 |
| 3 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 0.0 | 100.0 | 100.0 | 38.0 | 41.93 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 0.0 | 100.0 | 100.0 | 37.0 | 39.75 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 5 | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | 0.0 | 100.0 | 93.3 | 40.7 | 38.96 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 6 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 0.0 | 100.0 | 100.0 | 37.7 | 42.55 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 7 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 0.0 | 100.0 | 98.3 | 38.7 | 41.91 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 8 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 0.0 | 100.0 | 100.0 | 36.3 | 37.04 |
| | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 9 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 0.0 | 96.7 | 100.0 | 39.0 | 41.32 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | 0.0 | 100.0 | 100.0 | 36.7 | 40.94 |
| | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 11 | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POTP | 0.0 | 100.0 | 96.7 | 37.7 | 36.88 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 12 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 0.0 | 100.0 | 100.0 | 39.7 | 42.05 |
| | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | | | | | |
| | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 13 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 5.0 | 100.0 | 100.0 | 38.0 | 36.18 |
| | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | |
| 14 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 0.0 | 96.7 | 100.0 | 37.7 | 44.07 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | | |
| | Caparol | 4 | L | 1 | lb ai/a | PO1 | | | | | |
| LSD P=.05 | | | | | | | 0.00 | 3.52 | 3.82 | 4.56 | 8.29 |
| Standard Deviation | | | | | | | 0.00 | 2.10 | 2.27 | 2.72 | 4.94 |
| CV | | | | | | | 0.0 | 2.27 | 2.47 | 7.12 | 12.25 |

# Celery Tolerance and Purple Amaranth Control with GoalTender – Eding - 2021

**Project Code: 113-21-3** **Location: Hamilton, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Celery** **Variety:CR-1**
**Planting Method: Transplanted** **Planting Date: 6/29/21**
**Harvest Date: 8/25/21**
**Plant Spacing: 4″; 2 rows/plot** **Row Spacing: 40″**
**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 | 6/30/21 | 11:30 | 77/70 F | Wet | W 2mph | 44% | 5% | No |
| PO1 | 7/1/21 | 1:00-2:00pm | 84/82 F | Moist | NE 1mph | 49% | 20% | No |
| PO2 | 7/16/21 | 10-12pm | 75/70 F | Moist | 1mph | 75% | 90% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/3/21 | No Crop or weed data recorded | | | |
| 7/1/21 | Celery | 5-7″ | 6-8 LS | Good |
| 7/1/21 | PUAM = Purple Amaranth | 0.5-4″ | Vegetative | Low to High |
| 7/16/21 | Celery | 7-8″ | 10-11 LS | Good |
| 7/16/21 | PUAM | 2-5″ | Vegetative | High |

**Additional Weeds Observed Throughout Season**

GRASS = 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. Maintenance herbicide of Select Max (16 fl oz/ac) + NIS (0.25%) applied on 7/16/21 to all plots before application of GoalTender.
4. Plots 203 and 305 also received Caparol (2 lb ai/ac) application on 7/1/21.
5. At PO2 application timing, only treatment 2, 4 and 11 received GoalTender. Treatment 4 and 11 received 0.125 lb ai/ac GoalTernder and treatment 2 received 0.25 lb ai/ac GoalTender.
6. For yield data, 10 feet of two rows/plot were harvested (total of 20 feet).

# Michigan State University

**Celery Tolerance and Purple Amaranth Control with GoalTender - Eding - 2021**

Trial ID:113-21-3 Location:Hamilton, MI Trial Year:2021

Protocol ID:113-21-3 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | PUAM | | PUAM | | PUAM |
| Crop Name | | | | | | | CELERY | | CELERY | | CELERY | |
| Rating Date | | | | | | | 10-Jun-2021 | 10-Jun-2021 | 18-Jun-2021 | 18-Jun-2021 | 1-Jul-2021 | 1-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC | SC |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Caparol | 4 | L | 1 | lb ai/a | POTP,PO1 | 0.0 | 38.3 | 0.0 | 35.0 | 0.0 | 16.7 |
| 3 | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | 45.0 | 100.0 | 26.7 | 98.3 | 0.0 | 100.0 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | | |
| 4 | Caparol | 4 | L | 2 | lb ai/a | POTP | 0.0 | 53.3 | 0.0 | 48.3 | 0.0 | 36.7 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | | | |
| 5 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 45.0 | 100.0 | 40.0 | 95.0 | 0.0 | 96.7 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | POTP | | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 50.0 | 100.0 | 43.3 | 98.3 | 16.7 | 100.0 |
| | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | POTP | 33.3 | 100.0 | 35.0 | 98.3 | 13.3 | 98.3 |
| | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | | |
| 8 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 43.3 | 100.0 | 36.7 | 98.3 | 21.7 | 100.0 |
| | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | | | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | | | |
| 9 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 30.0 | 100.0 | 25.0 | 90.0 | 0.0 | 98.3 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | | | |
| 10 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 15.0 | 90.0 | 0.0 | 85.0 | 3.3 | 91.7 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | POTP | 3.3 | 76.7 | 3.3 | 63.3 | 0.0 | 66.7 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | | | |
| 12 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 3.3 | 86.7 | 0.0 | 83.3 | 8.3 | 100.0 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | | | |
| LSD P=.05 | | | | | | | 17.96 | 28.51 | 9.89 | 20.55 | 14.11 | 27.58 |
| Standard Deviation | | | | | | | 10.60 | 16.84 | 5.84 | 12.14 | 8.33 | 16.29 |
| CV | | | | | | | 47.42 | 21.38 | 33.36 | 16.3 | 157.89 | 21.6 |

# Celery Tolerance and Purple Amaranth Control with GoalTender – Eding - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | GRASS | CELERY | PUAM | GRASS |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | |
| Crop Name | | | | | | | | CELERY | | |
| Rating Date | | | | | | | 1-Jul-2021 | 16-Jul-2021 | 16-Jul-2021 | 16-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Caparol | 4 | L | 1 | lb ai/a | POTP,PO1 | 31.7 | 0.0 | 0.0 | 0.0 |
| 3 | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | 93.3 | 0.0 | 88.3 | 76.7 |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | |
| 4 | Caparol | 4 | L | 2 | lb ai/a | POTP | 60.0 | 0.0 | 58.3 | 13.3 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | |
| 5 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 90.0 | 5.0 | 91.7 | 76.7 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | POTP | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 100.0 | 13.3 | 95.0 | 96.7 |
| | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | POTP | 95.0 | 13.3 | 93.3 | 90.0 |
| | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | |
| 8 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 98.3 | 26.7 | 93.3 | 95.0 |
| | GoalTender | 4 | SC | 0.5 | lb ai/a | POTP | | | | |
| | Caparol | 4 | L | 2 | lb ai/a | PO1 | | | | |
| 9 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 85.0 | 8.3 | 95.0 | 46.7 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | |
| 10 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 100.0 | 11.7 | 91.7 | 95.0 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | POTP | 90.0 | 0.0 | 76.7 | 46.7 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | |
| 12 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 98.3 | 16.7 | 93.3 | 95.0 |
| | GoalTender | 4 | SC | 0.062 | lb ai/a | PO1 | | | | |
| LSD P=.05 | | | | | | | 33.47 | 11.35 | 17.80 | 14.81 |
| Standard Deviation | | | | | | | 19.77 | 6.70 | 10.51 | 8.74 |
| CV | | | | | | | 25.19 | 84.63 | 14.39 | 14.34 |

# Celery Tolerance and Purple Amaranth Control with GoalTender – Eding - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | PUAM | | PUAM |
| Crop Name | | | | | | | CELERY | | CELERY | |
| Rating Date | | | | | | | 23-Jul-2021 | 23-Jul-2021 | 4-Aug-2021 | 4-Aug-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC |
| 1 | Non-treated | | | | | | 0.0 | 100.0 | 0.0 | 100.0 |
| 2 | Caparol | 4L | | 1 | lb ai/a | POTP,PO1 | 48.3 | 91.7 | 28.3 | 85.7 |
| 3 | GoalTender | 4SC | | 0.5 | lb ai/a | POTP | 0.0 | 90.0 | 0.0 | 84.0 |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 4 | Caparol | 4L | | 2 | lb ai/a | POTP | 40.0 | 88.3 | 25.0 | 85.0 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| 5 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 0.0 | 88.3 | 0.0 | 81.7 |
| | GoalTender | 4SC | | 0.25 | lb ai/a | POTP | | | | |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 16.7 | 93.3 | 10.0 | 75.0 |
| | GoalTender | 4SC | | 0.5 | lb ai/a | POTP | | | | |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | POTP | 5.0 | 95.0 | 8.3 | 78.3 |
| | GoalTender | 4SC | | 0.5 | lb ai/a | POTP | | | | |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 8 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 36.7 | 93.3 | 38.3 | 75.0 |
| | GoalTender | 4SC | | 0.5 | lb ai/a | POTP | | | | |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 9 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 8.3 | 88.3 | 3.3 | 76.3 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| 10 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 6.7 | 86.7 | 3.3 | 76.7 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | POTP | 36.7 | 95.0 | 26.7 | 86.7 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| 12 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 18.3 | 95.0 | 23.3 | 86.0 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| LSD P=.05 | | | | | | | 12.30 | 5.56 | 10.62 | 8.97 |
| Standard Deviation | | | | | | | 7.26 | 3.29 | 6.27 | 5.30 |
| CV | | | | | | | 40.24 | 3.57 | 45.15 | 6.42 |

# Celery Tolerance and Purple Amaranth Control with GoalTender – Eding - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | PUAM | | |
| Crop Name | | | | | | | CELERY | | CELERY | CELERY |
| Rating Date | | | | | | | 25-Aug-2021 | 25-Aug-2021 | 25-Aug-2021 | 25-Aug-2021 |
| Rating Type | | | | | | | RATING | RATING | HARVEST | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | NO./20 FT | KG/20 ft |
| Assessed By | | | | | | | SC | SC | NS | NS |
| 1 | Non-treated | | | | | | 0.0 | 100.0 | 32.7 | 22.00 |
| 2 | Caparol | 4L | | 1 | lb ai/a | POTP,PO1 | 20.0 | 85.0 | 34.0 | 17.59 |
| 3 | GoalTender | 4SC | | 0.5 | lb ai/a | POTP | 3.3 | 84.3 | 33.3 | 25.12 |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 4 | Caparol | 4L | | 2 | lb ai/a | POTP | 13.3 | 88.0 | 34.0 | 19.80 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| 5 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 0.0 | 73.3 | 32.7 | 26.45 |
| | GoalTender | 4SC | | 0.25 | lb ai/a | POTP | | | | |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 6.7 | 63.3 | 31.0 | 18.09 |
| | GoalTender | 4SC | | 0.5 | lb ai/a | POTP | | | | |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | POTP | 5.0 | 74.0 | 32.7 | 21.27 |
| | GoalTender | 4SC | | 0.5 | lb ai/a | POTP | | | | |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 8 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 46.7 | 52.3 | 23.3 | 9.22 |
| | GoalTender | 4SC | | 0.5 | lb ai/a | POTP | | | | |
| | Caparol | 4L | | 2 | lb ai/a | PO1 | | | | |
| 9 | Chateau SW | 51 | WDG | 0.096 | lb ai/a | POTP | 0.0 | 76.0 | 31.7 | 22.82 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| 10 | Dual Magnum | 7.62 | EC | 1.9 | lb ai/a | POTP | 0.0 | 73.3 | 34.0 | 24.74 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | POTP | 16.7 | 86.7 | 37.3 | 19.50 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| 12 | Zidua | 4.17 | SC | 0.106 | lb ai/a | POTP | 23.3 | 78.3 | 28.7 | 12.84 |
| | GoalTender | 4SC | | 0.062 | lb ai/a | PO1 | | | | |
| LSD P=.05 | | | | | | | 11.10 | 11.65 | 4.87 | 8.58 |
| Standard Deviation | | | | | | | 6.56 | 6.88 | 2.88 | 5.07 |
| CV | | | | | | | 58.28 | 8.83 | 8.96 | 25.88 |

# Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower – HTRC - 2021

**Project Code: 114-21-1** **Location: Holt, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Mose**
**Crop: Cabbage, Cauliflower** **Variety: Blue Vantage, Candid Charm**
**Planting Method: Transplanted** **Planting Date: 5/26/21**
**Harvest Date: multiple harvest; see data**
**Plant Spacing: 22″** **Row Spacing: 36″; one row of each crop/plot**
**Tillage Type: Conventional** **Study Design: RCB Replications: 3**
**Plot Size: 5.3 ft wide x 30 ft long**

**Soil Type: Marlette Fine Sandy Loam** **OM: 2.1%** **pH: 6.9**
**Sand: 47%** **Silt: 26%** **Clay: 27%** **CEC: 8**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PRT | 5/25/21 | 10-10:25am | 83/67 F | Slightly Moist | SW 2mph | 49% | 45% | No |
| POT | 5/27/21 | 8:00-8:30am | 51/55 F | Well Moist | 2mph | 58% | 10% | No |
| PO1 | 6/16/21 | 1:00-1:30pm | 82/88 F | Dry | 2mph | 21% | 10% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 5/25/21 | No crop or weeds | | | |
| 5/27/21 | Cabbage & Cauliflower | | 3-4 LS | Good |
| 5/27/21 | No weeds | | | |
| 6/16/21 | Cabbage & Cauliflower | 5-7″ | 8-9 LS | Good |
| 6/16/21 | COLQ = Common Lambsquarters | 4-8″ | Vegetative | Moderate to low/dense in nontreated |
| 6/16/21 | RRPW = Redroot Pigweed | 5-10″ | Vegetative | Moderate to low/dense in nontreated |
| 6/16/21 | CORW = Common Ragweed | 4-8″ | Vegetative | Moderate to low/dense in nontreated |

**Additional Weeds Observed Throughout Season**

**TOTAL WC = overall control of broadleaves, sedges, and 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. Maintenance application of SelectMax (16 fl oz/ac) + NIS (0.25%) applied to all plots on 6/28/21 to control grasses.**
**4. Non-treated plots kept weedy until end June. Non-treated plants hand-weeded on first week of July and kept weed free after this. Therefore, lower yields reported from non-treated plots.**
**5 Pyridate injury showed as leaf discoloration for initial one to two weeks and then some level of crop stunting. But plants started recovering within one month of application.**
**6. Upstage injury showed as severe leaf discoloration for first two to three weeks and then plant start recovering.**

# Michigan State University

**Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower - HTRC - 2021**

Trial ID: 114-21-1 Location: East Lansing, MI Trial Year: 2021

Protocol ID: 114-21-1 Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CABBAGE 04Jun2021 RATING 0-100 SC | CAULI 04Jun2021 RATING 0-100 SC | TOTAL WC 04Jun2021 RATING 0-100 SC | CABBAGE 11Jun2021 RATING 0-100 SC | CAULI 11Jun2021 RATING 0-100 SC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 95.0 | 0.0 | 0.0 |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 95.0 | 0.0 | 0.0 |
| | GoalTender | 4 | SC | 0.188 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 1.7 | 1.7 | 96.7 | 0.0 | 0.0 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 96.7 | 0.0 | 0.0 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.3 | 3.3 | 95.0 | 0.0 | 0.0 |
| | Lentagran | 45 | WP | 0.47 | lb ai/a | PO1 | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 96.7 | 0.0 | 0.0 |
| | Tough | 5 | EC | 0.62 | lb ai/a | PO1 | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.3 | 3.3 | 98.3 | 1.7 | 0.0 |
| | Lentagran | 45 | WP | 0.62 | lb ai/a | PO1 | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 98.3 | 11.7 | 13.3 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.094 | lb ai/a | PO1 | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 50.0 | 50.0 | 98.3 | 43.3 | 40.0 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 11 | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | 53.3 | 53.3 | 98.3 | 31.7 | 31.7 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POT | | | | | |
| LSD (P=.05) | | | | | | | 6.20 | 6.20 | 28.40 | 18.84 | 19.84 |
| Standard Deviation | | | | | | | 3.64 | 3.64 | 16.67 | 11.06 | 11.65 |
| CV | | | | | | | 35.87 | 35.87 | 18.34 | 137.74 | 150.78 |

## Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | TOTAL WC | CABBAGE | CAULI | COLQ | RRPW |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | | CABBAGE | CAULI | | |
| Rating Date | | | | | | | 11Jun2021 | 21Jun2021 | 21Jun2021 | 21Jun2021 | 21Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Non-treated | | | | | | 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 88.3 | 0.0 | 0.0 | 81.7 | 83.3 |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 86.7 | 26.7 | 25.0 | 86.7 | 90.0 |
| | GoalTender | 4 | SC | 0.188 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 91.7 | 10.0 | 11.7 | 75.0 | 91.7 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 91.7 | 18.3 | 21.7 | 81.7 | 83.3 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 90.0 | 11.7 | 13.3 | 81.7 | 85.0 |
| | Lentagran | 45 | WP | 0.47 | lb ai/a | PO1 | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 90.0 | 20.0 | 21.7 | 88.3 | 88.3 |
| | Tough | 5 | EC | 0.62 | lb ai/a | PO1 | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 90.0 | 5.0 | 8.3 | 78.3 | 88.3 |
| | Lentagran | 45 | WP | 0.62 | lb ai/a | PO1 | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 95.0 | 38.3 | 40.0 | 96.7 | 96.7 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.094 | lb ai/a | PO1 | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 86.7 | 25.0 | 20.0 | 91.7 | 91.7 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 11 | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | 90.0 | 25.0 | 20.0 | 91.7 | 90.0 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POT | | | | | |
| LSD (P=.05) | | | | | | | 29.14 | 9.35 | 9.57 | 9.39 | 6.51 |
| Standard Deviation | | | | | | | 17.11 | 5.49 | 5.62 | 5.51 | 3.82 |
| CV | | | | | | | 20.24 | 33.56 | 34.03 | 7.1 | 4.73 |

## Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | CORW | | | COLQ | RRPW | CORW |
| Crop Name | | | | | | | | CABBAGE | CAULI | | | |
| Rating Date | | | | | | | 21Jun2021 | 28Jun2021 | 28Jun2021 | 28Jun2021 | 28Jun2021 | 28Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC | SC |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 73.3 | 0.0 | 0.0 | 71.7 | 86.7 | 66.7 |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 88.3 | 20.0 | 20.0 | 81.7 | 93.0 | 91.7 |
| | GoalTender | 4 | SC | 0.188 | lb ai/a | PO1 | | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 86.7 | 1.7 | 1.7 | 76.7 | 95.0 | 91.7 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 80.0 | 1.7 | 1.7 | 91.7 | 95.0 | 81.7 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 85.0 | 0.0 | 1.7 | 78.3 | 95.0 | 81.7 |
| | Lentagran | 45 | WP | 0.47 | lb ai/a | PO1 | | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 83.3 | 8.3 | 6.7 | 95.0 | 95.0 | 85.0 |
| | Tough | 5 | EC | 0.62 | lb ai/a | PO1 | | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 80.0 | 0.0 | 3.3 | 76.0 | 95.0 | 81.7 |
| | Lentagran | 45 | WP | 0.62 | lb ai/a | PO1 | | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 96.7 | 26.7 | 31.0 | 95.0 | 96.7 | 96.7 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | PO1 | | | | | | |
| | Stinger | 3 | L | 0.094 | lb ai/a | PO1 | | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 83.3 | 3.3 | 0.0 | 95.0 | 93.3 | 87.7 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | | |
| 11 | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | 80.0 | 3.3 | 3.3 | 93.3 | 93.3 | 80.0 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POT | | | | | | |
| LSD (P=.05) | | | | | | | 7.11 | 6.70 | 6.25 | 11.11 | 5.85 | 14.81 |
| Standard Deviation | | | | | | | 4.17 | 3.93 | 3.67 | 6.52 | 3.43 | 8.70 |
| CV | | | | | | | 5.49 | 66.53 | 58.23 | 8.4 | 4.03 | 11.33 |

# Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CABBAGE 06Jul2021 RATING 0-100 SC | CAULI 06Jul2021 RATING 0-100 SC | COLQ 06Jul2021 RATING 0-100 SC | RRPW 06Jul2021 RATING 0-100 SC | CORW 06Jul2021 RATING 0-100 SC | CABBAGE 28Jul2021 RATING 0-100 SC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 100.0 | 100.0 | 100.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 63.3 | 91.7 | 55.0 | 1.7 |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.3 | 3.3 | 75.0 | 96.7 | 88.3 | 3.3 |
| | GoalTender | 4 | SC | 0.188 | lb ai/a | PO1 | | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 75.0 | 90.0 | 88.3 | 3.3 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 91.7 | 96.7 | 78.3 | 0.0 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 3.3 | 80.0 | 96.7 | 81.7 | 1.7 |
| | Lentagran | 45 | WP | 0.47 | lb ai/a | PO1 | | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 93.3 | 96.7 | 81.7 | 5.0 |
| | Tough | 5 | EC | 0.62 | lb ai/a | PO1 | | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.0 | 73.3 | 95.0 | 80.0 | 6.7 |
| | Lentagran | 45 | WP | 0.62 | lb ai/a | PO1 | | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 11.7 | 10.0 | 91.7 | 98.3 | 98.3 | 4.3 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | PO1 | | | | | | |
| | Stinger | 3 | L | 0.094 | lb ai/a | PO1 | | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 3.3 | 0.0 | 91.7 | 91.7 | 81.7 | 0.0 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | | |
| 11 | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | 0.0 | 0.0 | 95.0 | 95.0 | 80.0 | 5.0 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POT | | | | | | |
| LSD (P=.05) | | | | | | | 4.64 | 4.30 | 24.14 | 9.79 | 23.66 | 5.47 |
| Standard Deviation | | | | | | | 2.72 | 2.52 | 14.17 | 5.75 | 13.89 | 3.21 |
| CV | | | | | | | 163.48 | 166.49 | 16.77 | 6.03 | 16.73 | 113.98 |

# Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CAULI | CABBAGE | CAULI | CABBAGE | CABBAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | CAULI | CABBAGE | CAULI | CABBAGE | CABBAGE |
| Rating Date | | | | | | | 28Jul2021 | 30Jun2021 | 30Jun2021 | 26Jul2021 | 26Jul2021 |
| Rating Type | | | | | | | RATING | STAND CTS | STAND CTS | HARVEST | HARVEST |
| Rating Unit | | | | | | | 0-100 | NO./PLOT | NO./PLOT | NO./PLOT | KG/PLOT |
| Assessed By | | | | | | | SC | RM/HT | RM/HT | MH | MH |
| 1 | Non-treated | | | | | | 0.0 | 16.7 | 16.7 | 0.7 | 1.17 |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 2.0 | 17.3 | 16.0 | 1.0 | 1.73 |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.3 | 17.3 | 16.7 | 1.7 | 3.10 |
| | GoalTender | 4 | SC | 0.188 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.3 | 17.0 | 16.7 | 2.3 | 4.34 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 17.7 | 17.0 | 0.3 | 0.59 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 1.7 | 18.7 | 16.3 | 1.0 | 1.97 |
| | Lentagran | 45 | WP | 0.47 | lb ai/a | PO1 | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.3 | 18.3 | 16.7 | 0.7 | 1.13 |
| | Tough | 5 | EC | 0.62 | lb ai/a | PO1 | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.3 | 17.3 | 15.7 | 0.7 | 1.07 |
| | Lentagran | 45 | WP | 0.62 | lb ai/a | PO1 | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.3 | 18.0 | 15.7 | 1.0 | 1.42 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.094 | lb ai/a | PO1 | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 0.0 | 18.7 | 16.0 | 0.0 | 0.00 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 11 | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | 1.7 | 18.3 | 16.7 | 0.7 | 1.09 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POT | | | | | |
| LSD (P=.05) | | | | | | | 5.21 | 1.93 | 1.81 | 1.75 | 3.05 |
| Standard Deviation | | | | | | | 3.05 | 1.13 | 1.06 | 1.03 | 1.79 |
| CV | | | | | | | 152.47 | 6.39 | 6.5 | 112.8 | 111.92 |

# Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | CABBAGE | CABBAGE | CABBAGE | CABBAGE | CABBAGE |
| Rating Date | | | | | | | 28Jul2021 | 28Jul2021 | 03Aug2021 | 03Aug2021 | 09Aug2021 |
| Rating Type | | | | | | | HARVEST | HARVEST | HARVEST | HARVEST | HARVEST |
| Rating Unit | | | | | | | NO./PLOT | KG/PLOT | NO./PLOT | KG/PLOT | NO./PLOT |
| Assessed By | | | | | | | HT | HT | HT,RM | HT,RM | RM |
| 1 | Non-treated | | | | | | 3.3 | 3.49 | 1.0 | 1.25 | 1.3 |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.7 | 4.92 | 5.0 | 6.88 | 3.0 |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.7 | 5.30 | 4.7 | 7.35 | 5.0 |
| | GoalTender | 4 | SC | 0.188 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 4.0 | 6.06 | 3.3 | 5.40 | 3.3 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 5.7 | 8.60 | 2.3 | 3.57 | 3.3 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 4.0 | 5.23 | 7.0 | 10.89 | 3.3 |
| | Lentagran | 45 | WP | 0.47 | lb ai/a | PO1 | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 2.0 | 2.81 | 2.3 | 3.69 | 6.3 |
| | Tough | 5 | EC | 0.62 | lb ai/a | PO1 | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 4.0 | 5.29 | 6.3 | 8.91 | 4.3 |
| | Lentagran | 45 | WP | 0.62 | lb ai/a | PO1 | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 1.7 | 2.54 | 5.3 | 7.73 | 5.7 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.094 | lb ai/a | PO1 | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 1.0 | 1.45 | 6.7 | 9.26 | 5.7 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 11 | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | 1.0 | 1.41 | 4.0 | 6.22 | 5.0 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POT | | | | | |
| LSD (P=.05) | | | | | | | 4.90 | 6.91 | 3.60 | 5.68 | 3.84 |
| Standard Deviation | | | | | | | 2.88 | 4.06 | 2.12 | 3.33 | 2.25 |
| CV | | | | | | | 93.07 | 94.9 | 48.5 | 51.58 | 53.52 |

# Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CABBAGE 09Aug2021 HARVEST KG/PLOT RM | CABBAGE 16Aug2021 HARVEST NO./PLOT HT | CABBAGE 16Aug2021 HARVEST KG/PLOT HT | CABBAGE TOTAL NO./PLOT | CABBAGE HARVEST KG/PLOT | CAULI 28Jul2021 HARVEST NO./PLOT HT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Code | | | | | | | | | | | |
| | Crop Name | | | | | | | | | | | |
| | Rating Date | | | | | | | | | | | |
| | Rating Type | | | | | | | | | | | |
| | Rating Unit | | | | | | | | | | | |
| | Assessed By | | | | | | | | | | | |
| 1 | Non-treated | | | | | | 1.99 | 6.3 | 6.10 | 12.7 | 14.00 | 5.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 4.40 | 2.7 | 3.36 | 15.3 | 21.28 | 6.7 |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 7.52 | 1.0 | 1.26 | 16.0 | 24.53 | 6.7 |
| | GoalTender | 4 | SC | 0.188 | lb ai/a | PO1 | | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 5.00 | 2.0 | 1.88 | 15.0 | 22.68 | 4.7 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 5.24 | 4.3 | 6.12 | 16.0 | 24.12 | 8.3 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 4.99 | 2.7 | 2.94 | 18.0 | 26.01 | 4.7 |
| | Lentagran | 45 | WP | 0.47 | lb ai/a | PO1 | | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 9.40 | 3.3 | 4.41 | 14.7 | 21.45 | 5.3 |
| | Tough | 5 | EC | 0.62 | lb ai/a | PO1 | | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 6.33 | 2.3 | 3.04 | 17.7 | 24.64 | 6.7 |
| | Lentagran | 45 | WP | 0.62 | lb ai/a | PO1 | | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 8.39 | 1.7 | 2.37 | 15.3 | 22.45 | 1.0 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | PO1 | | | | | | |
| | Stinger | 3 | L | 0.094 | lb ai/a | PO1 | | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 9.04 | 2.7 | 3.03 | 16.0 | 22.78 | 7.3 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | | |
| 11 | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | 7.12 | 3.0 | 3.33 | 13.7 | 19.17 | 5.3 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POT | | | | | | |
| LSD (P=.05) | | | | | | | 6.01 | 3.70 | 4.79 | 3.35 | 5.63 | 5.22 |
| Standard Deviation | | | | | | | 3.53 | 2.17 | 2.81 | 1.97 | 3.30 | 3.06 |
| CV | | | | | | | 55.95 | 74.69 | 81.81 | 12.7 | 14.96 | 54.63 |

# Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | CAULI | CAULI | CAULI | CAULI | CAULI |
| Rating Date | | | | | | | 28Jul2021 | 03Aug2021 | 03Aug2021 | 09Aug2021 | 09Aug2021 |
| Rating Type | | | | | | | HARVEST | HARVEST | HARVEST | HARVEST | HARVEST |
| Rating Unit | | | | | | | KG/PLOT | NO./PLOT | KG/PLOT | NO./PLOT | KG/PLOT |
| Assessed By | | | | | | | HT | HT,RM | HT,RM | RM | RM |
| 1 | Non-treated | | | | | | 3.26 | 4.0 | 2.03 | 1.7 | 1.04 |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 5.46 | 5.0 | 3.54 | 3.7 | 2.96 |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 4.95 | 5.7 | 4.58 | 2.7 | 2.61 |
| | GoalTender | 4 | SC | 0.188 | lb ai/a | PO1 | | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 3.38 | 8.3 | 7.43 | 1.7 | 1.29 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 6.26 | 3.0 | 2.57 | 2.3 | 1.72 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 2.78 | 6.3 | 6.92 | 2.7 | 1.74 |
| | Lentagran | 45 | WP | 0.47 | lb ai/a | PO1 | | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 4.06 | 4.7 | 3.86 | 4.3 | 3.04 |
| | Tough | 5 | EC | 0.62 | lb ai/a | PO1 | | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 5.01 | 5.3 | 4.25 | 3.0 | 2.20 |
| | Lentagran | 45 | WP | 0.62 | lb ai/a | PO1 | | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.63 | 8.3 | 7.42 | 3.0 | 2.39 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | PO1 | | | | | |
| | Stinger | 3 | L | 0.094 | lb ai/a | PO1 | | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 5.42 | 5.0 | 4.47 | 3.0 | 2.71 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 11 | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | 4.15 | 6.3 | 5.48 | 2.3 | 1.99 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POT | | | | | |
| LSD (P=.05) | | | | | | | 4.29 | 2.91 | 2.41 | 3.01 | 2.37 |
| Standard Deviation | | | | | | | 2.52 | 1.71 | 1.41 | 1.77 | 1.39 |
| CV | | | | | | | 61.22 | 30.34 | 29.7 | 64.04 | 64.76 |

# Evaluation of 2 Formulations of Pyridate for Efficacy & Crop Tolerance on Cabbage & Cauliflower – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CAULI 16Aug2021 HARVEST NO./PLOT HT | CAULI 16Aug2021 HARVEST KG/PLOT HT | CAULI TOTAL NO./PLOT | CAULI TOTAL KG/PLOT |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Non-treated | | | | | | 4.3 | 1.47 | 15.0 | 7.79 |
| 2 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 1.0 | 0.45 | 16.3 | 12.41 |
| 3 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.3 | 0.17 | 15.3 | 12.31 |
| | GoalTender | 4 | SC | 0.188 | lb ai/a | PO1 | | | | |
| 4 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 1.7 | 1.13 | 16.3 | 13.23 |
| | Stinger | 3 | L | 0.188 | lb ai/a | PO1 | | | | |
| 5 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 1.3 | 1.06 | 15.0 | 11.61 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | |
| 6 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 1.3 | 0.92 | 15.0 | 12.36 |
| | Lentagran | 45 | WP | 0.47 | lb ai/a | PO1 | | | | |
| 7 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 2.7 | 1.44 | 17.0 | 12.39 |
| | Tough | 5 | EC | 0.62 | lb ai/a | PO1 | | | | |
| 8 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 0.0 | 0.00 | 15.0 | 11.45 |
| | Lentagran | 45 | WP | 0.62 | lb ai/a | PO1 | | | | |
| 9 | Dual Magnum | 7.62 | EC | 1.3 | lb ai/a | PRT | 2.0 | 1.25 | 14.3 | 11.69 |
| | GoalTender | 4 | SC | 0.25 | lb ai/a | PO1 | | | | |
| | Stinger | 3 | L | 0.094 | lb ai/a | PO1 | | | | |
| 10 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 0.7 | 0.40 | 16.0 | 13.00 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | |
| 11 | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | 0.7 | 0.27 | 14.7 | 11.89 |
| | Satellite Hydrocap | 3.8 | ME | 1.9 | lb ai/a | POT | | | | |
| LSD (P=.05) | | | | | | | 3.59 | 1.77 | 1.95 | 2.54 |
| Standard Deviation | | | | | | | 2.11 | 1.04 | 1.15 | 1.49 |
| CV | | | | | | | 145.0 | 134.17 | 7.41 | 12.62 |

# New Herbicide Evaluation for Row Middle Weed Control in Pickling Cucumber – HTRC - 2021

**Project Code: 108-21-1** **Location: Holt, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Cucumber** **Variety: Expedition**
**Planting Method: Seeded** **Planting Date: 5/17/21**
**Harvest Date: 7/9/21**
**Plant Spacing: 3″** **Row Spacing: 14″; 3 rows/plot**
**Tillage Type: Conventional** **Study Design: RCB Replications: 4**
**Plot Size: 12 ft wide x 25 ft long**

**Soil Type: Capac Loam** **OM: 2.1%** **pH: 6.7**
**Sand: 47%** **Silt: 28%** **Clay: 25%** **CEC: 8.5**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PO1 | 6/10/21 | 8:00-9:00am | 76/74 F | Moist | E 1-2mph | 57% | 0% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/10/21 | Cucumber | | 3 LS | Good |
| 6/10/21 | COLQ = Common Lambsquarters | 10 cm | 4-5 LS | Dense in Rep 2-4, moderate in Rep 1 |
| 6/10/21 | RRPW = Redroot pigweed | 8-10 cm | 4-5 LS | |
| 6/10/21 | CORW = Common Ragweed | 8-10 cm | 4-5 LS | |

**Additional Weeds Observed Throughout Season**
**Grasses = Large Crabgrass & Foxtail spp.**

**Notes and Comments**
**1. Spray applied with 2 nozzle-shielded boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. Herbicide treatments were applied in 2.7′ band in allies on both sides of crop area. Each plot has 2.7′ herbicide treatment band, 5.3′ crop area (three rows of cucumbers), and then second 2.7′ herbicide treatment band. There was a 1.3′ buffer area between each herbicide treatment bands in allies. So total plot area was 2.7+5.3+2.7+1.3 = 12 feet.**
**2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.**
**3. Maintenance application of Strategy (0.375 lb ai/a) applied to crop rows on 5/17/21 immediately after planting. Crop area sprayed with one application of SelectMax (16 fl oz/ac) and hand-weeded as needed throughout season.**
**4. Plot 302 sprayed with Treatment 5 and 6.**
**5. Weed control and crop injury ratings at harvest was similar to July 28, 2021 ratings.**

# Michigan State University

**New Herbicide Evaluation for Row Middle Weed Control in Pickling Cucumber - HTRC - 2021**

Trial ID: 108-21-1 Location: Holt, MI Trial Year: 2021

Protocol ID: 108-21-1 Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CUKE | GRASSES | COLQ | CORW | RRPW |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | GRASSES | COLQ | CORW | RRPW |
| Crop Name | | | | | | | CUKE | | | | |
| Rating Date | | | | | | | 21Jun2021 | 21Jun2021 | 21Jun2021 | 21Jun2021 | 21Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Untreated | | | | | PO1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Gramoxone 3SL | 3 | SL | 1 | lb ai/a | PO1 | 33.8 | 95.0 | 92.5 | 96.3 | 92.5 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 3 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 23.8 | 0.0 | 93.8 | 88.8 | 93.8 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 16.3 | 95.0 | 98.8 | 98.8 | 100.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 22.5 | 97.5 | 100.0 | 98.8 | 100.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 21.3 | 96.3 | 97.5 | 96.3 | 98.8 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 7 | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | PO1 | 27.5 | 95.0 | 100.0 | 96.3 | 100.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 8 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 21.3 | 93.8 | 100.0 | 97.5 | 100.0 |
| | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | | | | | |
| | MSO-Noble | 100 | SL | 1 | lb ai/a | PO1 | | | | | |
| 9 | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO1 | 75.0 | 95.0 | 100.0 | 100.0 | 100.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 10 | Fierce EZ | 3.04 | SC | 0.286 | lb ai/a | PO1 | 93.8 | 88.8 | 100.0 | 100.0 | 100.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| LSD (P=.05) | | | | | | | 9.78 | 8.02 | 3.36 | 5.00 | 4.21 |
| Standard Deviation | | | | | | | 6.74 | 5.53 | 2.32 | 3.44 | 2.90 |
| CV | | | | | | | 20.13 | 7.31 | 2.63 | 3.95 | 3.28 |

# New Herbicide Evaluation for Row Middle Weed Control in Pickling Cucumber – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CUKE | GRASS | COLQ | CORW | RRPW |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | GRASS | COLQ | CORW | RRPW |
| Crop Name | | | | | | | CUKE | | | | |
| Rating Date | | | | | | | 28Jun2021 | 28Jun2021 | 28Jun2021 | 28Jun2021 | 28Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Untreated | | | | | PO1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Gramoxone 3SL | 3 | SL | 1 | lb ai/a | PO1 | 2.5 | 95.0 | 91.3 | 92.5 | 95.0 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 3 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 2.5 | 0.0 | 96.3 | 85.0 | 98.8 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 1.3 | 90.0 | 97.5 | 97.5 | 100.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 0.0 | 91.3 | 98.8 | 97.5 | 100.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 1.3 | 92.5 | 95.0 | 95.0 | 97.5 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 7 | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | PO1 | 5.0 | 92.5 | 100.0 | 93.8 | 100.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 8 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 2.5 | 90.0 | 100.0 | 95.0 | 100.0 |
| | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | | | | | |
| | MSO-Noble | 100 | SL | 1 | lb ai/a | PO1 | | | | | |
| 9 | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO1 | 74.5 | 85.0 | 98.8 | 100.0 | 100.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 10 | Fierce EZ | 3.04 | SC | 0.286 | lb ai/a | PO1 | 93.8 | 88.8 | 98.8 | 100.0 | 100.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| LSD (P=.05) | | | | | | | 8.00 | 7.08 | 4.81 | 6.19 | 5.09 |
| Standard Deviation | | | | | | | 5.51 | 4.88 | 3.32 | 4.27 | 3.51 |
| CV | | | | | | | 30.08 | 6.73 | 3.78 | 4.98 | 3.93 |

# New Herbicide Evaluation for Row Middle Weed Control in Pickling Cucumber – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | | |
| Crop Name | | | | | | | CUKE | CUKE | CUKE | CUKE | CUKE | CUKE |
| Rating Date | | | | | | | 07Jul2021 | 07Jul2021 | 13Jul2021 | 13Jul2021 | 13Jul2021 | 13Jul2021 |
| Rating Type | | | | | | | HVST VINE | HVST FRUIT | GRADE1 | GRADE2 | GRADE3 | GRADE4 |
| Rating Unit | | | | | | | KG/PLOT | KG/PLOT | KG/PLOT | KG/PLOT | KG/PLOT | KG/PLOT |
| Assessed By | | | | | | | CF | CF | HT,RM | HT,RM | HT,RM | HT,RM |
| 1 | Untreated | | | | | PO1 | 24.26 | 27.75 | 0.79 | 4.25 | 14.23 | 5.79 |
| 2 | Gramoxone 3SL | 3 | SL | 1 | lb ai/a | PO1 | 33.42 | 34.23 | 3.00 | 5.41 | 18.17 | 6.37 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 3 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 27.51 | 28.40 | 0.69 | 4.39 | 16.53 | 4.80 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 26.21 | 30.99 | 0.83 | 4.91 | 16.96 | 5.17 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 26.65 | 29.62 | 2.09 | 4.77 | 16.54 | 4.93 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 25.09 | 30.65 | 0.86 | 4.90 | 16.57 | 5.56 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 7 | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | PO1 | 20.27 | 23.30 | 0.83 | 4.88 | 11.95 | 3.74 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 8 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 21.69 | 28.96 | 0.96 | 4.97 | 16.19 | 4.16 |
| | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | | | | | | |
| | MSO-Noble | 100 | SL | 1 | lb ai/a | PO1 | | | | | | |
| 9 | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO1 | 4.00 | 3.62 | 0.34 | 1.37 | 2.80 | 0.26 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 10 | Fierce EZ | 3.04 | SC | 0.286 | lb ai/a | PO1 | 0.73 | 0.00 | 0.18 | 0.51 | 0.13 | 0.00 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| LSD (P=.05) | | | | | | | 8.32 | 11.28 | 2.10 | 1.51 | 6.50 | 3.70 |
| Standard Deviation | | | | | | | 5.73 | 7.77 | 1.45 | 1.04 | 4.48 | 2.52 |
| CV | | | | | | | 27.35 | 32.74 | 137.35 | 25.81 | 34.45 | 62.56 |

# Performance of Quizalofop on Dill – IR4 - 2021

**Project Code: 117-21-1** **Location: Holt, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Mose**
**Crop: Dill** **Variety: Mammoth**
**Planting Method: seeded** **Planting Date: 5/12/21**
**Harvest Date: 7/7/21**
**Plant Spacing: 1″** **Row Spacing: 14″; 3 rows per bed**
**Tillage Type: Conventional** **Study Design: RCB Replications: 3**
**Plot Size: 5.3 ft wide x 30 ft long**

**Soil Type: Marlette Fine Sandy Loam** **OM: 2.3%** **pH: 6.7**
**Sand: 47%** **Silt: 26%** **Clay: 27%** **CEC: 9.3**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PO1 | 6/23/21 | 12:15-12:40PM | 69/63 F | Wet | 9-11 mph | 65% | 90% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/23/21 | Dill | 3-8″ | Vegetative | Good |
| 6/23/21 | CORW = Common Ragweed | 3-5″ | Vegetative | Few |
| 6/23/21 | PEST = Perennial Sowthistle | 3-5″ | Vegetative | Moderate |
| 6/23/21 | Pigweed | 3-6″ | Vegetative | Few |

**Notes and Comments**
1. Spray applied with 4 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. On 5/12/21, after planting, maintenance preemergence application of Caparol (1.6 lb ai/ac) plus command (0.25 lb ai/ac).
4. Few to no weeds in plot at time of PO1 application. There were no grasses growing in whole study area at the time of application and at any rating timings.
5. Rain occurred approximately 15 minutes after PO1 application.

# Michigan State University

**Performance of Quizalofop on Dill - IR4 - 2021**

Trial ID:117-21-1 Location:HTRC Trial Year:2021

Protocol ID:117-21-1 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | DILL 29-Jun-2021 RATING 0-100 NS | DILL 6-Jul-2021 RATING 0-100 SC | DILL 7-Jul-2021 HARVEST LB/PLOT SC, HT |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Untreated Weed-Free Check | | | | | PO1 | 0 | 0 | 8.40 |
| 2 | Assure II | 0.88 | EC | 0.048 | lb ai/a | PO1 | 13 | 0 | 7.78 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | |
| 3 | Assure II | 0.88 | EC | 0.096 | lb ai/a | PO1 | 15 | 0 | 8.72 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | |
| 4 | Assure II | 0.88 | EC | 0.193 | lb ai/a | PO1 | 10 | 2 | 9.36 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | |
| 5 | Lorox | 50 | DF | 1 | lb ai/a | PO1 | 17 | 3 | 5.68 |
| 6 | Select Max | 0.97 | EC | 0.09 | lb ai/a | PO1 | 12 | 0 | 6.59 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | |
| 7 | Caparol | 4 | L | 1 | lb ai/a | PO1 | 20 | 2 | 6.81 |
| LSD P=.05 | | | | | | | 20.85 | 3.54 | 7.82 |
| Standard Deviation | | | | | | | 11.72 | 1.99 | 4.39 |
| CV | | | | | | | 94.64 | 209.17 | 57.66 |

# Performance of Pyridate on Basil – IR4 – SWMREC - 2021

**Project Code: 112-21-2** **Location: Benton Harbor, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Basil** **Variety: Obsession**
**Planting Method: seeded** **Planting Date: 5/27/21**
**Harvest Date: 9/17/21**
**Plant Spacing: 1″** **Row Spacing: 10″ 4 rows/bed**
**Tillage Type: Conventional** **Study Design: RCB Replications: 4**
**Plot Size: 5.3 ft wide x 25 ft long**

**Soil Type: Spinks Loamy Fine Sand** **OM: 0.9%** **pH: 5.7**
**Sand: 86%** **Silt: 6%** **Clay: 8%** **CEC: 3**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PRE (maintenance) | 5/27/21 | 11:30-11:50am | 62/60 F | Dry | SW (No speed recorded) | 41% | 8% | No |
| PO1 | 6/22/21 | 11:00-11:40am | 67/60 F | Damp | SW 4-7mph | 46% | 75% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 5/27/21 | Basil and Weeds | PRE | | |
| 6/22/21 | Basil | 0.25-0.5″ | 4 LS | Good |
| 6/22/21 | COLQ = Common Lambsquarters | 1-2.5″ | 2 to 4 LS | High |
| 6/22/21 | RRPW = Redroot Pigweed | 1-2″ | 2 to 3 LS | High |
| 6/22/21 | LACG = Large Crabgrass | 0.5-2″ | 1 to 2 LS | High |
| 6/22/21 | CAWE = Carpetweed | 0.5 -2″ | 1 to 3 LS | Moderate |

**Additional Weeds Observed Throughout Season**

COPU = Common Purslane

**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 application of Devrinol (1 lb ai/ac) 2 lb/ac immediately after seeding the basil in all the plots including the non-treated. SelectMax was applied at 16 fl oz/ac (0.12 lb ai/ac) + 0.25% NIS on July 14 and 30, 2021 for crabgrass control. Plots were fertilized with 50# N at planting, on July 27, and mid-August.
4. Plots (except weedy check) hand weeded after July 14, 2021 as needed.
5. Harvest: Plants were pulled from ground and weighed with roots.
6. The injury reported in weedy plots are due to weed competition and mainly reported as crop stunting and overall reduction in plant vigor.
7. Injury from both Tough EC and Lentagran was reported as initial whiting of leaves followed by necrotic leaves and then crop death. Injury from these herbicides include both crop stunting (at lower rate most of the plants recovered from initial leave whiting but that slowed crop growth) and reduced crop stand (at higher rate most of the plants did not able to recover from initial injury and reported dead or loss in crop stand.

# Michigan State University

**Performance of Pyridate on Basil - IR4 - SMWREC - 2021**

Trial ID: 117-21-2 Location: Benton Harbor, MI Trial Year: 2021

Protocol ID: 117-21-2 Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | BASIL | COLQ | CAWE | RRPW | LACG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Code | | | | | | | COLQ | CAWE | RRPW | LACG |
| | Crop Name | | | | | | BASIL | | | | |
| | Rating Date | | | | | | 30Jun2021 | 30Jun2021 | 30Jun2021 | 30Jun2021 | 30Jun2021 |
| | Rating Type | | | | | | RATING | RATING | RATING | RATING | RATING |
| | Rating Unit | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| | Assessed By | | | | | | MH | MH | MH | MH | MH |
| 1 | Untreated Weed-Free | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Tough | 5 | EC | 0.23 | lb ai/a | PO1 | 2.5 | 93.8 | 12.5 | 11.3 | 5.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 3 | Tough | 5 | EC | 0.31 | lb ai/a | PO1 | 3.8 | 97.5 | 11.3 | 10.0 | 7.5 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 4 | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | 13.8 | 100.0 | 12.5 | 10.0 | 5.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 5 | Tough | 5 | EC | 0.94 | lb ai/a | PO1 | 83.8 | 100.0 | 72.5 | 83.8 | 17.5 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 6 | Lentagran | 45 | WP | 0.23 | lb ai/a | PO1 | 2.5 | 77.5 | 12.5 | 10.0 | 5.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 7 | Lentagran | 45 | WP | 0.31 | lb ai/a | PO1 | 2.5 | 83.8 | 12.5 | 8.8 | 2.5 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 8 | Untreated Weedy | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LSD (P=.05) | | | | | | | 6.45 | 8.70 | 4.92 | 3.27 | 7.42 |
| Standard Deviation | | | | | | | 4.39 | 5.91 | 3.35 | 2.22 | 5.04 |
| CV | | | | | | | 32.26 | 8.56 | 20.02 | 13.3 | 94.95 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | BASIL | COLQ | CAWE | RRPW | LACG | COPU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Code | | | | | | | COLQ | CAWE | RRPW | LACG | COPU |
| | Crop Name | | | | | | BASIL | | | | | |
| | Rating Date | | | | | | 06Jul2021 | 06Jul2021 | 06Jul2021 | 06Jul2021 | 06Jul2021 | 06Jul2021 |
| | Rating Type | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| | Rating Unit | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| | Assessed By | | | | | | MH | MH | MH | MH | MH | MH |
| 1 | Untreated Weed-Free | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Tough | 5 | EC | 0.23 | lb ai/a | PO1 | 7.5 | 80.0 | 65.0 | 17.5 | 0.0 | 81.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 3 | Tough | 5 | EC | 0.31 | lb ai/a | PO1 | 8.8 | 92.5 | 70.0 | 21.3 | 0.0 | 88.8 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 4 | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | 30.0 | 92.5 | 70.0 | 25.0 | 0.0 | 81.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 5 | Tough | 5 | EC | 0.94 | lb ai/a | PO1 | 95.5 | 96.3 | 85.0 | 75.0 | 21.3 | 82.5 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 6 | Lentagran | 45 | WP | 0.23 | lb ai/a | PO1 | 0.0 | 67.5 | 73.8 | 23.8 | 0.0 | 76.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 7 | Lentagran | 45 | WP | 0.31 | lb ai/a | PO1 | 2.5 | 55.0 | 80.0 | 40.0 | 0.0 | 86.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 8 | Untreated Weedy | | | | | | 45.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LSD (P=.05) | | | | | | | 8.19 | 19.17 | 21.92 | 17.46 | 22.10 | 13.96 |
| Standard Deviation | | | | | | | 5.57 | 13.03 | 14.91 | 11.87 | 15.03 | 9.49 |
| CV | | | | | | | 23.53 | 21.55 | 26.87 | 46.9 | 565.69 | 15.3 |

# Michigan State University

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | RRPW | COLQ | | |
| Crop Name | | | | | | | BASIL | | | BASIL | BASIL |
| Rating Date | | | | | | | 14Jul2021 | 14Jul2021 | 14Jul2021 | 25Jul2021 | 10Aug2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Untreated Weed-Free | | | | | | 0.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 2 | Tough | 5 | EC | 0.23 | lb ai/a | PO1 | 33.8 | 33.8 | 47.5 | 33.8 | 33.5 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 3 | Tough | 5 | EC | 0.31 | lb ai/a | PO1 | 37.5 | 47.5 | 65.0 | 31.3 | 26.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 4 | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | 60.0 | 47.5 | 75.0 | 55.0 | 57.5 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 5 | Tough | 5 | EC | 0.94 | lb ai/a | PO1 | 93.8 | 73.8 | 88.5 | 95.0 | 94.5 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 6 | Lentagran | 45 | WP | 0.23 | lb ai/a | PO1 | 21.8 | 41.3 | 50.0 | 21.3 | 25.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 7 | Lentagran | 45 | WP | 0.31 | lb ai/a | PO1 | 26.3 | 36.3 | 43.8 | 28.8 | 31.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 8 | Untreated Weedy | | | | | | 63.8 | 0.0 | 0.0 | 72.5 | 78.8 |
| LSD (P=.05) | | | | | | | 10.19 | 15.25 | 18.32 | 10.38 | 11.42 |
| Standard Deviation | | | | | | | 6.93 | 10.37 | 12.46 | 7.06 | 7.77 |
| CV | | | | | | | 16.45 | 21.82 | 21.22 | 16.74 | 17.92 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | LACG | COLQ | |
| Crop Name | | | | | | | BASIL | | | BASIL |
| Rating Date | | | | | | | 30Aug2021 | 30Aug2021 | 30Aug2021 | 17Sep2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | KG/PLOT |
| Assessed By | | | | | | | BZ | BZ | BZ | SC |
| 1 | Untreated Weed-Free | | | | | | 5.0 | 95.0 | 100.0 | 24.00 |
| 2 | Tough | 5 | EC | 0.23 | lb ai/a | PO1 | 37.5 | 40.0 | 75.0 | 15.05 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 3 | Tough | 5 | EC | 0.31 | lb ai/a | PO1 | 22.5 | 35.0 | 97.5 | 15.66 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 4 | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | 50.0 | 40.0 | 75.0 | 12.49 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 5 | Tough | 5 | EC | 0.94 | lb ai/a | PO1 | 90.0 | 50.0 | 95.0 | 1.23 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 6 | Lentagran | 45 | WP | 0.23 | lb ai/a | PO1 | 35.0 | 25.0 | 95.0 | 14.68 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 7 | Lentagran | 45 | WP | 0.31 | lb ai/a | PO1 | 37.5 | 17.5 | 100.0 | 11.89 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 8 | Untreated Weedy | | | | | | 72.5 | 17.5 | 17.5 | 1.495 |
| LSD (P=.05) | | | | | | | 15.39 | 39.14 | 38.09 | 4.2407 |
| Standard Deviation | | | | | | | 10.47 | 26.61 | 25.90 | 2.8833 |
| CV | | | | | | | 23.92 | 66.54 | 31.63 | 23.91 |

# Weed Control in Basil Crop Tolerance from PRE and POST Herbicides – Van Drunen - 2021

**Project Code:** 117-21-3 **Location:** Momence, IL Van Drunen Farms

**Personnel:** Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose

**Crop:** Basil **Variety:** Passion; Plenty

**Planting Method:** seeded **Planting Date:** 5/21/21

**Harvest Date:** 7/26/21

**Plant Spacing:** 20 seeds/foot **Row Spacing:** 10″; 3 rows of each variety

**Tillage Type:** Conventional **Study Design:** RCB **Replications:** 3

**Plot Size:** 6.6 ft wide x 30 ft long

**Soil Type:** Jasper Loam **OM:** 3.9% **pH:** 7

**Sand:** 25% **Silt:** 42% **Clay:** 33% **CEC:** 20.8

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PRE | 5/24/21 | NA | 88/NA F | NA | NA | NA | NA | NA |
| PO1 | 6/15/21 | NA | 65/NA F | NA | S 1 mph | 75% | NA | NA |

**Crop and Weed Information at Application**

| | | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 5/24/21 | No crop; No weeds | | | |
| 6/15/21 | Basil | 2 inch | 1 LS | Good |

**Additional Weeds Observed Throughout Season**

BYGR = Barnyard grass
COPU = Common Purslane
RRPW = Redroot Pigweed

**Notes and Comments**

1. Spray applied with 6 nozzle boom. FF11002, 40 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. Harvest: Plants were cut at the soil and weighed by variety.

# Michigan State University

**Weed Control and Basil Crop Tolerance from PRE and POST Herbicides - Van Drunen - 2021**

Trial ID:117-21-3 Location:Momence, IL Trial Year:2021

Protocol ID:117-21-3 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | BYGR | COPU | RRPW |
| Crop Code | | | | | | | BASIL | BASIL | | | |
| Crop Name | | | | | | | PASSION | PLENTY | | | |
| Rating Date | | | | | | | 24-Jun-2021 | 24-Jun-2021 | 24-Jun-2021 | 24-Jun-2021 | 24-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | BZ | BZ | BZ | BZ | BZ |
| 1 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 0.0 | 0.0 | 100.0 | 30.0 | 0.0 |
| | Untreated Weed-Free | | | | | PO1 | | | | | |
| 2 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 56.7 | 43.3 | 100.0 | 60.0 | 96.7 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 3 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 73.3 | 66.7 | 100.0 | 80.0 | 100.0 |
| | Tough | 5 | EC | 0.94 | lb ai/a | PO1 | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 4 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 43.3 | 33.3 | 100.0 | 36.7 | 76.7 |
| | Pyridate | 30 | WP | 0.23 | lb ai/a | PO1 | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 5 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 56.7 | 46.7 | 100.0 | 66.7 | 70.0 |
| | Pyridate | 30 | WP | 0.31 | lb ai/a | PO1 | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | |
| 6 | Lorox | 50 | DF | 0.5 | lb ai/a | PRE | 81.7 | 81.7 | 93.3 | 100.0 | 100.0 |
| | Handweeded | | | | | PO1 | | | | | |
| 7 | Spartan | 4 | F | 0.25 | lb ai/a | PRE | 63.3 | 43.3 | 96.7 | 100.0 | 100.0 |
| | Handweeded | | | | | PO1 | | | | | |
| 8 | Ultra Blazer | 2 | L | 0.375 | lb ai/a | PRE | 10.0 | 43.3 | 80.0 | 90.0 | 93.3 |
| | Handweeded | | | | | PO1 | | | | | |
| 9 | Ultra Blazer | 2 | L | 0.75 | lb ai/a | PRE | 23.3 | 86.7 | 93.3 | 100.0 | 100.0 |
| | Handweeded | | | | | PO1 | | | | | |
| LSD P=.05 | | | | | | | 30.20 | 40.08 | 12.18 | 23.23 | 36.19 |
| Standard Deviation | | | | | | | 17.45 | 23.15 | 7.04 | 13.42 | 20.91 |
| CV | | | | | | | 38.45 | 46.83 | 7.34 | 18.21 | 25.54 |

# Weed Control in Basil Crop Tolerance from PRE and POST Herbicides – Van Drunen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | BASIL PASSION 26-Jul-2021 RATING 0-100 BZ | BASIL PLENTY 26-Jul-2021 RATING 0-100 BZ | BASIL PASSION 26-Jul-2021 HARVEST KG/PLOT BZ | BASIL PLENTY 26-Jul-2021 HARVEST KG/PLOT BZ |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Code | | | | | | | | | |
| | Crop Code | | | | | | | | | |
| | Crop Name | | | | | | | | | |
| | Rating Date | | | | | | | | | |
| | Rating Type | | | | | | | | | |
| | Rating Unit | | | | | | | | | |
| | Assessed By | | | | | | | | | |
| 1 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 16.7 | 20.0 | 11.86 | 9.75 |
| | Untreated Weed-Free | | | | | PO1 | | | | |
| 2 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 20.0 | 13.3 | 8.50 | 11.57 |
| | Tough | 5 | EC | 0.47 | lb ai/a | PO1 | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 3 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 23.3 | 13.3 | 7.16 | 11.06 |
| | Tough | 5 | EC | 0.94 | lb ai/a | PO1 | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 4 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 10.0 | 10.0 | 15.85 | 13.30 |
| | Pyridate | 30 | WP | 0.23 | lb ai/a | PO1 | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 5 | Devrinol DF-XT | 50 | DF | 2 | lb ai/a | PRE | 3.3 | 6.7 | 14.39 | 11.54 |
| | Pyridate | 30 | WP | 0.31 | lb ai/a | PO1 | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | |
| 6 | Lorox | 50 | DF | 0.5 | lb ai/a | PRE | 46.7 | 56.7 | 4.50 | 2.95 |
| | Handweeded | | | | | PO1 | | | | |
| 7 | Spartan | 4 | F | 0.25 | lb ai/a | PRE | 23.3 | 20.0 | 6.23 | 9.63 |
| | Handweeded | | | | | PO1 | | | | |
| 8 | Ultra Blazer | 2 | L | 0.375 | lb ai/a | PRE | 0.0 | 20.0 | 21.12 | 8.30 |
| | Handweeded | | | | | PO1 | | | | |
| 9 | Ultra Blazer | 2 | L | 0.75 | lb ai/a | PRE | 3.3 | 63.3 | 15.83 | 2.04 |
| | Handweeded | | | | | PO1 | | | | |
| LSD P=.05 | | | | | | | 28.68 | 32.30 | 7.811 | 6.143 |
| Standard Deviation | | | | | | | 16.57 | 18.66 | 4.513 | 3.549 |
| CV | | | | | | | 101.67 | 75.19 | 38.52 | 39.85 |

# Identify the Optimum Rate and Timing of Tiafenacil in Hop Yards – SWMREC - 2021

**Project Code: 135-21-1** **Location: Benton Harbor, MI**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Hops** **Variety: Centennial, Willamette, Santiam**
**Planting Method: Transplant** **Planting Date:2013, 2016**
**Plant Spacing: 6 ft** **Row Spacing: 10 ft**
**Tillage Type: NA** **Study Design: RCB** **Replications: 3**
**Plot Size: 5.3 ft wide x 36 ft long (6 plants/plot)**

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

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PO1 | 6/17/21 | 10:50-11:20 am | 76/67 F | Dry | SE 2-4 mph | 21% | 20% | No |
| PO2 | 7/6/21 | 11-11:50 am | 88/82 F | Damp | W 1.5-4.5 mph | 44% | 45% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/17/21 | HOPS | 2-7′ | Vegetative | 100% |
| 6/17/21 | QUGR = Quackgrass | 5-7″ | Vegetative | Many |
| 7/6/21 | HOPS | 3-12′ | Vegetative | 70% |
| 7/6/21 | QUGR | 8-12″ | Vegetative | Many |
| 7/6/21 | CORW = Common Ragweed | 6-10″ | Vegetative | Few |

**Additional Weeds Observed Throughout Season**

HONE = horsenettle
HOWE = horseweed
LACG = large crabgrass
RESO = red sorrel
BLCA = Bladder Campion
GRASSES = overall control of grass spp.
TOTAL BL = include overall control of all broadleaf spp.
TOTAL WC = overall control of broadleaves, sedges, and grass spp.

**Notes and Comments**

1. Spray applied with 2 nozzle boom over the basal leaves of hop plants. 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. The reason for higher injury was poor stand of hop plants and uneven growth stage (in terms of vine height at the time of application). This injury includes both the basal leaf burndown and main shoot above the sprayed portion. There were no separate injury ratings for main shoot above the sprayed portion. Therefore, these injury ratings could be higher than normal.
4. In general, injury from tiafenacil treatments was reported similar to Aim treatments.
5. On July 25, ratings reported that all plants in 108 and 204 were dead. In plot 203, 80% of plants were dead.

# Michigan State University

**Identify the optimum rate and timing of tiafenacil in Hop yards-SWMREC-2021**

Trial ID: 135-21-1 Location: SWMREC Trial Year: 2021

Protocol ID: 135-21-1 Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | HOPS 30Jun2021 RATING 0-100 MH | TOTAL BL 30Jun2021 RATING 0-100 MH | GRASSES 30Jun2021 RATING 0-100 MH | HOPS 06Jul2021 RATING 0-100 MH | TOTAL BL 06Jul2021 RATING 0-100 MH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Non-treated - weedy | | | | | | 0 | 0 | 0 | 0 | 0 |
| 2 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 66 | 77 | 53 | 58 | 70 |
| | COC | 100 | SL | 1 | % v/v | | | | | | |
| 3 | DCC-3825 | 700 | WG | 0.045 | lb ai/a | PO1 | 47 | 90 | 67 | 46 | 80 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 4 | DCC-3825 | 700 | WG | 0.045 | lb ai/a | PO2 | 0 | 0 | 0 | 0 | 0 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 5 | DCC-3825 | 700 | WG | 0.089 | lb ai/a | PO1 | 58 | 87 | 72 | 44 | 73 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 6 | DCC-3825 | 700 | WG | 0.089 | lb ai/a | PO2 | 0 | 0 | 0 | 0 | 0 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 7 | DCC-3825 | 700 | WG | 0.045 | lb ai/a | PO1, PO2 | 55 | 87 | 67 | 49 | 77 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 8 | DCC-3825 | 700 | WG | 0.089 | lb ai/a | PO1, PO2 | 60 | 88 | 68 | 62 | 84 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 9 | DCC-3825 | 700 | WG | 0.022 | lb ai/a | PO1 | 32 | 70 | 62 | 12 | 57 |
| | Aim- carfentrazone | 2 | EW | 0.031 | lb ai/a | | | | | | |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 10 | DCC-3825 | 700 | WG | 0.022 | lb ai/a | PO2 | 0 | 0 | 0 | 0 | 0 |
| | Aim- carfentrazone | 2 | EW | 0.031 | lb ai/a | | | | | | |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| LSD (P=.05) | | | | | | | 44.60 | 10.07 | 23.90 | 25.84 | 16.33 |
| Standard Deviation | | | | | | | 25.76 | 5.87 | 13.93 | 15.00 | 9.52 |
| CV | | | | | | | 81.28 | 11.78 | 35.87 | 59.96 | 21.61 |

## Identify the Optimum Rate and Timing of Tiafenacil in Hop Yards – SWMREC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | GRASSES | HOPS | HONE | GRASSES | TOTAL WC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | GRASSES | | HONE | GRASSES | TOTAL WC |
| Crop Name | | | | | | | | HOPS | | | |
| Rating Date | | | | | | | 06Jul2021 | 14Jul2021 | 14Jul2021 | 14Jul2021 | 14Jul2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH | SC | SC | SC | SC |
| 1 | Non-treated - weedy | | | | | | 0 | 0 | 0 | 0 | 0 |
| 2 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 48 | 33 | 37 | 17 | 43 |
| | COC | 100 | SL | 1 | % v/v | | | | | | |
| 3 | DCC-3825 | 700 | WG | 0.045 | lb ai/a | PO1 | 52 | 24 | 32 | 20 | 42 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 4 | DCC-3825 | 700 | WG | 0.045 | lb ai/a | PO2 | 0 | 48 | 65 | 73 | 63 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 5 | DCC-3825 | 700 | WG | 0.089 | lb ai/a | PO1 | 67 | 30 | 28 | 28 | 45 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 6 | DCC-3825 | 700 | WG | 0.089 | lb ai/a | PO2 | 0 | 52 | 60 | 70 | 70 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 7 | DCC-3825 | 700 | WG | 0.045 | lb ai/a | PO1, PO2 | 53 | 42 | 77 | 82 | 88 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 8 | DCC-3825 | 700 | WG | 0.089 | lb ai/a | PO1, PO2 | 58 | 37 | 75 | 78 | 87 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 9 | DCC-3825 | 700 | WG | 0.022 | lb ai/a | PO1 | 60 | 13 | 37 | 27 | 45 |
| | Aim- carfentrazone | 2 | EW | 0.031 | lb ai/a | | | | | | |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| 10 | DCC-3825 | 700 | WG | 0.022 | lb ai/a | PO2 | 0 | 40 | 60 | 62 | 68 |
| | Aim- carfentrazone | 2 | EW | 0.031 | lb ai/a | | | | | | |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | | | |
| LSD (P=.05) | | | | | | | 27.37 | 17.86 | 14.23 | 12.50 | 20.17 |
| Standard Deviation | | | | | | | 15.95 | 10.32 | 8.29 | 7.28 | 11.76 |
| CV | | | | | | | 47.16 | 32.29 | 17.65 | 15.95 | 21.31 |

## Identify the Optimum Rate and Timing of Tiafenacil in Hop Yards – SWMREC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | TOTAL WC | |
| Crop Name | | | | | | | HOPS | | HOPS |
| Rating Date | | | | | | | 25Jul2021 | 25Jul2021 | 10Aug2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC |
| 1 | Non-treated - weedy | | | | | | 0 | 0 | 0 |
| 2 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 33 | 38 | 20 |
| | COC | 100 | SL | 1 | % v/v | | | | |
| 3 | DCC-3825 | 700 | WG | 0.045 | lb ai/a | PO1 | 25 | 33 | 23 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | |
| 4 | DCC-3825 | 700 | WG | 0.045 | lb ai/a | PO2 | 43 | 72 | 32 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | |
| 5 | DCC-3825 | 700 | WG | 0.089 | lb ai/a | PO1 | 23 | 35 | 18 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | |
| 6 | DCC-3825 | 700 | WG | 0.089 | lb ai/a | PO2 | 42 | 65 | 20 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | |
| 7 | DCC-3825 | 700 | WG | 0.045 | lb ai/a | PO1, PO2 | 37 | 82 | 15 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | |
| 8 | DCC-3825 | 700 | WG | 0.089 | lb ai/a | PO1, PO2 | 26 | 82 | 21 |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | |
| 9 | DCC-3825 | 700 | WG | 0.022 | lb ai/a | PO1 | 5 | 27 | 0 |
| | Aim- carfentrazone | 2 | EW | 0.031 | lb ai/a | | | | |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | |
| 10 | DCC-3825 | 700 | WG | 0.022 | lb ai/a | PO2 | 30 | 62 | 17 |
| | Aim- carfentrazone | 2 | EW | 0.031 | lb ai/a | | | | |
| | Noble-MSO | 100 | L | 1 | % v/v | | | | |
| LSD (P=.05) | | | | | | | 21.08 | 15.25 | 24.31 |
| Standard Deviation | | | | | | | 12.11 | 8.89 | 14.17 |
| CV | | | | | | | 46.03 | 17.95 | 86.66 |

# Weed Control in Mint – Irrer - 2021

**Project Code: 121-21-1** **Location: St. Johns, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Mint** **Variety: Native Spearmint**
**Planting Method: Roots** **Planting Date:**
**Plant Spacing: Meadow** **Row Spacing: Solid**
**Tillage Type: NA** **Study Design: RCB** **Replications: 3**
**Plot Size: 6 ft wide x 50 ft long**

**Soil Type: Capac Loam** **OM: 3%** **pH: 5.7**
**Sand: 42%** **Silt: 34%** **Clay: 24%** **CEC: 9.8**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| Dormant | 3/20/21 | 2:45-3:45pm | 58/41 F | Dry | S 0-5 mph | 19% | 0% | No |
| EPOST | 5/13/21 | 12:40-1:20 | 66/52 F | Dry | SW 0-3 mph | 23% | 0% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 3/20/21 | Mint | 0-1″ | Dormant/emergence | 4% |
| 3/20/21 | No weeds | | | |
| 5/13/21 | Mint | 1-5″ | Vegetative | 90% |
| 5/13/21 | No weeds | | | |

**Additional Weeds Observed Throughout Season**

COCW = Common Chickweed

**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. Weed pressure was very poor (less than 10 weeds/plot) in all the plots including non-treated - weedy.

# Michigan State University

**Weed Control in Mint - Irrer - 2021**

Trial ID:121-21-1 Location:St. Johns, MI Trial Year:2021

Protocol ID:121-21-1 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Code | | | | | | | | | | | COCW |
| Crop Name | | | | | | | MINT | MINT | MINT | MINT | |
| Rating Date | | | | | | | 20-Apr-2021 | 26-Apr-2021 | 6-May-2021 | 24-May-2021 | 24-May-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | BZ | BZ | BZ | BZ | BZ |
| 1 | Non-treated - Weedy | | | | | | 3.3 | 0.0 | 10.0 | 13.3 | 53.3 |
| 2 | Sinbar | 80 | WDG | 0.4 | lb ai/a | DORM | 0.0 | 10.0 | 3.3 | 6.7 | 96.7 |
| | GoalTender | 4 | SC | 0.313 | lb ai/a | DORM | | | | | |
| | Gramoxone 3SL | 3 | SL | 0.49 | lb ai/a | DORM | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | DORM | | | | | |
| 3 | Zidua | 4.17 | SC | 0.09 | lb ai/a | DORM | 3.3 | 0.0 | 16.7 | 10.0 | 80.0 |
| 4 | Zidua | 4.17 | SC | 0.18 | lb ai/a | DORM | 0.0 | 3.3 | 13.3 | 13.3 | 93.3 |
| 5 | Sharpen | 2.85 | SC | 0.045 | lb ai/a | DORM | 10.0 | 20.0 | 20.0 | 23.3 | 90.0 |
| | MSO | 100 | SL | 1 | % v/v | DORM | | | | | |
| | N Pak (AMS) | 100 | L | 2 | % v/v | DORM | | | | | |
| 6 | Sharpen | 2.85 | SC | 0.135 | lb ai/a | DORM | 40.0 | 40.0 | 36.7 | 33.3 | 100.0 |
| | MSO | 100 | SL | 1 | % v/v | DORM | | | | | |
| | N Pak (AMS) | 100 | L | 2 | % v/v | DORM | | | | | |
| 7 | Sharpen | 2.85 | SC | 0.045 | lb ai/a | DORM | 33.3 | 33.3 | 26.7 | 33.3 | 100.0 |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | DORM | | | | | |
| 8 | Aim | 2 | EC | 0.14 | lb ai/a | DORM | 6.7 | 16.7 | 13.3 | 20.0 | 80.0 |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | DORM | | | | | |
| 9 | Chateau SW | 51 | WDG | 0.214 | lb ai/a | DORM | 53.3 | 76.7 | 70.0 | 43.3 | 100.0 |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | DORM | | | | | |
| 10 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | DORM | 10.0 | 26.7 | 13.3 | 26.7 | 96.7 |
| | MSO | 100 | SL | 1 | % v/v | DORM | | | | | |
| 11 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | DORM | 50.0 | 46.7 | 43.3 | 40.0 | 93.3 |
| | MSO | 100 | SL | 1 | % v/v | DORM | | | | | |
| 12 | Starane Ultra | 2.8 | L | 0.125 | lb ai/a | EPOST | 0.0 | 3.3 | 0.0 | 46.7 | 100.0 |
| | NIS | 100 | SL | 0.25 | % v/v | EPOST | | | | | |
| 13 | Starane Ultra | 2.8 | L | 0.25 | lb ai/a | EPOST | 0.0 | 6.7 | 3.3 | 56.7 | 100.0 |
| | NIS | 100 | SL | 0.25 | % v/v | EPOST | | | | | |
| LSD P=.05 | | | | | | | 29.55 | 18.95 | 14.59 | 17.54 | 29.54 |
| Standard Deviation | | | | | | | 17.54 | 11.25 | 8.66 | 10.41 | 17.53 |
| CV | | | | | | | 108.55 | 51.6 | 41.7 | 36.9 | 19.26 |

# Weed Control in Mint – Irrer - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | |
|---|---|---|---|---|---|---|---|---|---|
| Crop Code | | | | | | | | | COCW |
| Crop Name | | | | | | | MINT | MINT | |
| Rating Date | | | | | | | 3-Jun-2021 | 4-Jun-2021 | 4-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | BZ | SC | SC |
| 1 | Non-treated - Weedy | | | | | | 6.7 | 0.0 | 0.0 |
| 2 | Sinbar | 80 | WDG | 0.4 | lb ai/a | DORM | 10.0 | 3.3 | 100.0 |
| | GoalTender | 4 | SC | 0.313 | lb ai/a | DORM | | | |
| | Gramoxone 3SL | 3 | SL | 0.49 | lb ai/a | DORM | | | |
| | NIS | 100 | SL | 0.25 | % v/v | DORM | | | |
| 3 | Zidua | 4.17 | SC | 0.09 | lb ai/a | DORM | 6.7 | 11.7 | 100.0 |
| 4 | Zidua | 4.17 | SC | 0.18 | lb ai/a | DORM | 3.3 | 10.0 | 100.0 |
| 5 | Sharpen | 2.85 | SC | 0.045 | lb ai/a | DORM | 13.3 | 3.3 | 98.3 |
| | MSO | 100 | SL | 1 | % v/v | DORM | | | |
| | N Pak (AMS) | 100 | L | 2 | % v/v | DORM | | | |
| 6 | Sharpen | 2.85 | SC | 0.135 | lb ai/a | DORM | 16.7 | 8.3 | 100.0 |
| | MSO | 100 | SL | 1 | % v/v | DORM | | | |
| | N Pak (AMS) | 100 | L | 2 | % v/v | DORM | | | |
| 7 | Sharpen | 2.85 | SC | 0.045 | lb ai/a | DORM | 20.0 | 16.7 | 100.0 |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | DORM | | | |
| 8 | Aim | 2 | EC | 0.14 | lb ai/a | DORM | 10.0 | 8.3 | 100.0 |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | DORM | | | |
| 9 | Chateau SW | 51 | WDG | 0.214 | lb ai/a | DORM | 16.7 | 16.7 | 100.0 |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | DORM | | | |
| 10 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | DORM | 10.0 | 15.0 | 100.0 |
| | MSO | 100 | SL | 1 | % v/v | DORM | | | |
| 11 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | DORM | 23.3 | 21.7 | 100.0 |
| | MSO | 100 | SL | 1 | % v/v | DORM | | | |
| 12 | Starane Ultra | 2.8 | L | 0.125 | lb ai/a | EPOST | 46.7 | 38.3 | 100.0 |
| | NIS | 100 | SL | 0.25 | % v/v | EPOST | | | |
| 13 | Starane Ultra | 2.8 | L | 0.25 | lb ai/a | EPOST | 60.0 | 63.3 | 100.0 |
| | NIS | 100 | SL | 0.25 | % v/v | EPOST | | | |
| LSD P=.05 | | | | | | | 11.63 | 9.05 | 1.35 |
| Standard Deviation | | | | | | | 6.90 | 5.37 | 0.80 |
| CV | | | | | | | 36.88 | 32.23 | 0.87 |

## Performance of Linuron on Ishikura Green Onion – IR4 – Schreur - 2021

**Project Code: 112-21-1** **Location: Hudsonville, MI**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Green Onion** **Variety: Ishikura**
**Planting Method: seeded** **Planting Date: 4/26/21**
**Harvest Date: 7/7/21**
**Plant Spacing: 30 seeds/ft** **Row Spacing: 20″; 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: 54%** **pH: 5.6**
**Sand: 27%** **Silt: 17%** **Clay: 2%** **CEC: NA**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PRE | 4/26/21 | 12-12:30pm | 57/51 F | Dry | SE 7-10 mph | 45% | 25% | No |
| PO1 | 6/2/21 | 10:45-11:15am | 77/65 F | Dry | SE 2-5 mph | 38% | 25% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 4/26/21 | Green Onion | Preemergence | | |
| 4/26/21 | No weeds | | | |
| 6/2/21 | Green Onion | 3-4″ | 2 LS | First replication good, poor stand in back half of second rep and full third rep |
| 6/2/21 | RRPW = Redroot Pigweed | 1-3″ | Vegetative | Moderate |
| 6/2/21 | CORW = Common Ragweed | 2-4″ | Vegetative | Moderate |
| 6/2/21 | COLQ = Common Lambsquarters | 1-3″ | Vegetative | Few |
| 6/2/21 | CEPR = Common Evening Primrose | 2-4″ | Vegetative | Few |

**Additional Weeds Observed Throughout Season**

FIBW = Field Bindweed
VIPW = Virginia Pepperweed
TOTAL WC = overall control of broadleaves, 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. Maintenance application of Prowl H2O 1.9 lb ai/a applied to whole field at planting as PRE application. Weather data is listed above for this application.
4. All the plots kept weed-free after June 16, 2021 by hand-weeding.

# Michigan State University

**Performance of Linuron on Ishikura Green Onion - IR4 - Schreur - 2021**

Trial ID:112-21-1 Location:Hudsonville, MI Trial Year:2021

Protocol ID:112-21-1 Investigator:Dr. Sushila Chaudhari

| Pest Code | | | | | | | | FIBW | COLQ | VIPW | TOTAL WC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Name | | | | | | | ONION | | | | |
| Rating Date | | | | | | | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 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 | Growth Stage | | | | | |
| 1 | Handweeded | | | | | PRE | 0 | 0 | 0 | 0 | 0 |
| 2 | Linex | 4 | F | 0.25 | lb ai/a | PO1 | 22 | 50 | 78 | 63 | 57 |
| 3 | Linex | 4 | F | 0.5 | lb ai/a | PO1 | 28 | 67 | 88 | 70 | 72 |
| 4 | Linex | 4 | F | 1 | lb ai/a | PO1 | 55 | 63 | 87 | 82 | 85 |
| 5 | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | 2 | 58 | 77 | 65 | 68 |
| 6 | Caparol | 4 | L | 1.6 | lb ai/a | PO1 | 25 | 82 | 92 | 75 | 88 |
| 7 | Chateau SW | 51 | WDG | 0.032 | lb ai/a | PO1 | 15 | 63 | 62 | 55 | 65 |
| 8 | Nortron | 4 | SC | 0.5 | lb ai/a | PO1 | 0 | 27 | 27 | 20 | 27 |
| LSD P=.05 | | | | | | | 10.04 | 33.10 | 25.17 | 29.93 | 26.50 |
| Standard Deviation | | | | | | | 5.73 | 18.90 | 14.37 | 17.09 | 15.13 |
| CV | | | | | | | 31.28 | 36.87 | 22.54 | 31.8 | 26.22 |

| Pest Code | | | | | | | | ONION | ONION |
|---|---|---|---|---|---|---|---|---|---|
| Crop Name | | | | | | | ONION | | |
| Rating Date | | | | | | | 18-Jun-2021 | 1-Jul-2021 | 7-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | KG/PLOT |
| Assessed By | | | | | | | SC | SC, CG, MS | SC, CF |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | |
| 1 | Handweeded | | | | | PRE | 0 | 0 | 8.48 |
| 2 | Linex | 4 | F | 0.25 | lb ai/a | PO1 | 13 | 0 | 8.06 |
| 3 | Linex | 4 | F | 0.5 | lb ai/a | PO1 | 22 | 3 | 6.74 |
| 4 | Linex | 4 | F | 1 | lb ai/a | PO1 | 32 | 10 | 6.82 |
| 5 | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | 2 | 3 | 8.77 |
| 6 | Caparol | 4 | L | 1.6 | lb ai/a | PO1 | 20 | 8 | 7.25 |
| 7 | Chateau SW | 51 | WDG | 0.032 | lb ai/a | PO1 | 7 | 0 | 9.37 |
| 8 | Nortron | 4 | SC | 0.5 | lb ai/a | PO1 | 0 | 3 | 8.69 |
| LSD P=.05 | | | | | | | 7.25 | 10.49 | 2.95 |
| Standard Deviation | | | | | | | 4.14 | 5.99 | 1.68 |
| CV | | | | | | | 34.84 | 169.09 | 20.99 |

# Performance of Linuron on Southport White Green Onion – IR4 – Schreur - 2021

**Project Code: 112-21-2** **Location: Hudsonville, MI**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Green Onion** **Variety: Southport White**
**Planting Method: seeded** **Planting Date: 4/26/21**
**Harvest Date: 7/7/21**
**Plant Spacing: 30 seeds/ft** **Row Spacing: 20″; 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: 54%** **pH: 5.6**
**Sand: 27%** **Silt: 17%** **Clay: 2%** **CEC: NA**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PRE | 4/26/21 | 12-12:30pm | 57/51 F | Dry | SE 7-10 mph | 45% | 25% | No |
| PO1 | 6/2/21 | 10:45-11:15am | 77/65 F | Dry | SE 2-5 mph | 38% | 25% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 4/26/21 | Green Onion | Preemergence | | |
| 4/26/21 | No weeds | | | |
| 6/2/21 | Green Onion | 3-4″ | 2 LS | First and second replication good, and poor stand of full third rep |
| 6/2/21 | RRPW = Redroot Pigweed | 1-3″ | Vegetative | Moderate |
| 6/2/21 | CORW = Common Ragweed | 2-4″ | Vegetative | Moderate |
| 6/2/21 | COLQ = Common Lambsquarters | 1-3″ | Vegetative | Few |
| 6/2/21 | CEPR = Common Evening Primrose | 2-4″ | Vegetative | Few |

**Additional Weeds Observed Throughout Season**

VIPW = Virginia Pepperweed
TOTAL WC = overall control of broadleaves, 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. Maintenance application of Prowl H2O 1.9 lb ai/a applied at planting. Weather data is listed above for this application.
4. All the plots kept weed-free after June 16, 2021 by hand-weeding.

# Michigan State University

**Performance of Linuron on Southport White Green Onion - IR4 - Schreur - 2021**

Trial ID:112-21-2 Location:Hudsonville, MI Trial Year:2021

Protocol ID:112-21-2 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | CORW | COLQ | VIPW | TOTAL WC |
| Crop Name | | | | | | | ONION | | | | |
| Rating Date | | | | | | | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Handweeded | | | | | PRE | 0 | 0 | 0 | 0 | 0 |
| 2 | Linex | 4 | F | 0.25 | lb ai/a | PO1 | 22 | 82 | 82 | 73 | 72 |
| 3 | Linex | 4 | F | 0.5 | lb ai/a | PO1 | 42 | 80 | 83 | 82 | 82 |
| 4 | Linex | 4 | F | 1 | lb ai/a | PO1 | 55 | 80 | 90 | 83 | 83 |
| 5 | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | 7 | 83 | 78 | 78 | 75 |
| 6 | Caparol | 4 | L | 1.6 | lb ai/a | PO1 | 62 | 80 | 82 | 87 | 85 |
| 7 | Chateau SW | 51 | WDG | 0.032 | lb ai/a | PO1 | 17 | 72 | 78 | 70 | 75 |
| 8 | Nortron | 4 | SC | 0.5 | lb ai/a | PO1 | 7 | 32 | 27 | 30 | 30 |
| LSD P=.05 | | | | | | | 9.86 | 26.33 | 16.26 | 20.44 | 18.38 |
| Standard Deviation | | | | | | | 5.63 | 15.03 | 9.28 | 11.67 | 10.49 |
| CV | | | | | | | 21.45 | 23.66 | 14.28 | 18.55 | 16.73 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | |
| Crop Name | | | | | | | ONION | ONION | ONION |
| Rating Date | | | | | | | 18-Jun-2021 | 1-Jul-2021 | 7-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | KG/PLOT |
| Assessed By | | | | | | | SC | SC, CG, MS | SC, CF |
| 1 | Handweeded | | | | | PRE | 0 | 0 | 11.21 |
| 2 | Linex | 4 | F | 0.25 | lb ai/a | PO1 | 10 | 0 | 8.16 |
| 3 | Linex | 4 | F | 0.5 | lb ai/a | PO1 | 23 | 2 | 6.17 |
| 4 | Linex | 4 | F | 1 | lb ai/a | PO1 | 27 | 3 | 4.31 |
| 5 | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | 7 | 2 | 8.04 |
| 6 | Caparol | 4 | L | 1.6 | lb ai/a | PO1 | 40 | 7 | 2.01 |
| 7 | Chateau SW | 51 | WDG | 0.032 | lb ai/a | PO1 | 13 | 3 | 5.17 |
| 8 | Nortron | 4 | SC | 0.5 | lb ai/a | PO1 | 7 | 2 | 6.47 |
| LSD P=.05 | | | | | | | 10.00 | 4.63 | 6.198 |
| Standard Deviation | | | | | | | 5.71 | 2.64 | 3.539 |
| CV | | | | | | | 36.05 | 115.4 | 54.95 |

## Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

**Project Code: 112-21-3** **Location: East Lansing, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Onion** **Variety: Champ**
**Planting Method: Seeded** **Planting Date: 4/13/21**
**Harvest Date: 8/31/21**
**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: 62%** **pH: 6.7**
**Sand: 18%** **Silt: 17%** **Clay: 1%** **CEC: NA**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PRE | 4/17/21 | 10-10:45am | 50/46 F | Moist | NW 0-2 mph | 58% | 10% | No |
| PO1 | 5/20/21 | 9:15-9:30am | 72/60 F | Dry | SE 1-3 mph | 64% | 100% | No |
| PO2 | 6/1/21 | 10:30-11:30am | 76/60 F | Dry | SW 4-5 mph | 40% | 10% | No |
| PO3 | 6/8/21 | 9:40-10:30am | 80/70 F | Damp | W 3 mph | 59% | 90% | No |
| PO4 | 6/20/21 | 8:00-9:25am | 80/69 F | Moist | 0 mph | 67% | 10% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 4/17/21 | No Onions and weeds | | | |
| 5/20/21 | Onion | 2″ | 1 LS | Good |
| 5/20/21 | HANS = Hairy Nightshade | <1″ | Cotyledon – 1 LS | Many |
| 5/20/21 | LATH = Ladysthumb | <1″ | Cotyledon – 1 LS | Many |
| 6/1/21 | Onion | 5-6″ | 2 LS | Good/100% |
| 6/1/21 | COPU = Common Purslane | < 1″ | Cotyledon | Few (nontreated only) |
| 6/1/21 | HANS | 1-3″/4-5″ in nontreated | 2-3 LS/6-8 LS in nontreated | Moderate/ many in nontreated |
| 6/1/21 | LATH | 1-3″/2-4″ in nontreated | 2-4 LS/4-6 LS in nontreated | Many |
| 6/8/21 | Onion | 5-6″ | 3 LS | Good |
| 6/20/21 | Onion | 5-7" | 4-5 LS | Good |
| 6/20/21 | HANS | 1-4″ | 2-5 LS | Many |
| 6/20/21 | LATH | 1-4″ | 2-5 LS | Many |

**Notes and Comments**
1. Spray applied with 2 nozzle boom and 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. Non-treated plots were hand-weeded on June 11,2021 and then two more times from mid-July to mid-august. All the treated plots were hand weeded only twice from mid-July to mid-August.
4. Due to the initial weed competition, yield reported low in non-treated.
5. There was some onion stand loss reported due to the weed competition and later hand weeding in nontreated control. This stand loss was reported as injury in nontreated plots.

# Michigan State University

**Onion Tolerance and Weed Control with Bicyclopyrone - Keilen - 2021**

Trial ID:112-21-3 Location:East Lansing, MI Trial Year:2021

Protocol ID:112-21-3 Investigator:Sushila Chaudhari

| Trt No | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | HANS | LATH | ONION | OVERALL | ONION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rating Date | | | | | | 27-Apr-2021 | 27-Apr-2021 | 7-May-2021 | 7-May-2021 | 17-May-2021 |
| | Rating Type | | | | | | RATING | RATING | RATING | RATING | RATING |
| | Rating Unit | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| | Assessed By | | | | | | MH | MH | MH | MH | SC |
| 1 | Non-treated | | | | | | 35.0 | 40.0 | 0.0 | 5.0 | 0.0 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 50.7 | 50.7 | 0.0 | 10.0 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 45.0 | 50.0 | 0.0 | 7.3 | 0.0 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 70.0 | 68.3 | 0.0 | 18.3 | 0.0 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 44.0 | 40.0 | 0.0 | 6.7 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 6 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 77.0 | 57.3 | 0.0 | 5.7 | 0.0 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 56.0 | 70.0 | 0.0 | 15.3 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 8 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 44.0 | 38.3 | 0.0 | 1.7 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO4 | | | | | |
| 9 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 55.0 | 77.3 | 0.0 | 9.0 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1, PO3 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 66.7 | 46.7 | 0.0 | 3.3 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |

# Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | HANS | LATH | ONION | OVERALL | ONION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | | | ONION | | ONION |
| Rating Date | | | | | | | 27-Apr-2021 | 27-Apr-2021 | 7-May-2021 | 7-May-2021 | 17-May-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH | MH | MH | MH | SC |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 68.7 | 65.7 | 0.0 | 4.0 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,4 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 12 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 80.7 | 45.0 | 0.0 | 6.7 | 0.0 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 13 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 65.7 | 55.0 | 0.0 | 6.3 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO3 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 14 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 72.0 | 70.0 | 0.0 | 8.7 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO4 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO4 | | | | | |
| LSD P=.05 | | | | | | | 34.48 | 35.95 | 0.00 | 9.08 | 0.00 |
| Standard Deviation | | | | | | | 20.54 | 21.42 | 0.00 | 5.41 | 0.00 |
| CV | | | | | | | 34.63 | 38.72 | 0.0 | 70.14 | 0.0 |

# Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | HANS | LATH | ONION | HANS | LATH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | HANS | LATH | | HANS | LATH |
| Crop Name | | | | | | | | | ONION | | |
| Rating Date | | | | | | | 17-May-2021 | 17-May-2021 | 26-May-2021 | 26-May-2021 | 26-May-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | MH | MH | MH |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 30.7 | 32.3 | 1.7 | 76.7 | 76.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 28.3 | 31.7 | 0.0 | 75.0 | 75.0 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 31.7 | 35.0 | 0.0 | 75.0 | 75.0 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 31.7 | 32.3 | 0.0 | 78.3 | 78.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 6 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 36.0 | 36.3 | 0.0 | 50.0 | 50.0 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 32.3 | 31.7 | 0.0 | 85.0 | 85.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 8 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 28.0 | 29.0 | 0.0 | 78.3 | 78.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO4 | | | | | |
| 9 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 30.0 | 35.0 | 0.0 | 80.0 | 80.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1, PO3 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 28.3 | 25.7 | 0.0 | 78.3 | 78.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 31.7 | 34.3 | 0.0 | 61.7 | 61.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,4 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |

# Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | HANS | LATH | | HANS | LATH |
| Crop Name | | | | | | | | | ONION | | |
| Rating Date | | | | | | | 17-May-2021 | 17-May-2021 | 26-May-2021 | 26-May-2021 | 26-May-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | MH | MH | MH |
| 12 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 30.0 | 31.7 | 0.0 | 56.7 | 56.7 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 13 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 31.0 | 28.0 | 0.0 | 81.7 | 81.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO3 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 14 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 33.3 | 33.0 | 1.7 | 81.7 | 81.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO4 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO4 | | | | | |
| LSD P=.05 | | | | | | | 11.45 | 9.64 | 1.87 | 24.36 | 24.36 |
| Standard Deviation | | | | | | | 6.82 | 5.74 | 1.11 | 14.51 | 14.51 |
| CV | | | | | | | 23.7 | 19.33 | 466.99 | 21.2 | 21.2 |

# Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | HANS | LATH | | LATH |
| Crop Name | | | | | | | ONION | | | ONION | |
| Rating Date | | | | | | | 4-Jun-2021 | 4-Jun-2021 | 4-Jun-2021 | 17-Jun-2021 | 17-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG/MH | CG/MH | CG/MH | CG | CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 0.0 | 96.7 | 81.7 | 3.3 | 53.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 0.0 | 100.0 | 86.7 | 1.7 | 83.3 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 0.0 | 95.0 | 86.7 | 1.7 | 71.7 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 0.0 | 83.3 | 75.0 | 5.0 | 85.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 6 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 0.0 | 43.3 | 45.0 | 3.3 | 76.7 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 0.0 | 98.3 | 88.3 | 0.0 | 93.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 8 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 0.0 | 96.7 | 80.0 | 0.0 | 80.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO4 | | | | | |
| 9 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 0.0 | 96.7 | 83.3 | 6.7 | 93.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1, PO3 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 0.0 | 96.7 | 91.7 | 1.7 | 83.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 0.0 | 96.7 | 93.3 | 5.0 | 90.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,4 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | | |

# Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | HANS | LATH | | LATH |
| Crop Name | | | | | | | ONION | | | ONION | |
| Rating Date | | | | | | | 4-Jun-2021 | 4-Jun-2021 | 4-Jun-2021 | 17-Jun-2021 | 17-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG/MH | CG/MH | CG/MH | CG | CG |
| 12 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 0.0 | 83.3 | 83.3 | 0.0 | 58.3 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 13 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 0.0 | 86.7 | 76.7 | 5.0 | 81.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO3 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | | |
| 14 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 0.0 | 91.7 | 78.3 | 6.7 | 90.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO4 | | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO4 | | | | | |
| LSD P=.05 | | | | | | | 0.00 | 11.58 | 10.03 | 5.79 | 28.91 |
| Standard Deviation | | | | | | | 0.00 | 6.90 | 5.97 | 3.45 | 17.22 |
| CV | | | | | | | 0.0 | 8.29 | 7.96 | 120.76 | 23.18 |

# Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | YENS | COPU | ONION | LATH |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | YENS | COPU | | LATH |
| Crop Name | | | | | | | | | ONION | |
| Rating Date | | | | | | | 17-Jun-2021 | 17-Jun-2021 | 29-Jun-2021 | 29-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG | CG | CG | CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 88.3 | 100.0 | 0.0 | 28.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 86.7 | 100.0 | 1.7 | 35.0 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 81.7 | 100.0 | 13.3 | 61.7 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 86.7 | 96.7 | 1.7 | 65.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | |
| 6 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 88.3 | 100.0 | 11.7 | 61.7 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 91.7 | 88.3 | 1.7 | 93.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | |
| 8 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 86.7 | 98.3 | 1.7 | 70.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO4 | | | | |
| 9 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 86.7 | 100.0 | 1.7 | 95.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1, PO3 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 78.3 | 100.0 | 6.7 | 68.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 75.0 | 100.0 | 3.3 | 93.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,4 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | |

# Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | YENS | COPU | ONION | LATH |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Code | | | | | | YENS | COPU | | LATH |
| | Crop Name | | | | | | | | ONION | |
| | Rating Date | | | | | | 17-Jun-2021 | 17-Jun-2021 | 29-Jun-2021 | 29-Jun-2021 |
| | Rating Type | | | | | | RATING | RATING | RATING | RATING |
| | Rating Unit | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| | Assessed By | | | | | | CG | CG | CG | CG |
| 12 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 75.0 | 100.0 | 10.0 | 58.3 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 13 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 91.7 | 100.0 | 11.7 | 76.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO3 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 14 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 95.0 | 90.0 | 6.7 | 96.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO4 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO4 | | | | |
| LSD P=.05 | | | | | | | 18.16 | 10.79 | 7.57 | 46.31 |
| Standard Deviation | | | | | | | 10.82 | 6.43 | 4.51 | 27.59 |
| CV | | | | | | | 13.63 | 7.07 | 88.08 | 42.75 |

# Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | YENS | COPU | ONION | ONION |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | |
| Crop Name | | | | | | | | | ONION | ONION |
| Rating Date | | | | | | | 29-Jun-2021 | 29-Jun-2021 | 29-Jul-2021 | 31-Aug-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | KG/PLOT |
| Assessed By | | | | | | | CG | CG | MH | MH/CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 22.58 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 76.7 | 100.0 | 0.0 | 39.67 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO4 | 66.7 | 100.0 | 0.0 | 38.80 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 61.7 | 100.0 | 0.0 | 30.60 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 56.7 | 95.0 | 0.0 | 29.60 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | |
| 6 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 66.7 | 100.0 | 0.0 | 33.59 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 93.3 | 96.7 | 0.0 | 45.59 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | |
| 8 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 91.7 | 93.3 | 0.0 | 36.64 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO3 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO4 | | | | |
| 9 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 85.0 | 100.0 | 0.0 | 42.22 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1, PO3 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO2 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO3 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 51.7 | 100.0 | 0.0 | 38.86 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 75.0 | 100.0 | 6.7 | 30.84 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,4 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO4 | | | | |

# Onion Tolerance and Weed Control with Bicyclopyrone – Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | YENS | COPU | | |
| Crop Name | | | | | | | | | ONION | ONION |
| Rating Date | | | | | | | 29-Jun-2021 | 29-Jun-2021 | 29-Jul-2021 | 31-Aug-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | KG/PLOT |
| Assessed By | | | | | | | CG | CG | MH | MH/CG |
| 12 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO3 | 90.0 | 100.0 | 5.0 | 25.84 |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PRE | | | | |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | PO1 | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO2 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 13 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 91.7 | 100.0 | 5.0 | 31.64 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO3 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO2 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO4 | | | | |
| 14 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE | 93.3 | 100.0 | 5.0 | 37.55 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO4 | | | | |
| | BIR | 1.67 | SL | 0.045 | lb ai/a | PO2 | | | | |
| | Buctril | 2 | EC | 0.125 | lb ai/a | PO3 | | | | |
| | Zidua | 4.17 | SC | 0.09 | lb ai/a | PO4 | | | | |
| LSD P=.05 | | | | | | | 47.38 | 2.74 | 5.29 | 13.39 |
| Standard Deviation | | | | | | | 28.23 | 1.63 | 3.15 | 7.98 |
| CV | | | | | | | 39.52 | 1.78 | 203.68 | 23.08 |

# Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control – Keilen - 2021

**Project Code: 112-21-4** **Location: East Lansing, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Onion** **Variety: Champ**
**Planting Method: Seeded** **Planting Date: 4/13/21**
**Harvest Date: 8/31/21**
**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: 62%** **pH: 6.7**
**Sand: 18%** **Silt: 17%** **Clay: 1%** **CEC: NA**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PRE | 4/17/21 | 10-10:45am | 50/46 F | Moist | NW 0-2 mph | 58% | 10% | No |
| DPRE | 5/3/21 | 3:20-4:00pm | 63/59 F | Wet | SE 2-4 mph | 81% | 100% | No |
| PO1 | 5/20/21 | 9:15-9:30am | 72/60 F | Dry | SE 1-3 mph | 64% | 100% | No |
| PO2 | 6/1/21 | 10:30-11:30am | 76/60 F | Dry | SW 4-5 mph | 40% | 10% | No |
| PO3 | 6/8/21 | 9:40-10:30am | 80/70 F | Damp | W 3 mph | 59% | 90% | No |
| PO4 | 6/20/21 | 8:00-9:25am | 80/69 F | Moist | 0 mph | 67% | 10% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 4/17/21 | Onions and weeds | PRE | | None |
| 5/3/21 | Onion | <1″ | Loop | 30-50% |
| 5/3/21 | COPU = Common Purslane | <1″ | Cotyledon | Moderate |
| 5/3/21 | HANS = Hairy Nightshade | <1″ | Cotyledon | Moderate |
| 5/3/21 | LATH = Ladysthumb | <1″ | Cotyledon | Moderate |
| 5/20/21 | Onion | 2″ | 1 LS | Good |
| 5/20/21 | HANS | <1″ | Cotyledon – 1 LS | Many |
| 5/20/21 | LATH | <1″ | Cotyledon – 1 LS | Many |
| 6/1/21 | Onion | 5-6″ | 2 LS | Good/100% |
| 6/1/21 | COPU | < 1″ | Cotyledon | Few (nontreated only) |
| 6/1/21 | HANS | 1-3″/4-5″ (nontreated) | 2-3 LS/6-8 LS in nontreated | Moderate & many in nontreated |
| 6/1/21 | LATH | 1-3″/2-4″ in (nontreated) | 2-4 LS/4-6 LS in nontreated | Many |
| 6/8/21 | Onion | 5-6″ | 3 LS | Good |
| 6/20/21 | Onion | 5-7" | 4-5 LS | Good |
| 6/20/21 | HANS | 1-4″ | 2-5 LS | Many |
| 6/20/21 | LATH | 1-4″ | 2-5 LS | Many |

**Additional Weeds Observed Throughout Season**

**EBNS = Eastern Black Nightshade**
**YENS = Yellow Nutsedge**
**Barley = cover crop**
**TOTAL WC = overall control of broadleaves, sedges, and grass spp.**

**Notes and Comments**

**1. Spray applied with 2 nozzle boom and 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. Non-treated plots were hand-weeded on June 11,2021 and then two more times from mid-July to mid-august. All the treated plots were hand weeded only twice from mid-July to mid-August.**
**4. Due to the initial weed competition, yield reported low in nontreated plots.**
**5. There was onion stand loss reported due to the weed competition and later hand-weeding in non-treated control plots. This loss was reported as injury in non-treated plots.**

# Michigan State University

**Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2021**

Trial ID: 112-21-4 Location: East Lansing, MI Trial Year: 2021

Protocol ID: 112-21-4 Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | ONION 07May2021 RATING 0-100 MH | TOTAL WC 07May2021 RATING 0-100 MH | ONION 17May2021 RATING 0-100 SC | EBNS 17May2021 RATING 0-100 SC | LATH 17May2021 RATING 0-100 SC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Non-treated | | | | | | 0.0 | 8.3 | 0.0 | 0.0 | 0.0 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 10.7 | 0.0 | 26.7 | 21.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 9.7 | 0.0 | 20.0 | 21.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Valor | 4 | SC | 0.063 | lb ai/a | PO3 | | | | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 16.7 | 0.0 | 26.7 | 26.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO3 | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 8.3 | 0.0 | 20.0 | 18.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Prowl H20 | 3.8 | CS | 0.95 | lb ai/a | PO3 | | | | | |
| 6 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 10.0 | 46.7 | 15.0 | 81.7 | 81.7 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 31.7 | 90.0 | 16.7 | 85.0 | 88.3 |
| | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 8 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 33.3 | 93.3 | 28.3 | 86.7 | 86.7 |
| | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 9 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 38.3 | 93.3 | 46.7 | 91.7 | 90.0 |
| | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 10.0 | 1.7 | 28.3 | 28.3 |
| | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO2 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,3,4 | | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 10.0 | 0.0 | 15.0 | 20.0 |
| | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO3 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,4 | | | | | |
| 12 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 13.3 | 0.0 | 20.0 | 21.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Loyant | 0.21 | L | 0.0065 | lb ai/a | PO3 | | | | | |
| | Loyant | 0.21 | L | 0.013 | lb ai/a | PO4 | | | | | |
| 13 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 8.3 | 0.0 | 25.0 | 16.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Loyant | 0.21 | L | 0.013 | lb ai/a | PO3 | | | | | |
| | Loyant | 0.21 | L | 0.026 | lb ai/a | PO4 | | | | | |
| 14 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 13.3 | 0.0 | 31.7 | 27.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Starane Ultra | 2.8 | L | 0.123 | lb ai/a | PO3,4 | | | | | |
| LSD (P=.05) | | | | | | | 5.62 | 14.34 | 5.22 | 8.61 | 8.78 |
| Standard Deviation | | | | | | | 3.35 | 8.54 | 3.11 | 5.13 | 5.23 |
| CV | | | | | | | 41.37 | 27.68 | 40.17 | 12.85 | 13.33 |

# Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | BARLEY | ONION | LATH | YENS | ONION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | | ONION | | | ONION |
| Rating Date | | | | | | | 17May2021 | 17Jun2021 | 17Jun2021 | 17Jun2021 | 29Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | CG | CG | CG | CG |
| 1 | Non-treated | | | | | | 0.0 | 50.0 | 100.0 | 100.0 | 55.0 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 0.0 | 90.0 | 95.0 | 5.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 6.7 | 93.3 | 100.0 | 26.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Valor | 4 | SC | 0.063 | lb ai/a | PO3 | | | | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 8.3 | 100.0 | 98.3 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO3 | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 0.0 | 75.0 | 91.7 | 0.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Prowl H20 | 3.8 | CS | 0.95 | lb ai/a | PO3 | | | | | |
| 6 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 5.0 | 98.3 | 70.0 | 5.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 25.0 | 3.3 | 96.7 | 95.0 | 1.7 |
| | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 8 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 40.0 | 5.0 | 96.7 | 96.7 | 6.7 |
| | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 9 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 50.0 | 10.0 | 96.7 | 88.3 | 5.0 |
| | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 1.7 | 90.0 | 96.7 | 3.3 |
| | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO2 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,3,4 | | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 0.0 | 88.3 | 86.7 | 3.3 |
| | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO3 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,4 | | | | | |
| 12 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 90.0 | 71.7 | 75.0 | 96.7 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Loyant | 0.21 | L | 0.0065 | lb ai/a | PO3 | | | | | |
| | Loyant | 0.21 | L | 0.013 | lb ai/a | PO4 | | | | | |
| 13 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 1.0 | 93.3 | 90.0 | 90.0 | 100.0 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Loyant | 0.21 | L | 0.013 | lb ai/a | PO3 | | | | | |
| | Loyant | 0.21 | L | 0.026 | lb ai/a | PO4 | | | | | |
| 14 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 0.0 | 3.3 | 86.7 | 86.7 | 28.3 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Starane Ultra | 2.8 | L | 0.123 | lb ai/a | PO3,4 | | | | | |
| LSD (P=.05) | | | | | | | 6.47 | 20.04 | 13.42 | 28.28 | 37.11 |
| Standard Deviation | | | | | | | 3.85 | 11.94 | 7.99 | 16.84 | 22.11 |
| CV | | | | | | | 46.44 | 60.41 | 8.79 | 18.57 | 91.94 |

# Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | LATH | YENS | COPU | ONION | ONION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Code | | | | | | | | | | |
| | Crop Name | | | | | | | | | ONION | ONION |
| | Rating Date | | | | | | 29Jun2021 | 29Jun2021 | 29Jun2021 | 29Jul2021 | 31Aug2021 |
| | Rating Type | | | | | | RATING | RATING | RATING | RATING | HARVEST |
| | Rating Unit | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | KG/PLOT |
| | Assessed By | | | | | | CG | CG | CG | MH | NS |
| 1 | Non-treated | | | | | | 100.0 | 100.0 | 100.0 | 60.0 | 16.98 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 96.7 | 98.3 | 100.0 | 0.0 | 41.46 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 68.3 | 100.0 | 100.0 | 13.3 | 39.69 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Valor | 4 | SC | 0.063 | lb ai/a | PO3 | | | | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 96.7 | 100.0 | 100.0 | 0.0 | 41.91 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO3 | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 45.0 | 76.7 | 100.0 | 1.7 | 39.85 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Prowl H20 | 3.8 | CS | 0.95 | lb ai/a | PO3 | | | | | |
| 6 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 100.0 | 96.7 | 100.0 | 3.3 | 42.27 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 7 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 100.0 | 91.7 | 100.0 | 1.7 | 42.64 |
| | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 8 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 98.3 | 96.7 | 100.0 | 0.0 | 42.75 |
| | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 9 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 98.3 | 66.7 | 100.0 | 8.3 | 22.36 |
| | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | DPRE | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,3,4 | | | | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 96.7 | 96.7 | 100.0 | 0.0 | 44.85 |
| | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO2 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,3,4 | | | | | |
| 11 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 93.3 | 70.0 | 100.0 | 5.0 | 38.75 |
| | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO3 | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,2,4 | | | | | |
| 12 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 63.3 | 70.0 | 100.0 | 100.0 | 0.00 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Loyant | 0.21 | L | 0.0065 | lb ai/a | PO3 | | | | | |
| | Loyant | 0.21 | L | 0.013 | lb ai/a | PO4 | | | | | |
| 13 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 85.0 | 81.7 | 100.0 | 100.0 | 0.00 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Loyant | 0.21 | L | 0.013 | lb ai/a | PO3 | | | | | |
| | Loyant | 0.21 | L | 0.026 | lb ai/a | PO4 | | | | | |
| 14 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | PRE,PO1 | 66.7 | 38.3 | 100.0 | 10.0 | 30.68 |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO1,PO2 | | | | | |
| | Starane Ultra | 2.8 | L | 0.123 | lb ai/a | PO3,4 | | | | | |
| LSD (P=.05) | | | | | | | 40.34 | 47.79 | 0.00 | 24.25 | 16.96 |
| Standard Deviation | | | | | | | 24.03 | 28.47 | 0.00 | 14.44 | 10.10 |
| CV | | | | | | | 27.84 | 33.68 | 0.0 | 66.67 | 31.85 |

# White Campion Control with PRE and POST Herbicides in Onion – Woodwayk - 2021

**Project Code: 112-21-5** **Location: Hudsonville, MI**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Dry Bulb Onion** **Variety: Powell**
**Planting Method: Seeded** **Planting Date: 3/24/21**
**Harvest Date: No harvest**
**Plant Spacing: 1″** **Row Spacing: 12″; 4 rows/plot**
**Tillage Type: Conventional** **Study Design: RCB Replications: 3**
**Plot Size: 5.3 ft wide x 30 ft long**

**Soil Type: Carlisle Muck** **OM: 40.9%** **pH: 6.0**
**Sand: 40%** **Silt: 17%** **Clay: 2%** **CEC: NA**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| DPRE | 4/7/2021 | 9:00-9:45am | 62/53 F | Moist | SE 5-7mph | 68% | 40% | No |
| PO3 | 5/24/21 | 11:27-1:30 pm | 83/66 F | Dry | E 0.8mph | 58% | 65% | No |
| PO4 | 6/8/21 | 10:40-11:15am | 83/69 F | Damp | NW 2-4mph | 70% | 65% | No |
| Late POST | 6/22/21 | 8:20-9:00am | 56/55 F | Moist | 2.5-4 mph | 69% | 5% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 4/7/21 | No Onion or Weeds | | | |
| 4/7/21 | Cover crop: Barley | 2″ | Vegetative | Many |
| 5/24/21 | Onion (1st rep) | | 2-3 LS | Good |
| 5/24/21 | Onion (2&3 rep) | | 3-4 LS | Good |
| 5/24/21 | WHCA = White Campion | 2-7″ | Vegetative | Many |
| 5/24/21 | VIPA = Virginia Pepperweed | 2-5″ | Vegetative | Moderate |
| 6/8/21 | Onion | | 5 LS | Good |
| 6/8/21 | YENS = Yellow Nutsedge | 2-4″ | Vegetative | Moderate |
| 6/8/21 | WHCA | 4-10″ | Vegetative | Many |
| 6/8/21 | VIPA | 4-8″ | Vegetative | Moderate |
| 6/8/21 | WICA = Wild Carrot | 2-4″ | Vegetative | Few |
| 6/22/21 | Onion | 8-11″ | 5-6 LS | |
| 6/22/21 | WHCA | 6-13″ | Flowering | Many |

**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. Two maintenance applications were made at one leaf-stage (PO1) and 2 leaf-stage (PO2) of onions. PO1 application made by grower on 5/3/21 [GoalTender (4 fl oz/ac; 0.125 lb ai/ac) Plus SelectMax (16 fl oz/ac; 0.12 lb ai/acre)]. At PO2 application on 5/13/2021, GoalTender (4 fl oz/ac; 0.125 lb ai/ac) was applied to whole study area.
4. Due to the high density of White campion the trial was terminated by 6/20/2021 and decided to evaluate several non-selective herbicides (not registered to use in onion) at late-POST application timing for control of white campion.

# Michigan State University

**White Campion Control with PRE and POST Herbicides in Onion - Woodwayk - 2021**

Trial ID: 112-21-5 | Location: Hudsonville, MI | Trial Year: 2021

Protocol ID: 112-21-5 | Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | WHCA | GRASS | | WHCA | VIPW |
| Crop Name | | | | | | | ONION | | | ONION | | |
| Rating Date | | | | | | | 11May2021 | 11May2021 | 11May2021 | 03Jun2021 | 03Jun2021 | 03Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH | MH | MH | CG/SC | CG/SC | CG/SC |
| 1 | Non-treated | | | | | | 0.0 | 5.0 | 46.7 | 0.0 | 0.0 | 0.0 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 0.0 | 17.3 | 52.3 | 0.0 | 66.7 | 68.3 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | | | | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 2.3 | 30.0 | 88.3 | 0.0 | 58.3 | 56.7 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | | |
| | Outlook | 6 | EC | 0.98 | lb ai/a | PO3,PO4 | | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | | | | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 0.0 | 20.0 | 82.0 | 0.0 | 58.3 | 65.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | | |
| | Nortron | 4 | SC | 1 | lb ai/a | PO3,PO4 | | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 1.7 | 15.0 | 81.7 | 0.0 | 43.3 | 53.3 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | | |
| | Chateau SW | 51 | WDG | 0.064 | lb ai/a | PO3,PO4 | | | | | | |
| 6 | Nortron | 4 | SC | 1 | lb ai/a | DPRE | 1.7 | 10.0 | 73.3 | 0.0 | 33.3 | 35.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | | | | | |
| 7 | Nortron | 4 | SC | 1 | lb ai/a | DPRE | 0.0 | 9.0 | 77.3 | 0.0 | 48.3 | 45.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | | |
| | Outlook | 6 | EC | 0.98 | lb ai/a | PO3,PO4 | | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | | | | | |
| 8 | Nortron | 4 | SC | 1 | lb ai/a | DPRE | 0.0 | 4.0 | 53.3 | 0.0 | 45.0 | 48.3 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | | |
| | Nortron | 4 | SC | 1 | lb ai/a | PO3,PO4 | | | | | | |
| 9 | Nortron | 4 | SC | 1 | lb ai/a | DPRE | 0.0 | 14.7 | 81.0 | 0.0 | 31.7 | 50.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | | |
| | Chateau SW | 51 | WDG | 0.064 | lb ai/a | PO3,PO4 | | | | | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 0.0 | 26.3 | 86.0 | 0.0 | 61.7 | 65.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | | | | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | | | | | |
| LSD (P=.05) | | | | | | | 3.15 | 14.75 | 43.64 | 0.00 | 24.13 | 23.94 |
| Standard Deviation | | | | | | | 1.84 | 8.60 | 25.44 | 0.00 | 14.07 | 13.95 |
| CV | | | | | | | 324.15 | 56.8 | 35.23 | 0.0 | 31.49 | 28.67 |

# White Campion Control with PRE and POST Herbicides in Onion – Woodwayk - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | |
|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | WHCA | VIPW |
| Crop Name | | | | | | | | |
| Rating Date | | | | | | | 18Jun2021 | 18Jun2021 |
| Rating Type | | | | | | | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 |
| Assessed By | | | | | | | CG/SC | CG/SC |
| 1 | Non-treated | | | | | | 0.0 | 0.0 |
| 2 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 43.3 | 13.3 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | |
| 3 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 36.7 | 10.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | |
| | Outlook | 6 | EC | 0.98 | lb ai/a | PO3,PO4 | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | |
| 4 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 33.3 | 10.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | |
| | Nortron | 4 | SC | 1 | lb ai/a | PO3,PO4 | | |
| 5 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 30.0 | 8.3 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | |
| | Chateau SW | 51 | WDG | 0.064 | lb ai/a | PO3,PO4 | | |
| 6 | Nortron | 4 | SC | 1 | lb ai/a | DPRE | 11.7 | 6.7 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | |
| 7 | Nortron | 4 | SC | 1 | lb ai/a | DPRE | 26.7 | 3.3 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | |
| | Outlook | 6 | EC | 0.98 | lb ai/a | PO3,PO4 | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | |
| 8 | Nortron | 4 | SC | 1 | lb ai/a | DPRE | 20.0 | 20.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | |
| | Nortron | 4 | SC | 1 | lb ai/a | PO3,PO4 | | |
| 9 | Nortron | 4 | SC | 1 | lb ai/a | DPRE | 23.3 | 40.0 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | |
| | Chateau SW | 51 | WDG | 0.064 | lb ai/a | PO3,PO4 | | |
| 10 | Prowl H20 | 3.8 | CS | 1.9 | lb ai/a | DPRE | 33.3 | 13.3 |
| | Buctril | 2 | EC | 0.187 | lb ai/a | DPRE | | |
| | GoalTender | 4 | SC | 0.125 | lb ai/a | PO3,PO4 | | |
| LSD (P=.05) | | | | | | | 29.84 | 21.50 |
| Standard Deviation | | | | | | | 17.39 | 12.54 |
| CV | | | | | | | 67.33 | 100.28 |

# Michigan State University

**White Campion Control with late POST Herbicides in Onion - Woodwayk - 2021**

Trial ID: 112-21-5b | Location: Hudsonville, MI | Trial Year: 2021

Protocol ID: 112-21-5b | Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | WHCA | VIPW |
| Crop Name | | | | | | | ONION | | |
| Rating Date | | | | | | | 01Jul2021 | 01Jul2021 | 01Jul2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC/CG/MS | SC/CG/MS | SC/CG/MS |
| 1 | Untreated | | | | | | 0.0 | 0.0 | 0.0 |
| 2 | Starane Ultra | 2.8 | L | 0.28 | lb ai/a | POST | 25.0 | 21.7 | 25.0 |
| 3 | Stinger | 3 | L | 0.25 | lb ai/a | POST | 6.7 | 0.0 | 0.0 |
| 4 | Embed | 3.8 | L | 1.4 | lb ai/a | POST | 83.3 | 48.3 | 46.7 |
| 5 | Roundup PowerMax | 5.5 | L | 4 | lb ai/a | POST | 66.7 | 66.7 | 68.3 |
| | AMS | 100 | L | 2.5 | % v/v | POST | | | |
| 6 | Basagran | 4 | L | 1 | lb ai/a | POST | 15.0 | 6.7 | 3.3 |
| 7 | Caparol | 4 | L | 2 | lb ai/a | POST | 41.7 | 68.3 | 40.0 |
| 8 | Lorox | 50 | DF | 1.5 | lb ai/a | POST | 23.3 | 58.3 | 33.3 |
| 9 | Rely 280 | 2.34 | L | 0.74 | lb ai/a | POST | 93.3 | 85.0 | 86.7 |
| | AMS | 100 | L | 2.5 | % v/v | POST | | | |
| 10 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | POST | 53.3 | 50.0 | 50.0 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | |
| LSD (P=.05) | | | | | | | 19.54 | 27.17 | 27.16 |
| Standard Deviation | | | | | | | 11.39 | 15.84 | 15.83 |
| CV | | | | | | | 27.89 | 39.11 | 44.81 |

# Evaluation of Pumpkin & Squash Tolerance to POST S-Metolachlor Application – HTRC - 2021

**Project Code: 108-21-2** **Location: Holt, MI**
**Block: 140-146**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**

**Crop: Pumpkin & Winter Squash** **Variety: Waltham Butternut, Howden Pumpkin, Buttercup Burgess**

**Planting Method: Seeded** **Planting Date: 5/20/2021**

**Harvest Date: 10/1/2021 & 10/5/2021**

**Plant Spacing: 6′** **Row Spacing: 5′; 1 row each variety/plot**

**Tillage Type: Conventional** **Study Design: RCB Replications: 4**

**Plot Size: 16 ft wide x 30 ft long**

**Soil Type: Marlette Fine Loamy Sand** **OM: 2.1%** **pH: 7**
**Sand: 51%** **Silt: 25%** **Clay: 24%** **CEC: 10**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PRE | 5/20/21 | NA | 86/NA F | Dry | NA | NA | NA | No |
| 14 DAP | 6/9/21 | 8:00-9:00am | 78/69 F | Moist | 1-2mph | 79% | 0% | No |
| 28 DAP | 6/20/21 | 10:00-11:00am | 79/73 F | Moist | 0-7mph | 66% | 50% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 5/20/21 | No pumpkin, squash, & weeds | | | |
| 6/9/21 | Pumpkin | | 2 LS | Good |
| 6/9/21 | Buttercup | | 2 LS | See notes |
| 6/9/21 | Butternut | | 1 LS | See notes |
| 6/9/21 | No weeds | | | |
| 6/20/21 | Pumpkin | | 6-8 LS | |
| 6/20/21 | Buttercup | | 5-6 LS | |
| 6/20/21 | Butternut | | 3-6 LS | |
| 6/20/21 | No weeds | | | |

**Notes and Comments**

1. Preemergence spray applied with tractor sprayer: FF11002, 20 GPA, 30 psi, 3.2 mph.
2. 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. At 14 DAP application, butternut had low germination and buttercup had no germination in 111 and 411.
4. Due to machine failure, there were no pumpkin seeds planted in plots 111, 211, 311, & 411.
5. At June 28 rating, plants from 28 DAP application showed web-like symptoms similar as eaten by insects.
6. Higher injury ratings at July 12 rating was due to the combination of herbicide, pumpkin beetles, and bacterial wilt.
7. Trial kept weed-free by application of PRE Strategy, cultivation, and hand weeding.
8. In general, fruit set was lower due to the hot weather at flowering timing, and plants produced more male flowers than female flowers.

# Michigan State University

**Evaluation of Pumpkin & Squash Tolerance to POST S-metolachlor Application - HTRC - 2021**

Trial ID:108-21-2 Location:Holt, MI Trial Year:2021

Protocol ID:108-21-2 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | BCUP | PUMP | BNUT | BCUP | PUMP | BNUT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Crop Code | | | | | | | | | | | |
| | Crop Name | | | | | | BCUP | PUMP | BNUT | BCUP | PUMP | BNUT |
| | Rating Date | | | | | | 20-Jun-2021 | 20-Jun-2021 | 20-Jun-2021 | 28-Jun-2021 | 28-Jun-2021 | 28-Jun-2021 |
| | Rating Type | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| | Rating Unit | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| | Assessed By | | | | | | SC | SC | SC | SC | SC | SC |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 3.8 | 3.8 | 3.8 | 0.0 | 0.0 | 0.0 |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | PRE | | | | | | |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | 14 DAP | | | | | | |
| 3 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 0.0 | 0.0 | 0.0 | 26.3 | 5.0 | 22.5 |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | PRE | | | | | | |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | 28 DAP | | | | | | |
| 4 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 2.5 | 2.5 | 2.5 | 3.8 | 0.0 | 0.0 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 14 DAP | | | | | | |
| 5 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 17.5 | 15.0 | 18.8 | 0.0 | 0.0 | 0.0 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 14 DAP | | | | | | |
| 6 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 0.0 | 0.0 | 0.0 | 32.0 | 6.3 | 27.5 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 28 DAP | | | | | | |
| 7 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 0.0 | 0.0 | 0.0 | 32.5 | 11.3 | 33.8 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 28 DAP | | | | | | |
| 8 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 6.3 | 7.5 | 7.5 | 1.3 | 0.0 | 1.3 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 14 DAP | | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 14 DAP | | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 14 DAP | | | | | | |
| 9 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 7.5 | 5.0 | 7.5 | 2.5 | 1.3 | 2.5 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 14 DAP | | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 14 DAP | | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 14 DAP | | | | | | |
| 10 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 0.0 | 0.0 | 0.0 | 22.5 | 6.3 | 17.5 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 28 DAP | | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 28 DAP | | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 28 DAP | | | | | | |
| 11 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 0.0 | 0.0 | 0.0 | 25.0 | 8.8 | 20.0 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 28 DAP | | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 28 DAP | | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 28 DAP | | | | | | |
| LSD P=.05 | | | | | | | 4.84 | 4.83 | 3.84 | 9.50 | 4.40 | 7.16 |
| Standard Deviation | | | | | | | 3.35 | 3.34 | 2.66 | 6.58 | 3.05 | 4.96 |
| CV | | | | | | | 98.39 | 108.95 | 73.19 | 49.66 | 86.48 | 43.63 |

# Evaluation of Pumpkin & Squash Tolerance to POST S-Metolachlor Application – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | BCUP | PUMP | BNUT | PUMP | BCUP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Code | | | | | | | | | | | |
| Crop Name | | | | | | | BCUP | PUMP | BNUT | PUMP | BCUP |
| Rating Date | | | | | | | 12-Jul-2021 | 12-Jul-2021 | 12-Jul-2021 | 2-Jul-2021 | 2-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | STAND COUNT | STAND COUNT |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | | |
| Assessed By | | | | | | | SC | SC | SC | RM, HT | RM, HT |
| 1 | Non-treated | | | | | | 27.5 | 12.3 | 7.5 | 10.1 | 16.3 |
| 2 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 35.0 | 16.3 | 10.0 | 11.3 | 17.0 |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | 14 DAP | | | | | |
| 3 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 33.8 | 18.8 | 12.5 | 11.5 | 16.8 |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | 28 DAP | | | | | |
| 4 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 50.0 | 22.5 | 18.8 | 11.8 | 18.3 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 14 DAP | | | | | |
| 5 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 26.3 | 15.0 | 13.8 | 10.3 | 17.8 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 14 DAP | | | | | |
| 6 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 26.3 | 18.8 | 7.5 | 12.8 | 15.5 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 28 DAP | | | | | |
| 7 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 28.8 | 20.0 | 17.5 | 9.5 | 18.0 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 28 DAP | | | | | |
| 8 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 26.3 | 23.8 | 11.3 | 12.9 | 17.0 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 14 DAP | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 14 DAP | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 14 DAP | | | | | |
| 9 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 27.5 | 16.8 | 7.5 | 12.0 | 14.8 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 14 DAP | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 14 DAP | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 14 DAP | | | | | |
| 10 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 33.8 | 17.5 | 15.0 | 13.5 | 14.5 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 28 DAP | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 28 DAP | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 28 DAP | | | | | |
| 11 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 36.3 | 17.1 | 11.3 | 13.1 | 15.0 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 28 DAP | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 28 DAP | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 28 DAP | | | | | |
| LSD P=.05 | | | | | | | 28.50 | 15.97 | 14.68 | 3.70 | 5.46 |
| Standard Deviation | | | | | | | 19.73 | 10.98 | 10.17 | 2.55 | 3.78 |
| CV | | | | | | | 61.8 | 60.79 | 84.42 | 21.82 | 23.0 |

# Evaluation of Pumpkin & Squash Tolerance to POST S-Metolachlor Application – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Code | | | | | | | | ORANGE | ORANGE | GREEN | GREEN |
| Crop Name | | | | | | | BNUT | | | | |
| Rating Date | | | | | | | 2-Jul-2021 | 1-Oct-2021 | 1-Oct-2021 | 1-Oct-2021 | 1-Oct-2021 |
| Rating Type | | | | | | | STAND COUNT | HARVEST | HARVEST | HARVEST | HARVEST |
| Rating Unit | | | | | | | | NO./PLOT | KG./PLOT | NO./PLOT | KG./PLOT |
| Assessed By | | | | | | | RM, HT | NS | NS | NS | NS |
| 1 | Non-treated | | | | | | 12.0 | 11.4 | 100.35 | 4.7 | 37.23 |
| 2 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 10.5 | 12.5 | 91.84 | 5.5 | 31.82 |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | 14 DAP | | | | | |
| 3 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 13.5 | 12.3 | 92.54 | 5.0 | 34.27 |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | PRE | | | | | |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | 28 DAP | | | | | |
| 4 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 9.8 | 13.5 | 120.51 | 6.0 | 42.56 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 14 DAP | | | | | |
| 5 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 8.8 | 11.8 | 94.50 | 6.0 | 31.82 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 14 DAP | | | | | |
| 6 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 12.5 | 13.8 | 105.08 | 3.0 | 23.02 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 28 DAP | | | | | |
| 7 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 12.0 | 10.3 | 89.05 | 4.3 | 30.35 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 28 DAP | | | | | |
| 8 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 7.8 | 12.4 | 103.43 | 6.5 | 33.55 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 14 DAP | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 14 DAP | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 14 DAP | | | | | |
| 9 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 7.8 | 10.3 | 87.80 | 4.8 | 30.77 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 14 DAP | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 14 DAP | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 14 DAP | | | | | |
| 10 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 10.5 | 13.5 | 105.32 | 6.0 | 39.10 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 28 DAP | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 28 DAP | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 28 DAP | | | | | |
| 11 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 15.3 | 11.2 | 80.17 | 4.0 | 18.06 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 28 DAP | | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 28 DAP | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 28 DAP | | | | | |
| LSD P=.05 | | | | | | | 5.45 | 5.82 | 60.51 | 4.08 | 31.12 |
| Standard Deviation | | | | | | | 3.77 | 4.01 | 41.70 | 2.81 | 21.45 |
| CV | | | | | | | 34.5 | 33.26 | 42.85 | 55.5 | 66.93 |

# Evaluation of Pumpkin & Squash Tolerance to POST S-Metolachlor Application – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | BCUP 5-Oct-2021 HARVEST NO./PLOT NS, SC | BCUP 5-Oct-2021 HARVEST KG/PLOT NS, SC | BNUT 5-Oct-2021 HARVEST NO./PLOT NS, SC | BNUT 5-Oct-2021 HARVEST KG./PLOT NS, SC |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Non-treated | | | | | | 67.0 | 85.95 | 49.8 | 66.73 |
| 2 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 49.0 | 62.39 | 52.3 | 65.20 |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | PRE | | | | |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | 14 DAP | | | | |
| 3 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 48.0 | 60.43 | 31.5 | 42.37 |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | PRE | | | | |
| | Dual Magnum | 7.62 | EC | 0.63 | lb ai/a | 28 DAP | | | | |
| 4 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 34.5 | 45.62 | 29.0 | 40.41 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 14 DAP | | | | |
| 5 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 53.3 | 65.04 | 33.8 | 46.82 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 14 DAP | | | | |
| 6 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 58.8 | 78.42 | 43.3 | 58.34 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 28 DAP | | | | |
| 7 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 61.8 | 78.25 | 45.0 | 64.42 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 28 DAP | | | | |
| 8 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 68.0 | 92.33 | 44.5 | 64.27 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 14 DAP | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 14 DAP | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 14 DAP | | | | |
| 9 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 61.8 | 84.44 | 39.3 | 55.06 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 14 DAP | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 14 DAP | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 14 DAP | | | | |
| 10 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 41.0 | 51.17 | 34.3 | 42.76 |
| | Dual Magnum | 7.62 | EC | 1.26 | lb ai/a | 28 DAP | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 28 DAP | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 28 DAP | | | | |
| 11 | Strategy | 2.1 | SE | 1.575 | lb ai/a | PRE | 56.5 | 73.28 | 47.8 | 62.72 |
| | Dual Magnum | 7.62 | EC | 2.52 | lb ai/a | 28 DAP | | | | |
| | Sandea | 75 | WG | 0.023 | lb ai/a | 28 DAP | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | 28 DAP | | | | |
| LSD P=.05 | | | | | | | 36.06 | 52.90 | 18.31 | 29.51 |
| Standard Deviation | | | | | | | 24.97 | 36.63 | 12.68 | 20.44 |
| CV | | | | | | | 45.83 | 51.84 | 30.97 | 36.91 |

# New Herbicide Evaluation for Row Middle Weed Control in Hot Banana & Cherry Pepper – HTRC - 2021

**Project Code: 101-21-1** **Location: Holt, MI**
**Block: 78**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**

**Crop: Banana Pepper, Cherry Pepper** **Variety: Hot Hungarian Wax, Large Red**
**Planting Method: Transplanted** **Planting Date: 6/2/21**
**Harvest Date: 3 harvests/crop**
**Plant Spacing: 22″** **Row Spacing: 3 ft; 1 row of each variety/plot**
**Tillage Type: Conventional** **Study Design: RCB Replications: 3**
**Plot Size: 12 ft wide x 30 ft long**

**Soil Type: Marlette Fine Loamy Sand** **OM: 2.1%** **pH: 6.9**
**Sand: 47%** **Silt: 26%** **Clay: 27%** **CEC: 8**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PO1 | 6/23/21 | 12:30 pm | 67/64 F | Moist | S 5-10mph | 59% | 95% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/23/21 | Cherry Pepper | 6″ | | |
| 6/23/21 | Banana Pepper | 6″ | | |
| 6/23/21 | LATH = Ladysthumb | 2-4″ | | High |
| 6/23/21 | COPU = Common Purslane | 1-3″ | | High |
| 6/23/21 | RRPW = Redroot Pigweed | 2-4″ | | Medium |
| 6/23/21 | COLQ = Common Lambsquarters | 2-4″ | | High |
| 6/23/21 | GRASSES = Witchgrass and Large Crabgrass | 1-4″ | | high |

**Notes and Comments**

1. Spray applied with 2 nozzle-shielded boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. Herbicide treatments were applied in 2.7′ band in alleys on both sides of crop area. Each plot has 2.7′ herbicide treatment band, 5.3′ crop area (both rows of peppers), and then second 2.7′ herbicide treatment band. There was a 1.3′ buffer area between each herbicide treatment bands in alleys. Total plot area was 2.7 (herbicide treatments) + 5.3 (crop area) + 2.7 (herbicide treatments) + 1.3 (buffer area) = 12 feet. Row middles were mowed biweekly
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Maintenance application of Dual Magnum (0.95 lb ai/a) applied to crop area on 6/1/21 one day before planting. Crop area sprayed with SelectMax (16 fl oz/ac) once and then hand-weeded as needed throughout season.
4. Rain came immediately (5-10 minutes) after PO1 application.
5. In general higher crop injury (initial) was reported from all of the treatments because of adverse weather conditions at the time of herbicide application (cloudy, rainy, and wind gust up to 10-12 MPH).

# Michigan State University

**New Herbicide Evaluation for Row Middle Weed Control in Hot Banana & Cherry Pepper - HTRC - 2021**

Trial ID:101-21-1 Location:Holt, MI Trial Year:2021

Protocol ID:101-21-1 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | LATH | COPU | RRPW |
| Crop Name | | | | | | | BANANA | CHERRY | | | |
| Rating Date | | | | | | | 28-Jun-2021 | 28-Jun-2021 | 28-Jun-2021 | 28-Jun-2021 | 28-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Untreated | | | | | PO1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Gramoxone 3SL | 3 | SL | 1 | lb ai/a | PO1 | 15.0 | 26.7 | 90.0 | 91.7 | 95.0 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 3 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 31.7 | 50.0 | 90.0 | 86.7 | 90.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 38.3 | 43.3 | 88.3 | 90.0 | 90.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 30.0 | 45.0 | 91.7 | 91.7 | 93.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 38.3 | 55.0 | 96.7 | 96.7 | 95.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 7 | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | PO1 | 30.0 | 45.0 | 96.7 | 95.0 | 95.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 8 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 25.0 | 28.3 | 78.3 | 68.3 | 80.0 |
| | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | | | | | |
| | MSO-Noble | 100 | SL | 1 | lb ai/a | PO1 | | | | | |
| 9 | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO1 | 21.7 | 21.7 | 96.7 | 96.7 | 96.7 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | |
| 10 | Fierce EZ | 3.04 | SC | 0.286 | lb ai/a | PO1 | 28.3 | 33.3 | 98.3 | 98.3 | 98.3 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | |
| LSD P=.05 | | | | | | | 15.33 | 17.52 | 5.79 | 10.52 | 6.62 |
| Standard Deviation | | | | | | | 8.93 | 10.21 | 3.37 | 6.13 | 3.86 |
| CV | | | | | | | 34.58 | 29.31 | 4.08 | 7.52 | 4.63 |

# New Herbicide Evaluation for Row Middle Weed Control in Hot Banana & Cherry Pepper – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | COLQ | GRASSES | BANANA | CHERRY | COPU | COLQ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | COLQ | GRASSES | | | COPU | COLQ |
| Crop Name | | | | | | | | | BANANA | CHERRY | | |
| Rating Date | | | | | | | 28-Jun-2021 | 28-Jun-2021 | 7-Jul-2021 | 7-Jul-2021 | 7-Jul-2021 | 7-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC | SC |
| 1 | Untreated | | | | | PO1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Gramoxone 3SL | 3 | SL | 1 | lb ai/a | PO1 | 91.7 | 83.3 | 13.3 | 15.0 | 78.3 | 85.0 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 3 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 91.7 | 0.0 | 18.3 | 28.3 | 68.3 | 88.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 93.3 | 80.0 | 13.3 | 20.0 | 85.0 | 91.7 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 91.7 | 66.7 | 16.7 | 25.0 | 86.0 | 88.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 97.7 | 88.3 | 21.7 | 28.3 | 83.3 | 88.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 7 | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | PO1 | 95.0 | 85.0 | 16.7 | 26.7 | 86.7 | 90.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 8 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 78.3 | 43.3 | 10.0 | 15.0 | 53.3 | 85.0 |
| | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | | | | | | |
| | MSO-Noble | 100 | SL | 1 | lb ai/a | PO1 | | | | | | |
| 9 | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO1 | 95.0 | 80.0 | 16.7 | 23.3 | 95.0 | 95.0 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | | |
| 10 | Fierce EZ | 3.04 | SC | 0.286 | lb ai/a | PO1 | 98.3 | 91.7 | 23.3 | 31.0 | 95.0 | 95.0 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | | |
| LSD P=.05 | | | | | | | 7.04 | 25.56 | 7.97 | 8.06 | 13.52 | 5.93 |
| Standard Deviation | | | | | | | 4.11 | 14.90 | 4.64 | 4.70 | 7.88 | 3.46 |
| CV | | | | | | | 4.93 | 24.1 | 30.97 | 22.09 | 10.78 | 4.28 |

# New Herbicide Evaluation for Row Middle Weed Control in Hot Banana & Cherry Pepper – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | LATH | RRPW | BANANA | CHERRY | LATH | COPU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | LATH | RRPW | | | LATH | COPU |
| Crop Name | | | | | | | | | BANANA | CHERRY | | |
| Rating Date | | | | | | | 7-Jul-2021 | 7-Jul-2021 | 30-Jul-2021 | 30-Jul-2021 | 30-Jul-2021 | 30-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC | SC |
| 1 | Untreated | | | | | PO1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Gramoxone 3SL | 3 | SL | 1 | lb ai/a | PO1 | 79.7 | 93.3 | 8.3 | 6.7 | 21.7 | 6.7 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 3 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 81.7 | 93.3 | 5.0 | 13.3 | 20.0 | 18.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 81.7 | 90.0 | 10.0 | 11.7 | 38.3 | 31.7 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 85.0 | 95.0 | 3.3 | 6.7 | 45.0 | 36.7 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 90.0 | 95.0 | 5.0 | 18.3 | 53.3 | 30.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 7 | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | PO1 | 87.7 | 88.3 | 5.0 | 14.3 | 51.7 | 38.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 8 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 73.3 | 88.3 | 5.0 | 18.3 | 55.0 | 25.0 |
| | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | | | | | | |
| | MSO-Noble | 100 | SL | 1 | lb ai/a | PO1 | | | | | | |
| 9 | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO1 | 91.7 | 95.0 | 16.7 | 16.7 | 89.0 | 91.3 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | | |
| 10 | Fierce EZ | 3.04 | SC | 0.286 | lb ai/a | PO1 | 95.0 | 95.0 | 15.0 | 23.3 | 90.0 | 93.3 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | | |
| LSD P=.05 | | | | | | | 10.16 | 10.19 | 13.03 | 11.27 | 28.37 | 15.45 |
| Standard Deviation | | | | | | | 5.92 | 5.94 | 7.60 | 6.57 | 16.54 | 9.01 |
| CV | | | | | | | 7.73 | 7.13 | 103.57 | 50.79 | 35.64 | 24.26 |

# New Herbicide Evaluation for Row Middle Weed Control in Hot Banana & Cherry Pepper – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | OVERALL WEED | BANANA | CHERRY | BANANA | BANANA | BANANA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | | |
| Crop Name | | | | | | | WEED | BANANA | CHERRY | BANANA | BANANA | BANANA |
| Rating Date | | | | | | | 30-Jul-2021 | 30-Jun-2021 | 30-Jun-2021 | 18-Aug-2021 | 7-Sep-2021 | 6-Oct-2021 |
| Rating Type | | | | | | | RATING | STAND CT | STAND CT | HARVEST | HARVEST | HARVEST |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | KG/PLOT | KG/PLOT | KG/PLOT |
| Assessed By | | | | | | | SC | RM | RM | NS | MH | NS |
| 1 | Untreated | | | | | PO1 | 0.0 | 16.3 | 15.7 | 6.9 | 6.5 | 3.6 |
| 2 | Gramoxone 3SL | 3 | SL | 1 | lb ai/a | PO1 | 16.7 | 16.0 | 16.0 | 8.9 | 9.5 | 4.5 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 3 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 23.3 | 16.0 | 16.3 | 7.2 | 7.9 | 3.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 36.0 | 16.7 | 16.3 | 7.4 | 6.4 | 4.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 41.7 | 17.3 | 16.7 | 8.5 | 6.1 | 4.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 41.7 | 16.0 | 15.0 | 6.7 | 8.1 | 2.9 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 7 | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | PO1 | 43.3 | 15.3 | 16.3 | 6.7 | 9.9 | 3.2 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | | |
| 8 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 30.0 | 17.0 | 16.7 | 8.7 | 9.0 | 3.0 |
| | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | | | | | | |
| | MSO-Noble | 100 | SL | 1 | lb ai/a | PO1 | | | | | | |
| 9 | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO1 | 91.7 | 15.3 | 16.3 | 6.4 | 6.7 | 4.3 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | | |
| 10 | Fierce EZ | 3.04 | SC | 0.286 | lb ai/a | PO1 | 90.0 | 17.3 | 16.3 | 6.4 | 7.1 | 5.7 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | | |
| LSD P=.05 | | | | | | | 16.64 | 1.47 | 1.77 | 3.4 | 3.6 | 1.9 |
| Standard Deviation | | | | | | | 9.70 | 0.85 | 1.03 | 2.0 | 2.1 | 1.1 |
| CV | | | | | | | 23.4 | 5.23 | 6.37 | 27.2 | 27.0 | 29.4 |

# New Herbicide Evaluation for Row Middle Weed Control in Hot Banana & Cherry Pepper – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | BANANA TOTAL KG/PLOT | CHERRY 2-Sep-2021 HARVEST KG/PLOT MH, HT | CHERRY 21-Sep-2021 HARVEST KG/PLOT MH, NS | CHERRY 12-Oct-2021 HARVEST KG/PLOT NS | CHERRY TOTAL KG/PLOT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | | | | | |
| Rating Date | | | | | | | | | | | |
| Rating Type | | | | | | | | | | | |
| Rating Unit | | | | | | | | | | | |
| Assessed By | | | | | | | | | | | |
| 1 | Untreated | | | | | PO1 | 17.4 | 2.7 | 3.3 | 1.0 | 7.0 |
| 2 | Gramoxone 3SL | 3 | SL | 1 | lb ai/a | PO1 | 22.3 | 4.1 | 4.7 | 0.8 | 9.6 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 3 | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | 19.0 | 4.6 | 3.7 | 1.6 | 9.9 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 16.8 | 3.2 | 5.1 | 1.2 | 9.6 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 17.0 | 2.8 | 6.0 | 1.3 | 10.1 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 18.1 | 2.5 | 4.4 | 0.7 | 7.6 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 7 | DCC-3825 | 70 | WDG | 0.089 | lb ai/a | PO1 | 22.2 | 3.7 | 5.2 | 1.7 | 10.6 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 8 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 20.3 | 3.1 | 3.8 | 1.5 | 8.4 |
| | Aim | 2 | EC | 0.031 | lb ai/a | PO1 | | | | | |
| | MSO-Noble | 100 | SL | 1 | lb ai/a | PO1 | | | | | |
| 9 | Fierce EZ | 3.04 | SC | 0.143 | lb ai/a | PO1 | 17.2 | 3.9 | 5.3 | 1.8 | 11.1 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | |
| 10 | Fierce EZ | 3.04 | SC | 0.286 | lb ai/a | PO1 | 19.0 | 2.3 | 4.5 | 1.1 | 7.9 |
| | NIS | 100 | SL | 0.25 | lb ai/a | PO1 | | | | | |
| LSD P=.05 | | | | | | | 6.2 | 2.4 | 2.6 | 1.2 | 3.3 |
| Standard Deviation | | | | | | | 3.6 | 1.4 | 1.5 | 0.7 | 1.9 |
| CV | | | | | | | 19.2 | 42.9 | 33.1 | 53.7 | 20.9 |

# Evaluation of KFD-464-01 and KFD-291-02 Efficacy and Crop Response in Transplanted Tomato and Pepper – HTRC - 2021

**Project Code: 101-21-3** **Location: Holt, MI**
**Block: 78**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Tomato & Pepper** **Variety: Primo Red & Aristotle**
**Planting Method: Transplanted** **Planting Date: 6/2/21**
**Harvest Date: Multiple harvests/crop; see data**
**Plant Spacing: 22″** **Row Spacing: 3 ft; 1 row of each crop/plot**
**Tillage Type: Conventional** **Study Design: RCB Replications: 3**
**Plot Size: 5.3 ft wide x 30 ft long**

**Soil Type: Marlette Fine Loamy Sand** **OM: 1.4%** **pH: 5.9**
**Sand: 53%** **Silt: 26%** **Clay: 21%** **CEC: 6.1**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PPI | 6/1/21 | 11:45am-12:30pm | 75/60 F | Damp | SW 3-5mph | 35% | 40% | No |
| PRT | 6/1/21 | 2:00-3:00pm | 79/64 F | Moist | 1-2 mph | 35% | 30% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/1/21 | No weeds or crop | | | |

**Additional Weeds Observed Throughout Season**

COLQ = Common Lambsquarters
COPU = Common Purslane
CORW = Common Ragweed
LACG = Large Crabgrass
RRPW = Redroot pigweed
GRASSES = Witchgrass and large crabgrass
TOTAL BL = include overall control of all broadleaf spp.
TOTAL WC = overall control of broadleaves, and 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. Crop area sprayed with SelectMax (16 fl oz/ac) one time, and hand-weeded (all the plots including non-treated) two to three times from Mid-July to Mid-August.
4. Lower yields in nontreated plots were due to initial weed competition.
5. Injury symptoms on tomato from Upstage initially as whiting of leaves and then crop stunting. Injury from both formulation of KFD was reported as crop stunting on tomatoes.
6. Injury symptoms on pepper from KFD was reported as leave necrosis followed by plant death.

# Michigan State University

**Evaluation of KFD-464-01 & KFD-291-02 Efficacy and Crop Response in Transplanted Tomato and Pepper - HTRC - 2021**

Trial ID:101-21-3 Location:Holt, MI Trial Year:2021

Protocol ID:101-21-3 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | TOTAL BL | | |
| Crop Name | | | | | | | PEPPER | TOMATO | | PEPPER | TOMATO |
| Rating Date | | | | | | | 11-Jun-2021 | 11-Jun-2021 | 11-Jun-2021 | 17-Jun-2021 | 17-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | CG | CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 33.3 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 80.0 | 10.0 | 98.3 | 95.0 | 11.7 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 50.0 | 8.3 | 91.7 | 91.7 | 5.0 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 63.3 | 13.3 | 96.7 | 93.3 | 11.7 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 73.3 | 25.0 | 96.7 | 95.0 | 11.7 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 75.0 | 30.0 | 98.3 | 91.7 | 13.3 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 38.3 | 3.3 | 86.7 | 80.0 | 6.7 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 50.0 | 21.7 | 86.3 | 85.0 | 8.3 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 66.7 | 25.0 | 91.7 | 93.3 | 11.7 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 73.3 | 28.3 | 96.7 | 93.3 | 20.0 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 21.7 | 46.7 | 88.3 | 8.3 | 73.3 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 28.3 | 51.7 | 96.7 | 11.7 | 81.7 |
| LSD P=.05 | | | | | | | 13.51 | 12.84 | 28.41 | 7.93 | 9.78 |
| Standard Deviation | | | | | | | 7.98 | 7.58 | 16.78 | 4.68 | 5.77 |
| CV | | | | | | | 15.44 | 34.56 | 18.97 | 6.7 | 27.17 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | COPU | CORW | LACG | LATH | RRPW |
| Crop Name | | | | | | | | | | | |
| Rating Date | | | | | | | 17-Jun-2021 | 17-Jun-2021 | 17-Jun-2021 | 17-Jun-2021 | 17-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG | CG | CG | CG | CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 100.0 | 98.3 | 98.3 | 100.0 | 100.0 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 96.7 | 95.0 | 90.0 | 95.0 | 95.0 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 96.7 | 95.0 | 95.0 | 96.7 | 98.3 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 98.3 | 98.3 | 98.3 | 98.3 | 100.0 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 100.0 | 100.0 | 100.0 | 98.3 | 100.0 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 98.3 | 90.0 | 91.7 | 93.3 | 98.3 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 98.3 | 93.3 | 93.3 | 91.7 | 100.0 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 100.0 | 96.7 | 98.3 | 95.0 | 100.0 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 100.0 | 100.0 | 98.3 | 96.7 | 98.3 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 96.7 | 93.3 | 98.3 | 96.7 | 100.0 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 100.0 | 100.0 | 100.0 | 96.7 | 98.3 |
| LSD P=.05 | | | | | | | 5.05 | 4.89 | 5.03 | 7.36 | 3.43 |
| Standard Deviation | | | | | | | 2.98 | 2.89 | 2.97 | 4.34 | 2.03 |
| CV | | | | | | | 3.3 | 3.27 | 3.36 | 4.93 | 2.23 |

# Evaluation of KFD-464-01 and KFD-291-02 Efficacy and Crop Response in Transplanted Tomato and Pepper – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | COLQ | TOTAL WC | PEPPER | TOMATO | COPU |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | | | PEPPER | TOMATO | |
| Rating Date | | | | | | | 17-Jun-2021 | 17-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG | CG | CG | CG | CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 100.0 | 98.3 | 95.0 | 0.0 | 100.0 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 100.0 | 91.7 | 86.7 | 3.3 | 98.3 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 100.0 | 93.3 | 86.7 | 5.0 | 96.7 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 100.0 | 98.3 | 95.0 | 11.7 | 98.3 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 100.0 | 98.3 | 93.3 | 5.0 | 98.3 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 100.0 | 91.7 | 61.7 | 1.7 | 98.3 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 100.0 | 91.7 | 68.3 | 10.0 | 96.7 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 98.3 | 96.7 | 90.0 | 6.7 | 98.3 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 100.0 | 96.7 | 91.7 | 16.7 | 100.0 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 100.0 | 93.3 | 1.7 | 70.0 | 100.0 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 100.0 | 96.7 | 13.3 | 81.7 | 100.0 |
| LSD P=.05 | | | | | | | 1.41 | 5.03 | 19.55 | 5.50 | 2.85 |
| Standard Deviation | | | | | | | 0.83 | 2.97 | 11.54 | 3.25 | 1.69 |
| CV | | | | | | | 0.91 | 3.41 | 17.68 | 18.41 | 1.86 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CORW | LACG | LATH | RRPW | COLQ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | | | | | |
| Rating Date | | | | | | | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG | CG | CG | CG | CG |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 96.7 | 100.0 | 100.0 | 100.0 | 100.0 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 95.0 | 91.7 | 96.7 | 98.3 | 100.0 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 100.0 | 95.0 | 98.3 | 98.3 | 100.0 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 98.3 | 98.3 | 98.3 | 100.0 | 100.0 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 98.3 | 98.3 | 98.3 | 100.0 | 100.0 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 93.3 | 93.3 | 91.7 | 98.3 | 100.0 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 93.3 | 95.0 | 91.7 | 98.3 | 100.0 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 96.7 | 96.7 | 95.0 | 100.0 | 100.0 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 100.0 | 100.0 | 98.3 | 100.0 | 100.0 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 90.0 | 98.3 | 98.3 | 98.3 | 100.0 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| LSD P=.05 | | | | | | | 5.45 | 4.81 | 8.68 | 2.92 | 0.00 |
| Standard Deviation | | | | | | | 3.22 | 2.84 | 5.12 | 1.72 | 0.00 |
| CV | | | | | | | 3.64 | 3.2 | 5.77 | 1.89 | 0.0 |

# Evaluation of KFD-464-01 and KFD-291-02 Efficacy and Crop Response in Transplanted Tomato and Pepper – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | TOTAL WC | PEPPER | TOMATO | TOTAL BL | GRASSES | PEPPER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | | |
| Crop Name | | | | | | | | PEPPER | TOMATO | | | PEPPER |
| Rating Date | | | | | | | 23-Jun-2021 | 2-Jul-2021 | 2-Jul-2021 | 2-Jul-2021 | 2-Jul-2021 | 12-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG | MH | MH | MH | MH | SC |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 96.7 | 58.3 | 33.3 | 91.7 | 93.3 | 90.0 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 93.3 | 55.0 | 3.3 | 88.3 | 80.0 | 60.0 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 93.3 | 43.3 | 31.7 | 88.3 | 83.3 | 78.3 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 98.3 | 86.7 | 11.7 | 93.3 | 91.7 | 83.3 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 96.7 | 83.3 | 8.3 | 96.7 | 96.7 | 85.0 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 93.3 | 23.3 | 0.0 | 73.3 | 76.7 | 41.7 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 93.3 | 43.3 | 11.7 | 76.7 | 86.7 | 48.3 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 95.0 | 81.7 | 3.3 | 86.7 | 90.0 | 80.0 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 96.7 | 61.7 | 21.7 | 93.3 | 96.7 | 90.0 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 95.0 | 0.0 | 13.3 | 78.3 | 96.7 | 10.0 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 96.7 | 3.3 | 43.3 | 98.3 | 96.7 | 11.7 |
| LSD P=.05 | | | | | | | 4.58 | 41.47 | 35.58 | 10.55 | 11.22 | 13.90 |
| Standard Deviation | | | | | | | 2.71 | 24.49 | 21.01 | 6.23 | 6.62 | 8.21 |
| CV | | | | | | | 3.1 | 54.42 | 138.78 | 7.75 | 8.04 | 14.52 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | TOMATO | PEPPER | TOMATO | PEPPER | TOMATO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | TOMATO | PEPPER | TOMATO | PEPPER | TOMATO |
| Rating Date | | | | | | | 12-Jul-2021 | 9-Aug-2021 | 9-Aug-2021 | 30-Jun-2021 | 30-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | STAND COUNT | STAND COUNT |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | NO./PLOT | NO./PLOT |
| Assessed By | | | | | | | SC | SC | SC | HT,RM | HT,RM |
| 1 | Non-treated | | | | | | 0.0 | 0.0 | 0.0 | 16.3 | 17.7 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 10.0 | 90.0 | 6.7 | 2.3 | 17.3 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 6.7 | 51.7 | 6.7 | 12.7 | 13.0 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 10.0 | 60.0 | 1.7 | 11.0 | 17.3 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 16.7 | 82.7 | 8.3 | 6.0 | 15.3 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 20.0 | 80.0 | 10.0 | 6.7 | 14.7 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 10.0 | 38.3 | 6.7 | 13.7 | 15.7 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 8.3 | 36.7 | 5.0 | 14.3 | 16.7 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 23.3 | 70.0 | 10.0 | 7.3 | 16.3 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 23.3 | 81.7 | 10.0 | 6.7 | 16.3 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 21.7 | 6.7 | 18.3 | 16.3 | 16.3 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 65.0 | 1.7 | 37.7 | 15.7 | 16.0 |
| LSD P=.05 | | | | | | | 15.30 | 18.54 | 10.60 | 3.56 | 3.55 |
| Standard Deviation | | | | | | | 9.03 | 10.95 | 6.26 | 2.10 | 2.10 |
| CV | | | | | | | 50.43 | 21.92 | 62.08 | 19.55 | 13.05 |

# Evaluation of KFD-464-01 and KFD-291-02 Efficacy and Crop Response in Transplanted Tomato and Pepper – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | PEPPER 6-Aug-2021 HARVEST NO./PLOT NS | PEPPER 6-Aug-2021 HARVEST KG/PLOT NS | PEPPER 18-Aug-2021 HARVEST NO./PLOT NS | PEPPER 18-Aug-2021 HARVEST KG/PLOT NS | PEPPER 2-Sep-2021 HARVEST NO./PLOT MH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Non-treated | | | | | | 2.0 | 0.3 | 3.0 | 0.4 | 25.7 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 0.7 | 0.1 | 0.7 | 0.2 | 2.7 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 1.0 | 0.1 | 3.3 | 0.5 | 14.0 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 0.3 | 0.1 | 1.7 | 0.3 | 23.3 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 0.0 | 0.0 | 0.7 | 0.1 | 9.7 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 0.7 | 0.1 | 2.7 | 0.5 | 13.0 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 0.0 | 0.0 | 4.7 | 0.9 | 22.0 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 2.3 | 0.5 | 3.7 | 0.7 | 27.3 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 1.0 | 0.2 | 1.0 | 0.2 | 18.0 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 0.3 | 0.1 | 1.3 | 0.2 | 8.0 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 6.3 | 1.8 | 9.7 | 1.7 | 55.0 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 18.3 | 3.4 | 14.7 | 2.8 | 53.7 |
| LSD P=.05 | | | | | | | 5.5 | 1.0 | 5.3 | 1.0 | 16.4 |
| Standard Deviation | | | | | | | 3.2 | 0.6 | 3.1 | 0.6 | 9.7 |
| CV | | | | | | | 117.1 | 104.2 | 79.4 | 86.9 | 42.8 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | PEPPER 2-Sep-2021 HARVEST KG/PLOT MH | PEPPER 17-Sep-2021 HARVEST NO./PLOT MH, HT | PEPPER 17-Sep-2021 HARVEST KG/PLOT MH, HT | PEPPER 6-Oct-2021 HARVEST NO./PLOT NS | PEPPER 6-Oct-2021 HARVEST KG/PLOT NS | PEPPER TOTAL NO./PLOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Non-treated | | | | | | 3.5 | 6.7 | 1.2 | 31.0 | 4.5 | 68.3 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 0.4 | 1.3 | 0.2 | 1.7 | 0.2 | 7.0 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 2.1 | 8.0 | 1.3 | 13.0 | 1.8 | 39.3 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 3.5 | 7.3 | 1.1 | 5.7 | 0.9 | 38.3 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 1.4 | 4.3 | 0.8 | 8.0 | 1.1 | 22.7 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 2.1 | 6.3 | 0.7 | 12.3 | 1.8 | 35.0 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 3.5 | 14.0 | 2.5 | 12.0 | 1.5 | 52.7 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 4.0 | 7.7 | 1.3 | 14.0 | 2.1 | 55.0 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 3.0 | 4.3 | 0.7 | 7.7 | 0.9 | 32.0 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 1.2 | 3.3 | 0.6 | 8.7 | 1.3 | 21.7 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 8.2 | 23.0 | 3.6 | 22.7 | 3.2 | 116.7 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 8.7 | 24.3 | 4.0 | 26.3 | 4.0 | 137.3 |
| LSD P=.05 | | | | | | | 2.6 | 14.1 | 2.3 | 14.0 | 2.0 | 33.6 |
| Standard Deviation | | | | | | | 1.6 | 8.3 | 1.4 | 8.2 | 1.2 | 19.9 |
| CV | | | | | | | 44.7 | 90.0 | 90.3 | 60.6 | 61.7 | 38.1 |

# Evaluation of KFD-464-01 and KFD-291-02 Efficacy and Crop Response in Transplanted Tomato and Pepper – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | PEPPER TOTAL KG./PLOT | TOMATO 18-Aug-2021 HARVEST KG/PLOT NS | TOMATO 26-Aug-2021 HARVEST KG/PLOT NS | TOMATO 3-Sep-2021 HARVEST KG/PLOT MH, HT | TOMATO 10-Sep-2021 HARVEST KG/PLOT MH, HT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Code | | | | | | | | | | |
| | Crop Name | | | | | | | | | | |
| | Rating Date | | | | | | | | | | |
| | Rating Type | | | | | | | | | | |
| | Rating Unit | | | | | | | | | | |
| | Assessed By | | | | | | | | | | |
| 1 | Non-treated | | | | | | 9.9 | 11.4 | 5.5 | 19.4 | 9.5 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 1.1 | 8.9 | 7.3 | 32.9 | 16.1 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 5.9 | 8.9 | 11.9 | 33.2 | 18.9 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 5.8 | 6.6 | 11.7 | 44.3 | 13.7 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 3.4 | 6.6 | 8.4 | 35.5 | 15.7 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 5.1 | 5.7 | 9.1 | 34.7 | 12.1 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 8.4 | 9.4 | 10.3 | 34.6 | 13.0 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 8.7 | 6.4 | 9.0 | 46.2 | 16.8 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 5.0 | 8.7 | 5.7 | 29.7 | 11.3 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 3.5 | 3.1 | 8.2 | 29.2 | 15.0 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 18.5 | 7.0 | 9.5 | 38.7 | 15.4 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 23.0 | 1.3 | 1.0 | 29.3 | 10.5 |
| LSD P=.05 | | | | | | | 5.8 | 4.0 | 3.7 | 16.3 | 8.7 |
| Standard Deviation | | | | | | | 3.4 | 2.4 | 2.2 | 9.6 | 5.2 |
| CV | | | | | | | 42.2 | 33.8 | 26.8 | 28.4 | 36.9 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | TOMATO 17-Sep-2021 HARVEST KG/PLOT NS, MH | TOMATO 24-Sep-2021 HARVEST KG/PLOT NS | TOMATO TOTAL KG/PLOT |
|---|---|---|---|---|---|---|---|---|---|
| | Pest Code | | | | | | | | |
| | Crop Name | | | | | | | | |
| | Rating Date | | | | | | | | |
| | Rating Type | | | | | | | | |
| | Rating Unit | | | | | | | | |
| | Assessed By | | | | | | | | |
| 1 | Non-treated | | | | | | 5.1 | 10.3 | 61.1 |
| 2 | Dual Magnum | 7.62 | EC | 1.4 | lb ai/a | PPI | 10.6 | 13.8 | 89.5 |
| | Tricor | 75 | DF | 0.25 | lb ai/a | PPI | | | |
| 3 | KFD-464-01 | 3.35 | SC | 0.2017 | lb ai/a | PPI | 8.6 | 6.0 | 87.5 |
| 4 | KFD-464-01 | 3.35 | SC | 0.2704 | lb ai/a | PPI | 7.1 | 12.5 | 95.9 |
| 5 | KFD-464-01 | 3.35 | SC | 0.54 | lb ai/a | PPI | 7.8 | 14.4 | 88.4 |
| 6 | KFD-464-01 | 3.35 | SC | 0.6783 | lb ai/a | PPI | 9.8 | 15.5 | 86.8 |
| 7 | KFD-291-02 | 45 | DF | 0.1696 | lb ai/a | PPI | 6.2 | 11.1 | 84.5 |
| 8 | KFD-291-02 | 45 | DF | 0.2249 | lb ai/a | PPI | 7.4 | 12.9 | 98.7 |
| 9 | KFD-291-02 | 45 | DF | 0.4498 | lb ai/a | PPI | 7.0 | 11.2 | 73.5 |
| 10 | KFD-291-02 | 45 | DF | 0.5623 | lb ai/a | PPI | 6.5 | 12.7 | 74.6 |
| 11 | Satellite Hydrocap | 3.8 | ME | 0.95 | lb ai/a | PRT | 7.8 | 10.9 | 89.3 |
| | Upstage | 3 | SC | 0.25 | lb ai/a | PRT | | | |
| 12 | Upstage | 3 | SC | 0.98 | lb ai/a | PRT | 6.2 | 12.2 | 60.4 |
| LSD P=.05 | | | | | | | 5.1 | 7.0 | 29.5 |
| Standard Deviation | | | | | | | 3.0 | 4.1 | 17.4 |
| CV | | | | | | | 40.2 | 34.5 | 21.1 |

## Performance of Florpyrauxifen-benzyl on Blueberry – IR4 – TNRC - 2021

**Project Code: 127-21-1** **Location: Fennville, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Blueberry** **Variety: Blue Crop**
**Planting Method: Transplanted** **Planting Date: 2010**
**Harvest Date: 4 harvests 1/week; 7/14/21, 7/22/21, 7/30/21, 8/4/21**
**Plant Spacing: 4′** **Row Spacing: 12′**
**Tillage Type: NA** **Study Design: RCB** **Replications: 3**
**Plot Size: 5.3 ft wide x 16 ft long (4 plants/plot)**

**Soil Type: Metea Loamy Fine Sand** **OM: 4.4%** **pH: 4.5**
**Sand: 73%** **Silt: 14%** **Clay: 14%** **CEC: 17.2**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| PO1 | 6/11/21 | 12:20-12:45 | 85.9/77 F | Dry | W 1-4 mph | 55% | 5% | No |
| PO2 | 7/7/21 | 11:15-11:40 | 85/74.6 F | Moist | SW 2-3 mph | 60% | 70% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/11/21 | BLBE = Blueberry | 3-4 ft | Early fruit set | Good |
| 6/11/21 | DAND = Dandelion | 6-12″ | Flower | Few |
| 6/11/21 | HOWE = Horseweed | 6-12″ | Vegetative | Few |
| 6/11/21 | RESO = Red Sorrel | 4-6″ | Vegetative | Patches |
| 7/7/21 | BLBE | 3-4 ft | Fruit turning Blue | Good |
| 7/7/21 | DAND | 6-10″ | Flower | Few |
| 7/7/21 | HOWE | 6-12″ | Vegetative | Few |
| 7/7/21 | RESO | 4-6″ | Vegetative | Patches |

**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.**
**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.**
**6. Non-treated plots kept weedy throughout season.**
**7. Overall, weed pressure was low in this trial due to the black fabric mulch (removed in 2021 spring) and herbicide use in previous years.**

# Michigan State University

**Performance of Florpyrauxifen-benzyl on Blueberry - IR4 - TNRC - 2021**

Trial ID:127-21-1 Location:Fennville, MI Trial Year:2021

Protocol ID:127-21-1 Investigator:Dr. Sushila Chaudhari

| Pest Code | | | | | | | | | RESO | DAND | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Name | | | | | | | BLBE | BLBE | | | BLBE |
| Rating Date | | | | | | | 18-Jun-2021 | 1-Jul-2021 | 1-Jul-2021 | 1-Jul-2021 | 7-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | MH,NS | MH,NS | MH,NS | MH |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
| 1 | Untreated Weedy | | | | | PO1,PO2 | 0 | 0 | 0 | 0 | 0 |
| 2 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1 | 15 | 3 | 98 | 97 | 2 |
| 3 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1 | 13 | 8 | 98 | 100 | 2 |
| 4 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO2 | 0 | 0 | 0 | 0 | 0 |
| 5 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO2 | 0 | 0 | 0 | 0 | 0 |
| 6 | Loyant | 0.21 | L | 0.013 | lb ai/a | PO1,PO2 | 15 | 2 | 70 | 100 | 0 |
| 7 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 12 | 2 | 95 | 100 | 0 |
| 8 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1,PO2 | 12 | 3 | 67 | 100 | 3 |
| 9 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 10 | 3 | 72 | 97 | 3 |
| 10 | Loyant | 0.21 | L | 0.035 | lb ai/a | PO1,PO2 | 15 | 5 | 95 | 98 | 5 |
| LSD P=.05 | | | | | | | 7.33 | 6.98 | 45.68 | 4.92 | 4.27 |
| Standard Deviation | | | | | | | 4.27 | 4.07 | 26.63 | 2.87 | 2.49 |
| CV | | | | | | | 46.59 | 152.67 | 44.75 | 4.15 | 166.05 |

| Pest Code | | | | | | | RESO | DAND | | RESO | HOWE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Name | | | | | | | | | BLBE | | |
| Rating Date | | | | | | | 7-Jul-2021 | 7-Jul-2021 | 14-Jul-2021 | 14-Jul-2021 | 14-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH | MH | MH | MH | MH |
| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
| 1 | Untreated Weedy | | | | | PO1,PO2 | 0 | 0 | 0 | 0 | 0 |
| 2 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1 | 95 | 98 | 3 | 97 | 100 |
| 3 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1 | 97 | 95 | 10 | 95 | 98 |
| 4 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO2 | 0 | 33 | 7 | 77 | 75 |
| 5 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO2 | 0 | 33 | 8 | 72 | 73 |
| 6 | Loyant | 0.21 | L | 0.013 | lb ai/a | PO1,PO2 | 65 | 97 | 5 | 78 | 80 |
| 7 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 98 | 100 | 2 | 98 | 63 |
| 8 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1,PO2 | 67 | 67 | 8 | 70 | 78 |
| 9 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 67 | 100 | 3 | 75 | 88 |
| 10 | Loyant | 0.21 | L | 0.035 | lb ai/a | PO1,PO2 | 92 | 100 | 10 | 90 | 90 |
| LSD P=.05 | | | | | | | 47.51 | 56.22 | 7.86 | 36.55 | 27.13 |
| Standard Deviation | | | | | | | 27.70 | 32.77 | 4.58 | 21.31 | 15.81 |
| CV | | | | | | | 47.75 | 45.31 | 80.9 | 28.35 | 21.18 |

# Performance of Florpyrauxifen-benzyl on Blueberry – IR4 – TNRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | RESO | HOWE | RED COLOR | CURLING |
| Crop Name | | | | | | | BLBE | | | BLBE | BLBE |
| Rating Date | | | | | | | 22-Jul-2021 | 22-Jul-2021 | 22-Jul-2021 | 28-Jul-2021 | 28-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH | MH | MH | SC | SC |
| 1 | Untreated Weedy | | | | | PO1,PO2 | 0 | 0 | 0 | 0 | 0 |
| 2 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1 | 2 | 85 | 100 | 2 | 3 |
| 3 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1 | 5 | 95 | 98 | 2 | 3 |
| 4 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO2 | 2 | 73 | 83 | 8 | 8 |
| 5 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO2 | 8 | 73 | 83 | 27 | 25 |
| 6 | Loyant | 0.21 | L | 0.013 | lb ai/a | PO1,PO2 | 0 | 83 | 93 | 12 | 8 |
| 7 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 7 | 97 | 87 | 20 | 12 |
| 8 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1,PO2 | 7 | 80 | 100 | 28 | 18 |
| 9 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 2 | 83 | 98 | 13 | 12 |
| 10 | Loyant | 0.21 | L | 0.035 | lb ai/a | PO1,PO2 | 10 | 92 | 90 | 18 | 18 |
| LSD P=.05 | | | | | | | 5.97 | 30.24 | 11.21 | 8.56 | 9.67 |
| Standard Deviation | | | | | | | 3.48 | 17.63 | 6.53 | 4.99 | 5.64 |
| CV | | | | | | | 83.59 | 23.14 | 7.84 | 38.39 | 52.02 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | RESO | HOWE | RED COLOR | CURLING |
| Crop Name | | | | | | | | | BLBE | BLBE |
| Rating Date | | | | | | | 28-Jul-2021 | 28-Jul-2021 | 10-Aug-2021 | 10-Aug-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC |
| 1 | Untreated Weedy | | | | | PO1,PO2 | 0 | . | 0 | 0 |
| 2 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1 | . | . | 1.7 | 3 |
| 3 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1 | . | . | 8.3 | 5 |
| 4 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO2 | 20 | 50 | 10.7 | 10 |
| 5 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO2 | 48 | 73 | 31.7 | 30 |
| 6 | Loyant | 0.21 | L | 0.013 | lb ai/a | PO1,PO2 | 43 | 40 | 15.0 | 10 |
| 7 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 45 | 75 | 28.3 | 25 |
| 8 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1,PO2 | 60 | . | 35.0 | 25 |
| 9 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 30 | 55 | 15.0 | 15 |
| 10 | Loyant | 0.21 | L | 0.035 | lb ai/a | PO1,PO2 | . | . | 18.3 | 20 |
| LSD P=.05 | | | | | | | 51.87 | . | 9.77 | 6.83 |
| Standard Deviation | | | | | | | 5.00 | . | 5.70 | 3.98 |
| CV | | | | | | | 14.29 | . | 34.74 | 27.76 |

## Performance of Florpyrauxifen-benzyl on Blueberry – IR4 – TNRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | BLBE | BLBE | BLBE | BLBE | BLBE |
| Rating Date | | | | | | | 14-Jul-2021 | 22-Jul-2021 | 30-Jul-2021 | 4-Aug-2021 | |
| Rating Type | | | | | | | HARVEST | HARVEST | HARVEST | HARVEST | TOTAL |
| Rating Unit | | | | | | | KG/PLOT | KG/PLOT | KG/PLOT | KG/PLOT | KG/PLOT |
| Assessed By | | | | | | | NS | NS | NS | NS | |
| 1 | Untreated Weedy | | | | | PO1,PO2 | 0.62 | 1.06 | 1.24 | 0.58 | 3.49 |
| 2 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1 | 0.69 | 0.89 | 0.96 | 0.50 | 3.04 |
| 3 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1 | 0.90 | 1.07 | 0.96 | 0.36 | 3.29 |
| 4 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO2 | 0.53 | 0.91 | 0.86 | 0.28 | 2.59 |
| 5 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO2 | 0.64 | 1.15 | 1.28 | 0.51 | 3.58 |
| 6 | Loyant | 0.21 | L | 0.013 | lb ai/a | PO1,PO2 | 0.90 | 1.08 | 0.94 | 0.34 | 3.26 |
| 7 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 0.91 | 1.15 | 0.99 | 0.39 | 3.44 |
| 8 | Loyant | 0.21 | L | 0.053 | lb ai/a | PO1,PO2 | 0.59 | 0.73 | 0.63 | 0.39 | 2.33 |
| 9 | Loyant | 0.21 | L | 0.026 | lb ai/a | PO1,PO2 | 0.62 | 0.94 | 1.10 | 0.36 | 3.02 |
| 10 | Loyant | 0.21 | L | 0.035 | lb ai/a | PO1,PO2 | 0.50 | 0.83 | 0.88 | 0.52 | 2.73 |
| LSD P=.05 | | | | | | | 0.63 | 0.60 | 0.80 | 0.56 | 2.49 |
| Standard Deviation | | | | | | | 0.37 | 0.35 | 0.46 | 0.32 | 1.45 |
| CV | | | | | | | 53.87 | 36.29 | 47.42 | 77.49 | 47.32 |

# Performance of Quinclorac on Grape – IR4 – HTRC - 2021

**Project Code: 132-21-1** **Location: Holt, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Grape** **Variety: Concord**
**Planting Method: NA** **Planting Date: 1967**
**Harvest Date: 9/16/21**
**Plant Spacing: 7 ft; 4 vines/plot** **Row Spacing: 10 ft**
**Tillage Type: NA** **Study Design: RCB** **Replications: 4**
**Plot Size: 6 ft wide x 30 ft long**

**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 | 6/28/21 | 8:50-9:30am | 75/71 F | NA | 0-2 mph | 76% | 10% | NA |
| PO2 | 7/28/21 | 9:45-10:30am | 82/56 F | Damp | SW 0-2mph | 71% | 15% | Light |
| FALL | 10/18/21 | 11:00-11:30am | 67/55 F | Moist | NW 1-2mph | 50% | 0% | Light |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/28/21 | Grape | 5′ | Small green fruit | Good-Fair |
| 6/28/21 | PEST = Perennial Sowthistle | 8-16″ | Flower | |
| 6/28/21 | FIBW = Field Bindweed | | Flower | Many |
| 6/28/21 | GORO = Goldenrod | 10-12″ | | |
| 6/28/21 | WICA = Wild Carrot | 8-12″ | | |
| 7/28/21 | Grape | 5′ | Green Fruit | Good |
| 7/28/21 | COLQ = Common Lambsquarters | 10-24″ | Vegetative | Moderate |
| 7/28/21 | VICR = Virginia Creeper | 10″ | Vegetative | Patches |
| 7/28/21 | SFGE = Smallflower Geranium | 6-12″ | Flower | Many |
| 7/28/21 | PEST | 2-4′ | Flower | Many |
| 7/28/21 | Grass | 6-24″ | Veg-Flower | Many |
| 7/28/21 | FIBW | Sprawling | Flower | Many |
| 7/28/21 | CATH = Canada Thistle | 20-30″ | Flower | Patches |
| 7/28/21 | EBNS = Eastern Black Nightshade | 20-24″ | Flower | Moderate |
| 10/18/21 | No Data Recorded | | | |

**Additional Weeds Observed Throughout Season**

**TOTAL WC = overall control of broadleaves 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. Maintenance sprays: Applied spring application (April 24, 2021) of Roundup PM (24 oz/acre) + Surflan 4AS (4qt/acre) + Karmex (4 lb/acre) for weed control. Gramoxone 2SL (1 lb ai/ac) plus 0.25% NIS was applied on May 26, 2021. Fusilade DX 2EC at 24 fl oz per ac (0.38 lb ai/ac) + NIS (0.25% v/v) was applied to control grasses on August 10, 2021. Applied 60 lb of N fertilizer on April 7, 2021.**
**3. Non-treated plots were hand weeded by using weed-trimmers twice during the season.**
**4. At harvesting, grapes were harvested from 3 vines/plot because in most of the plots fourth vine was not healthy enough to collect harvest data.**
**5. Fall application made before any frost event. At this time, grape vines still had 70-80% leaves and weeds were also growing well.**

# Michigan State University

**Performance of Quinclorac on Grape - IR4 - HTRC - 2021**

Trial ID: 132-21-1 | Location: Holt, MI | Trial Year: 2021
Protocol ID: 132-21-1 | Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | PEST | FIBW | CATH | TOTAL WC |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | |
| Crop Code | | | | | | | | | | |
| Crop Name | | | | | | | GRAPE | | | |
| Rating Date | | | | | | | 06Jul2021 | 06Jul2021 | 06Jul2021 | 06Jul2021 | 06Jul2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Untreated Weed-Free | | | | | PO1,2,FALL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2 | 12.5 | 42.5 | 70.0 | 37.5 | 56.3 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | | |
| 3 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2 | 21.3 | 47.5 | 75.0 | 33.8 | 66.3 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | | |
| 4 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2,FALL | 13.8 | 46.3 | 63.8 | 32.5 | 53.8 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | | |
| 5 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2,FALL | 16.3 | 42.5 | 68.8 | 33.8 | 55.0 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | | |
| LSD (P=.05) | | | | | | | 4.61 | 6.45 | 12.20 | 5.67 | 12.12 |
| Standard Deviation | | | | | | | 2.99 | 4.18 | 7.92 | 3.68 | 7.87 |
| CV | | | | | | | 23.47 | 11.7 | 14.27 | 13.38 | 17.01 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | PEST | FIBW | CATH | TOTAL WC |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | |
| Crop Code | | | | | | | | | | |
| Crop Name | | | | | | | GRAPE | | | |
| Rating Date | | | | | | | 12Jul2021 | 12Jul2021 | 12Jul2021 | 12Jul2021 | 12Jul2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Untreated Weed-Free | | | | | PO1,2,FALL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2 | 17.5 | 42.5 | 76.3 | 32.5 | 61.3 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | | |
| 3 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2 | 18.8 | 43.8 | 78.8 | 38.8 | 67.5 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | | |
| 4 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2,FALL | 20.0 | 48.3 | 75.0 | 37.5 | 58.8 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | | |
| 5 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2,FALL | 21.3 | 45.0 | 76.3 | 39.5 | 63.8 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | | |
| LSD (P=.05) | | | | | | | 5.58 | 13.68 | 15.03 | 8.08 | 12.16 |
| Standard Deviation | | | | | | | 3.62 | 8.88 | 9.76 | 5.25 | 7.89 |
| CV | | | | | | | 23.37 | 24.73 | 15.93 | 17.7 | 15.71 |

# Performance of Quinclorac on Grape – IR4 – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | PEST | FIBW | TOTAL WC |
| Crop Code | | | | | | | | | | |
| Crop Name | | | | | | | GRAPE | | | |
| Rating Date | | | | | | | 27Jul2021 | 27Jul2021 | 27Jul2021 | 27Jul2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC |
| 1 | Untreated Weed-Free | | | | | PO1,2,FALL | 0.0 | 100.0 | 100.0 | 100.0 |
| 2 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2 | 8.8 | 47.5 | 81.3 | 47.5 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 3 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2 | 18.8 | 47.5 | 86.3 | 57.5 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 4 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2,FALL | 16.3 | 53.8 | 81.3 | 50.0 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| 5 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2,FALL | 17.5 | 57.5 | 91.0 | 58.8 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| LSD (P=.05) | | | | | | | 6.09 | 9.54 | 7.28 | 15.18 |
| Standard Deviation | | | | | | | 3.95 | 6.19 | 4.73 | 9.85 |
| CV | | | | | | | 32.27 | 10.11 | 5.37 | 15.7 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | PEST | FIBW | TOTAL WC |
| Crop Code | | | | | | | | | | |
| Crop Name | | | | | | | GRAPE | | | |
| Rating Date | | | | | | | 05Aug2021 | 05Aug2021 | 05Aug2021 | 05Aug2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC |
| 1 | Untreated Weed-Free | | | | | PO1,2,FALL | 0.0 | 100.0 | 100.0 | 100.0 |
| 2 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2 | 12.3 | 55.8 | 86.8 | 57.5 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 3 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2 | 23.8 | 57.5 | 86.5 | 63.3 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 4 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2,FALL | 15.0 | 56.8 | 83.8 | 57.5 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| 5 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2,FALL | 24.3 | 62.0 | 85.0 | 60.3 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| LSD (P=.05) | | | | | | | 7.38 | 8.02 | 4.98 | 8.62 |
| Standard Deviation | | | | | | | 4.79 | 5.20 | 3.23 | 5.59 |
| CV | | | | | | | 31.83 | 7.84 | 3.66 | 8.26 |

# Performance of Quinclorac on Grape – IR4 – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | PEST | FIBW | TOTAL WC |
| Crop Code | | | | | | | | | | |
| Crop Name | | | | | | | GRAPE | | | |
| Rating Date | | | | | | | 13Aug2021 | 13Aug2021 | 13Aug2021 | 13Aug2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC |
| 1 | Untreated Weed-Free | | | | | PO1,2,FALL | 0.0 | 53.8 | 55.0 | 44.3 |
| 2 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2 | 15.8 | 60.0 | 88.0 | 58.8 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 3 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2 | 29.0 | 62.5 | 89.8 | 65.5 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 4 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2,FALL | 16.3 | 60.0 | 88.0 | 63.3 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| 5 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2,FALL | 28.5 | 66.8 | 90.5 | 64.3 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| LSD (P=.05) | | | | | | | 8.89 | 7.84 | 6.48 | 19.12 |
| Standard Deviation | | | | | | | 5.77 | 5.09 | 4.21 | 12.41 |
| CV | | | | | | | 32.25 | 8.4 | 5.12 | 20.96 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | PEST | FIBW | TOTAL WC |
| Crop Code | | | | | | | | | | |
| Crop Name | | | | | | | GRAPE | | | |
| Rating Date | | | | | | | 27Aug2021 | 27Aug2021 | 27Aug2021 | 27Aug2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC |
| 1 | Untreated Weed-Free | | | | | PO1,2,FALL | 0.0 | 62.5 | 62.0 | 60.0 |
| 2 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2 | 15.0 | 62.0 | 93.8 | 59.0 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 3 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2 | 32.0 | 66.8 | 96.3 | 67.5 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 4 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2,FALL | 18.8 | 63.8 | 93.0 | 60.0 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| 5 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2,FALL | 27.0 | 70.5 | 93.8 | 66.8 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| LSD (P=.05) | | | | | | | 8.80 | 16.80 | 19.55 | 19.78 |
| Standard Deviation | | | | | | | 5.71 | 10.90 | 12.69 | 12.84 |
| CV | | | | | | | 30.77 | 16.75 | 14.46 | 20.49 |

# Performance of Quinclorac on Grape – IR4 – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | HARVEST GRAPE 16Sep2012 MATURE NO./PLOT NS | HARVEST GRAPE 16Sep2021 MATURE KG/PLOT NS | HARVEST GRAPE 16Sep2021 >60% GREEN NO./PLOT NS | HARVEST GRAPE 16Sep2021 >60% GREEN KG/PLOT NS |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | |
| Crop Code | | | | | | | HARVEST | HARVEST | HARVEST | HARVEST |
| Crop Name | | | | | | | GRAPE | GRAPE | GRAPE | GRAPE |
| Rating Date | | | | | | | 16Sep2012 | 16Sep2021 | 16Sep2021 | 16Sep2021 |
| Rating Type | | | | | | | MATURE | MATURE | >60% GREEN | >60% GREEN |
| Rating Unit | | | | | | | NO./PLOT | KG/PLOT | NO./PLOT | KG/PLOT |
| Assessed By | | | | | | | NS | NS | NS | NS |
| 1 | Untreated Weed-Free | | | | | PO1,2,FALL | 299.0 | 28.4400 | 0.0 | 0.0000 |
| 2 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2 | 325.0 | 26.8875 | 50.3 | 4.0750 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 3 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2 | 297.8 | 25.2438 | 35.5 | 2.4575 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | | | |
| 4 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2,FALL | 250.5 | 20.7575 | 19.8 | 1.5013 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| 5 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2,FALL | 203.8 | 16.5700 | 33.5 | 2.5875 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | | | |
| LSD (P=.05) | | | | | | | 116.48 | 13.02182 | 53.51 | 4.27014 |
| Standard Deviation | | | | | | | 75.60 | 8.45142 | 34.73 | 2.77140 |
| CV | | | | | | | 27.47 | 35.84 | 124.94 | 130.47 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | HARVEST GRAPE 16Sep2021 TOTAL NO./PLOT NS | HARVEST GRAPE 16Sep2021 TOTAL KG/PLOT NS |
|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | |
| Crop Code | | | | | | | HARVEST | HARVEST |
| Crop Name | | | | | | | GRAPE | GRAPE |
| Rating Date | | | | | | | 16Sep2021 | 16Sep2021 |
| Rating Type | | | | | | | TOTAL | TOTAL |
| Rating Unit | | | | | | | NO./PLOT | KG/PLOT |
| Assessed By | | | | | | | NS | NS |
| 1 | Untreated Weed-Free | | | | | PO1,2,FALL | 299.0 | 28.4400 |
| 2 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2 | 375.3 | 30.9625 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | |
| 3 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2 | 333.3 | 27.7013 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2 | | |
| 4 | QuinStar 4L | 3.8 | L | 0.375 | lb ai/a | PO1,2,FALL | 270.3 | 22.2588 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | |
| 5 | QuinStar 4L | 3.8 | L | 0.75 | lb ai/a | PO1,2,FALL | 237.3 | 19.1575 |
| | COC | 100 | SL | 1.25 | % v/v | PO1,2,FALL | | |
| LSD (P=.05) | | | | | | | 108.83 | 12.91208 |
| Standard Deviation | | | | | | | 70.64 | 8.38019 |
| CV | | | | | | | 23.31 | 32.6 |

# Evaluation of DCC-3825 for Sucker Management in Grape - SWMREC- 2021

**Project Code: 132-21-2** **Location: Benton Harbor, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Grape** **Variety: Niagara**
**Planting Method: NA** **Planting Date: 1996**
**Plant Spacing: 7′; 6 vines/plot** **Row Spacing: 10′**
**Tillage Type: NA** **Study Design: RCB** **Replications: 4**
**Plot Size: 6 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 | 6/15/21 | 11:10am-12:20pm | 75/69 F | Dry | N 1-2 mph | 58% | 0% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/15/21 | Grape | 5′ | Early Fruit Set | Good |
| 6/15/21 | EBNS = Eastern Black Nightshade | 3-5″ | Vegetative | Many |
| 6/15/21 | POIV = Poison Ivy | 3-6″ | Vegetative | Moderate |
| 6/15/21 | SFGE = Small Flower Geranium | 2-5″ | Flower | Moderate |
| 6/15/21 | RESO = Red Sorrel | 3-7″ | Flower | Moderate |
| 6/15/21 | HOWE = Horseweed | 4-6″ | Vegetative | Moderate |
| 6/15/21 | Grasses = Annual grasses | | | Low |

**Additional Weeds Observed Throughout Season**

**TOTAL BL = include overall control of all broadleaf spp.**

**Notes and Comments**

1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. Application made in 2.7″ band on both sides of vine rows.
2. Sucker control, crop, and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Aim (2 LB/GAL) was used during application in place of Shark herbicide.

# Michigan State University

**Evaluation of DCC-3825 for Sucker Management in Grape - SWMREC - 2021**

Trial ID: 132-21-2 | Location: Benton Harbor, MI | Trial Year: 2021

Protocol ID: 132-21-2 | Investigator: Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | SUCKER | TOTAL BL | GRASSES |
| Crop Name | | | | | | | GRAPE | | | |
| Rating Date | | | | | | | 22Jun2021 | 22Jun2021 | 22Jun2021 | 22Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH/NS | MH/NS | MH/NS | MH/NS |
| 1 | Untreated | | | | | | 0 | 0 | 0 | 0 |
| 2 | DCC-3825 | 70 | WDG | 0.011 | lb ai/a | PO1 | 0 | 34 | 51 | 80 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 3 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 0 | 59 | 81 | 89 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 0 | 59 | 80 | 88 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 0 | 56 | 85 | 85 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.011 | lb ai/a | PO1 | 0 | 45 | 84 | 91 |
| | Rely 280 | 2.34 | L | 0.401 | lb ai/a | PO1 | | | | |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 7 | Rely 280 | 2.34 | L | 0.401 | lb ai/a | PO1 | 0 | 24 | 66 | 81 |
| 8 | Shark | 1.9 | EW | 0.030 | lb ai/a | PO1 | 0 | 56 | 74 | 74 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | |
| LSD (P=.05) | | | | | | | 0.00 | 17.86 | 13.84 | 10.38 |
| Standard Deviation | | | | | | | 0.00 | 12.14 | 9.41 | 7.06 |
| CV | | | | | | | 0.0 | 29.22 | 14.43 | 9.61 |

# Michigan State University

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | SUCKER | TOTAL BL | GRASSES |
| Crop Name | | | | | | | GRAPE | | | |
| Rating Date | | | | | | | 30Jun2021 | 30Jun2021 | 30Jun2021 | 30Jun2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH | MH | MH | MH |
| 1 | Untreated | | | | | | 0 | 0 | 0 | 0 |
| 2 | DCC-3825 | 70 | WDG | 0.011 | lb ai/a | PO1 | 0 | 38 | 56 | 75 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 3 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 0 | 49 | 70 | 79 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 0 | 59 | 74 | 83 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 0 | 60 | 76 | 78 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.011 | lb ai/a | PO1 | 0 | 53 | 76 | 84 |
| | Rely 280 | 2.34 | L | 0.401 | lb ai/a | PO1 | | | | |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | |
| 7 | Rely 280 | 2.34 | L | 0.401 | lb ai/a | PO1 | 0 | 45 | 71 | 79 |
| 8 | Shark | 1.9 | EW | 0.030 | lb ai/a | PO1 | 0 | 74 | 70 | 76 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | |
| LSD (P=.05) | | | | | | | 0.00 | 12.05 | 11.37 | 11.72 |
| Standard Deviation | | | | | | | 0.00 | 8.19 | 7.73 | 7.97 |
| CV | | | | | | | 0.0 | 17.42 | 12.52 | 11.54 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | SUCKER | TOTAL BL | GRASSES | SUCKER |
| Crop Name | | | | | | | GRAPE | | | | |
| Rating Date | | | | | | | 06Jul2021 | 06Jul2021 | 06Jul2021 | 06Jul2021 | 30Jul2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH | MH | MH | MH | SC |
| 1 | Untreated | | | | | | 0 | 0 | 0 | 0 | 0 |
| 2 | DCC-3825 | 70 | WDG | 0.011 | lb ai/a | PO1 | 0 | 31 | 46 | 70 | 20 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 3 | DCC-3825 | 70 | WDG | 0.022 | lb ai/a | PO1 | 0 | 51 | 65 | 74 | 31 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.045 | lb ai/a | PO1 | 0 | 45 | 54 | 68 | 32 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 5 | DCC-3825 | 70 | WDG | 0.067 | lb ai/a | PO1 | 0 | 51 | 64 | 60 | 34 |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 6 | DCC-3825 | 70 | WDG | 0.011 | lb ai/a | PO1 | 0 | 50 | 68 | 63 | 33 |
| | Rely 280 | 2.34 | L | 0.401 | lb ai/a | PO1 | | | | | |
| | MSO-Noble | 100 | SL | 1 | % v/v | PO1 | | | | | |
| 7 | Rely 280 | 2.34 | L | 0.401 | lb ai/a | PO1 | 0 | 33 | 64 | 73 | 20 |
| 8 | Shark | 1.9 | EW | 0.030 | lb ai/a | PO1 | 0 | 63 | 61 | 48 | 23 |
| | COC | 100 | SL | 1 | % v/v | PO1 | | | | | |
| LSD (P=.05) | | | | | | | 0.00 | 21.57 | 17.31 | 27.22 | 13.38 |
| Standard Deviation | | | | | | | 0.00 | 14.67 | 11.77 | 18.51 | 9.10 |
| CV | | | | | | | 0.0 | 36.24 | 22.36 | 32.63 | 37.91 |

# Potential Herbicides for Glyphosate Resistant Weeds in Grape using Vision Guided Precision Sprayer – HTRC - 2021

**Project Code: 132-21-3** **Location: Holt, MI**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Grape** **Variety: Concord**
**Planting Method: NA** **Planting Date: 1967**
**Harvest Date: This trial was not harvested**
**Plant Spacing: 7 ft** **Row Spacing: 10 ft**
**Tillage Type: NA** **Study Design: RCB** **Replications: 3**
**Plot Size: 5.4 ft wide x 30 ft long (3 vines/plot)**

**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 (trts 2-6) | 7/21/21 | 9:45-11:45 am | 73/69 F | Dry | 2-4 mph | 57% | 85% | No |
| PO1 trts 7-12) | 7/21/21 | 2:40-3:30 pm | 78/75 F | Dry | 2-4 mph | 41% | 75% | No |
| PO2 (trts 7-12) | 9/2/21 | 10-11:30 am | NA | NA | NA | NA | NA | Yes |
| PO2 (trts 2-6) | 9/2/21 | 12:50-1:25 pm | 75/69 | Dry | 1-5 mph | 34% | 0% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 7/21/21 | Grape – Bunch closure | | | |
| | Weeds in general | 5 to 8″ tall | | |
| 9/2/21 | Grape – 80% grapes berries showing purple colors (Veraison) | | | |
| | Weeds in general | 5 to 8″ tall | | |

**Additional Weeds Observed Throughout Season**

CATH = Cananda Thistle
FIBW = Field Bindweed
SFGE = Smallflower Geranium
WHCL = White Clover
WICA = Wild Carrot
GRASSES = overall control of grass spp.
TOTAL WC = overall control of broadleaves, sedges, and grass spp.

**Notes and Comments**
1. Spray applied with 2 nozzle-boom for treatments 2-6. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Spray applied with 4 nozzle vision guided sprayer attached to an ATV for treatments 7-12. FF11002, 20 gpa, 29 PSI, 4 mph, CO2 vision guided sprayer. Each nozzle covers 25 cm area.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. At PO2 application, treatments 6 & 11 were not applied.
4. West side of 104 sprayed with treatment 5 at PO2 application.
5. Applied spring application (April 24, 2021) of Roundup PM (24 oz/acre) + Surflan 4AS (4qt/acre) + Karmex (4 lb/acre) in early spring for weed control. Gramoxone 2SL (1 lb ai/ac) + NIS (0.25% v/v) was applied on May 26 and June 30, 2021. Fusilade DX 2EC at 24 fl oz per ac (0.38 lb ai/ac) + NIS (0.25% v/v) was applied to control grasses on August 10, 2021. Applied 60 lb of N fertilizer on April 7, 2021.

# Michigan State University

**Potential Herbicides for Glyphosate Resistant Weeds in Grape using Vision Guided Precision Sprayer - HTRC - 2021**

Trial ID:132-21-3 Location:Holt, MI Trial Year:2021

Protocol ID:132-21-3 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | TOTAL WC | GRASSES | FIBW | CATH | |
| Crop Name | | | | | | | GRAPE | | | | | GRAPE |
| Rating Date | | | | | | | 28-Jul-2021 | 28-Jul-2021 | 28-Jul-2021 | 28-Jul-2021 | 28-Jul-2021 | 8-Aug-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC | SC |
| 1 | Untreated Weedy | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Rely 280 | 2.34 | L | 1.5 | lb ai/a | PO1 | 3.3 | 95.0 | 93.3 | 93.3 | 88.7 | 3.3 |
| | N Pak (AMS) | 100 | L | 8 | % v/v | PO1 | | | | | | |
| 3 | Callisto | 4 | SC | 0.4 | lb ai/a | PO1 | 11.7 | 56.0 | 62.7 | 51.7 | 44.4 | 4.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 4 | Reglone | 2 | L | 1 | lb ai/a | PO1 | 5.0 | 80.0 | 56.7 | 78.3 | 65.0 | 6.7 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 5 | Homeplate | 100 | L | 6 | % v/v | PO1 | 3.3 | 26.7 | 6.7 | 15.0 | 13.3 | 4.0 |
| 6 | Embed Extra | 3.8 | L | 1.9 | lb ai/a | PO1 | 11.0 | 76.7 | 0.0 | 85.0 | 80.0 | 5.7 |
| 7 | Rely 280 | 2.34 | L | 1.5 | lb ai/a | PO2 | 0.0 | 90.0 | 86.7 | 88.3 | 85.0 | 0.0 |
| | N Pak (AMS) | 100 | L | 8 | % v/v | PO2 | | | | | | |
| 8 | Callisto | 4 | SC | 0.4 | lb ai/a | PO2 | 8.3 | 60.0 | 68.3 | 50.0 | 46.9 | 0.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 9 | Reglone | 2 | L | 1 | lb ai/a | PO2 | 3.3 | 91.7 | 86.7 | 90.0 | 85.0 | 5.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO2 | | | | | | |
| 10 | Homeplate | 100 | L | 6 | % v/v | PO2 | 0.0 | 40.0 | 16.7 | 33.3 | 30.0 | 0.0 |
| 11 | Embed Extra | 3.8 | L | 1.9 | lb ai/a | PO2 | 11.3 | 80.0 | 0.0 | 80.0 | 78.3 | 10.0 |
| 12 | BASF-1 | 3.13 | SC | 0.022 | lb ai/a | PO2 | 3.3 | 86.7 | 25.0 | 80.0 | | 1.7 |
| LSD P=.05 | | | | | | | 7.51 | 17.87 | 26.56 | 13.65 | 18.52 | 9.46 |
| Standard Deviation | | | | | | | 4.43 | 10.55 | 15.69 | 8.06 | 10.79 | 5.58 |
| CV | | | | | | | 87.71 | 16.18 | 37.45 | 12.98 | 19.25 | 166.13 |

# Potential Herbicides for Glyphosate Resistant Weeds in Grape using Vision Guided Precision Sprayer – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | TOTAL WC | GRASSES | FIBW | CATH | GRAPE | TOTAL WC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | | |
| Crop Name | | | | | | | | | | | GRAPE | |
| Rating Date | | | | | | | 8-Aug-2021 | 8-Aug-2021 | 8-Aug-2021 | 8-Aug-2021 | 7-Oct-2021 | 7-Oct-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | MHM | MHM |
| 1 | Untreated Weedy | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Rely 280 | 2.34 | L | 1.5 | lb ai/a | PO1 | 88.3 | 91.7 | 78.3 | 0.0 | 0.0 | 90.0 |
| | N Pak (AMS) | 100 | L | 8 | % v/v | PO1 | | | | | | |
| 3 | Callisto | 4 | SC | 0.4 | lb ai/a | PO1 | 59.3 | 58.3 | 52.7 | | 3.3 | 66.7 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 4 | Reglone | 2 | L | 1 | lb ai/a | PO1 | 60.0 | 40.0 | 58.3 | 50.0 | 0.0 | 76.7 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 5 | Homeplate | 100 | L | 6 | % v/v | PO1 | 23.3 | 6.7 | 13.3 | 0.0 | 1.7 | 33.3 |
| 6 | Embed Extra | 3.8 | L | 1.9 | lb ai/a | PO1 | 71.7 | 0.0 | 95.0 | 85.0 | 6.7 | 61.7 |
| 7 | Rely 280 | 2.34 | L | 1.5 | lb ai/a | PO2 | 91.7 | 86.7 | 88.3 | | 0.0 | 86.7 |
| | N Pak (AMS) | 100 | L | 8 | % v/v | PO2 | | | | | | |
| 8 | Callisto | 4 | SC | 0.4 | lb ai/a | PO2 | 65.0 | 51.7 | 55.0 | 75.0 | 0.0 | 63.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 9 | Reglone | 2 | L | 1 | lb ai/a | PO2 | 86.7 | 77.3 | 78.3 | 90.0 | 1.7 | 83.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO2 | | | | | | |
| 10 | Homeplate | 100 | L | 6 | % v/v | PO2 | 18.3 | 8.3 | 15.0 | 10.0 | 0.0 | 25.0 |
| 11 | Embed Extra | 3.8 | L | 1.9 | lb ai/a | PO2 | 77.7 | 0.0 | 83.3 | 80.0 | 1.7 | 33.3 |
| 12 | BASF-1 | 3 | SC | 0.022 | lb ai/a | PO2 | 85.0 | 36.7 | 80.0 | | 1.7 | 71.7 |
| LSD P=.05 | | | | | | | 19.57 | 24.49 | 20.63 | 13.09 | 3.43 | 19.74 |
| Standard Deviation | | | | | | | 11.56 | 14.46 | 12.19 | 5.77 | 2.03 | 11.66 |
| CV | | | | | | | 19.08 | 37.95 | 20.96 | 13.32 | 145.85 | 20.23 |

# Potential Herbicides for Glyphosate Resistant Weeds in Grape using Vision Guided Precision Sprayer – HTRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | GRASSES | FIBW | CATH | WICA | SFGE | WHCL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | | |
| Crop Name | | | | | | | | | | | | |
| Rating Date | | | | | | | 7-Oct-2021 | 7-Oct-2021 | 7-Oct-2021 | 7-Oct-2021 | 7-Oct-2021 | 7-Oct-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MHM | MHM | MHM | MHM | MHM | MHM |
| 1 | Untreated Weedy | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Rely 280 | 2.34 | L | 1.5 | lb ai/a | PO1 | 100.0 | 90.0 | 100.0 | 96.7 | 93.3 | 98.3 |
| | N Pak (AMS) | 100 | L | 8 | % v/v | PO1 | | | | | | |
| 3 | Callisto | 4 | SC | 0.4 | lb ai/a | PO1 | 93.3 | 40.0 | 100.0 | 91.7 | 81.7 | 73.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 4 | Reglone | 2 | L | 1 | lb ai/a | PO1 | 96.7 | 75.0 | 85.0 | 85.0 | 95.0 | 83.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 5 | Homeplate | 100 | L | 6 | % v/v | PO1 | 61.7 | 18.3 | 53.3 | 50.0 | 55.0 | 26.7 |
| 6 | Embed Extra | 3.8 | L | 1.9 | lb ai/a | PO1 | 88.3 | 88.3 | 86.7 | 58.3 | 83.3 | 41.7 |
| 7 | Rely 280 | 2.34 | L | 1.5 | lb ai/a | PO2 | 96.7 | 90.0 | 100.0 | 100.0 | 86.7 | 91.7 |
| | N Pak (AMS) | 100 | L | 8 | % v/v | PO2 | | | | | | |
| 8 | Callisto | 4 | SC | 0.4 | lb ai/a | PO2 | 88.3 | 56.7 | 100.0 | 96.7 | 73.3 | 93.3 |
| | NIS | 100 | SL | 0.25 | % v/v | PO1 | | | | | | |
| 9 | Reglone | 2 | L | 1 | lb ai/a | PO2 | 100.0 | 90.0 | 91.7 | 100.0 | 91.7 | 95.0 |
| | NIS | 100 | SL | 0.25 | % v/v | PO2 | | | | | | |
| 10 | Homeplate | 100 | L | 6 | % v/v | PO2 | 88.3 | 16.7 | 88.3 | 55.0 | 60.0 | 11.7 |
| 11 | Embed Extra | 3.8 | L | 1.9 | lb ai/a | PO2 | 86.7 | 80.0 | 88.3 | 43.3 | 78.3 | 10.0 |
| 12 | BASF-1 | 3 | SC | 0.022 | lb ai/a | PO2 | 96.7 | 81.7 | 100.0 | 58.3 | 96.7 | 76.7 |
| LSD P=.05 | | | | | | | 28.00 | 28.33 | 27.39 | 34.50 | 30.27 | 18.03 |
| Standard Deviation | | | | | | | 16.54 | 16.73 | 16.18 | 20.38 | 17.87 | 10.65 |
| CV | | | | | | | 19.91 | 27.63 | 19.54 | 29.28 | 23.97 | 18.21 |

# Apple Fall-Spring Weed Control with Pre and Postemergence Herbicides – HTRC – 2020-2021

**Project Code: 128-21-1** **Location: Holt, MI**
**Block: 153-160**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Apple** **Variety: See notes**
**Planting Method: Transplanted** **Planting Date: 2006**
**Plant Spacing: 12′** **Row Spacing: 18′**
**Tillage Type: NA** **Study Design: RCB** **Replications: 4**
**Plot Size: 11 ft wide x 50 ft long**

**Soil Type: Filer Fine Sandy Loam** **OM: 2.2%** **pH: 7**
**Sand: 46%** **Silt: 29%** **Clay: 25%** **CEC: 9.9**

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| FALL | 11/6/20 | 10am-12pm | 60/48 F | Moist | SE 3-5mph | 66% | 25% | No |
| SPRING | 4/6/21 | 11:40am-12:45pm | 67/49 F | Moist | S 5-7mph | 57% | 40% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 11/6/20 | Apple | 8-10′ | Post-Harvest | Good |
| 11/6/20 | Very few weeds in plot | | | |
| 4/6/21 | Apple | 10-15′ | Bud-break | Good |
| 4/6/21 | No weeds | | | |

**Additional Weeds Observed Throughout Season**

FIPC = Field Pennycress
WICA = Wild Carrot
HOWE = Horseweed
COLQ = Common Lambsquarters
GRASSES = overall control of grass spp.
TOTAL BL = include overall control of all broadleaf spp.
TOTAL WC = overall control of broadleaves, and 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. Apple Varieties: Auvil Early Fuji, Pacific Gala, Honeycrisp, LuckyJon, & Spartan
4. There was no injury observed on apple trees.

# Michigan State University

**Apple Fall-Spring Weed Control with Pre- and Postemergence herbicides-HTRC-2020-2021**

Trial ID:128-21-1 Location:East Lansing, MI Trial Year:2021

Protocol ID:128-21-1 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | SUCKER | TOTAL WC | FIPC | WICA | HOWE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Code | | | | | | | | | | |
| | Rating Date | | | | | | 24-May-2021 | 24-May-2021 | 24-May-2021 | 24-May-2021 | 24-May-2021 |
| | Rating Type | | | | | | RATING | RATING | RATING | RATING | RATING |
| | Rating Unit | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| | Assessed By | | | | | | SC | SC | SC | SC | SC |
| 1 | Non-Treated | | | | | | 72.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Fall | 47.5 | 80.0 | 92.5 | 85.0 | 100.0 |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Fall | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Fall | | | | | |
| 3 | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | 65.0 | 47.5 | 20.0 | 52.5 | 90.0 |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 4 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 75.0 | 93.8 | 100.0 | 95.0 | 99.5 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 5 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 53.8 | 96.3 | 98.8 | 95.0 | 100.0 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 6 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 73.8 | 97.5 | 100.0 | 95.0 | 98.8 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 7 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 80.0 | 92.5 | 100.0 | 95.0 | 100.0 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 8 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 52.5 | 85.0 | 97.5 | 87.5 | 100.0 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |

# Apple Fall-Spring Weed Control with Pre and Postemergence Herbicides – HTRC – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | SUCKER | TOTAL WC | FIPC | WICA | HOWE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Rating Date | | | | | | | 24-May-2021 | 24-May-2021 | 24-May-2021 | 24-May-2021 | 24-May-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 9 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 53.8 | 85.0 | 97.5 | 85.0 | 92.5 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 10 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 62.5 | 91.3 | 97.5 | 88.3 | 97.5 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 11 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 63.8 | 90.0 | 90.0 | 92.5 | 100.0 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 12 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 80.0 | 85.0 | 87.5 | 83.3 | 100.0 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 13 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 77.5 | 92.5 | 100.0 | 85.0 | 98.8 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 14 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 71.3 | 88.8 | 95.0 | 75.0 | 98.8 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 15 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 80.0 | 92.5 | 100.0 | 70.0 | 100.0 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 16 | Roundup PowerMax | 5.5 | L | 2 | lb ai/a | Fall | 83.8 | 85.0 | 95.0 | 82.5 | 95.0 |
| | N Pak (AMS) | 100 | L | 2.5 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| LSD P=.05 | | | | | | | 40.18 | 12.35 | 15.35 | 20.09 | 6.52 |
| Standard Deviation | | | | | | | 28.11 | 8.64 | 10.74 | 14.06 | 4.56 |
| CV | | | | | | | 41.17 | 10.62 | 12.53 | 17.76 | 4.97 |

# Apple Fall-Spring Weed Control with Pre and Postemergence Herbicides – HTRC – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | GRASSES | COLQ | SUCKER | FIPC | WICA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Rating Date | | | | | | | 24-May-2021 | 24-May-2021 | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | CG | CG | CG |
| 1 | Non-Treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Fall | 90.0 | 92.5 | 43.8 | 100.0 | 80.0 |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Fall | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Fall | | | | | |
| 3 | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | 80.0 | 92.5 | 43.8 | 38.8 | 71.3 |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 4 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 95.0 | 98.8 | 60.0 | 100.0 | 96.3 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 5 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 97.5 | 98.8 | 66.3 | 100.0 | 96.3 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 6 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 100.0 | 98.8 | 60.0 | 100.0 | 97.5 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 7 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 92.5 | 97.5 | 55.0 | 100.0 | 96.3 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 8 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 72.5 | 97.5 | 35.0 | 98.8 | 95.0 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |

# Apple Fall-Spring Weed Control with Pre and Postemergence Herbicides – HTRC – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | GRASSES | COLQ | SUCKER | FIPC | WICA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Rating Date | | | | | | | 24-May-2021 | 24-May-2021 | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | CG | CG | CG |
| 9 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 76.3 | 97.5 | 37.5 | 100.0 | 92.5 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 10 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 92.5 | 92.5 | 66.3 | 100.0 | 75.0 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 11 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 95.0 | 98.8 | 36.3 | 96.3 | 92.5 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 12 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 80.0 | 97.5 | 63.8 | 98.8 | 95.0 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 13 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 78.8 | 100.0 | 55.0 | 100.0 | 93.8 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 14 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 77.5 | 100.0 | 63.8 | 100.0 | 88.8 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 15 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 88.8 | 100.0 | 73.8 | 100.0 | 76.3 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 16 | Roundup PowerMax | 5.5 | L | 2 | lb ai/a | Fall | 72.5 | 91.3 | 86.3 | 100.0 | 91.3 |
| | N Pak (AMS) | 100 | L | 2.5 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| LSD P=.05 | | | | | | | 21.43 | 6.86 | 51.54 | 14.81 | 23.82 |
| Standard Deviation | | | | | | | 14.99 | 4.80 | 36.07 | 10.37 | 16.67 |
| CV | | | | | | | 18.62 | 5.28 | 68.19 | 11.58 | 19.94 |

# Apple Fall-Spring Weed Control with Pre and Postemergence Herbicides – HTRC – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | HOWE | GRASSES | COLQ | TOTAL WC | GRASSES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Rating Date | | | | | | | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 | 2-Sep-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG | CG | CG | CG | SC |
| 1 | Non-Treated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Fall | 100.0 | 96.3 | 70.0 | 82.5 | 76.3 |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Fall | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Fall | | | | | |
| 3 | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | 97.5 | 92.5 | 93.8 | 60.0 | 57.0 |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 4 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 98.8 | 98.8 | 100.0 | 95.0 | 80.0 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 5 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 100.0 | 97.5 | 98.8 | 96.3 | 90.8 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 6 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 100.0 | 100.0 | 100.0 | 97.5 | 92.5 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 7 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 100.0 | 88.8 | 97.5 | 96.3 | 82.3 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 8 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 100.0 | 88.8 | 96.3 | 93.8 | 68.8 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |

# Apple Fall-Spring Weed Control with Pre and Postemergence Herbicides – HTRC – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | HOWE | GRASSES | COLQ | TOTAL WC | GRASSES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Rating Date | | | | | | | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 | 23-Jun-2021 | 2-Sep-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | CG | CG | CG | CG | SC |
| 9 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 100.0 | 90.0 | 100.0 | 92.5 | 53.8 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 10 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 100.0 | 92.5 | 97.5 | 92.5 | 87.5 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 11 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 100.0 | 96.3 | 100.0 | 92.5 | 82.5 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 12 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 100.0 | 95.0 | 98.8 | 93.8 | 86.3 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 13 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 100.0 | 87.5 | 100.0 | 90.0 | 53.8 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 14 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 100.0 | 92.5 | 98.8 | 90.0 | 71.3 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 15 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 100.0 | 91.3 | 100.0 | 88.8 | 62.5 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| 16 | Roundup PowerMax | 5.5 | L | 2 | lb ai/a | Fall | 100.0 | 88.8 | 96.3 | 91.3 | 46.3 |
| | N Pak (AMS) | 100 | L | 2.5 | lb ai/a | Fall | | | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | | | |
| LSD P=.05 | | | | | | | 2.01 | 8.08 | 11.91 | 7.12 | 29.60 |
| Standard Deviation | | | | | | | 1.41 | 5.66 | 8.33 | 4.98 | 20.71 |
| CV | | | | | | | 1.51 | 6.48 | 9.21 | 5.89 | 30.37 |

# Apple Fall-Spring Weed Control with Pre and Postemergence Herbicides – HTRC – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | TOTAL BL | HOWE | WICA |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | |
| Rating Date | | | | | | | 2-Sep-2021 | 2-Sep-2021 | 2-Sep-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC |
| 1 | Non-Treated | | | | | | 0.0 | 0.0 | 0.0 |
| 2 | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Fall | 65.8 | 71.5 | 68.8 |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Fall | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Fall | | | |
| 3 | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | 45.0 | 51.8 | 45.8 |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 4 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 86.3 | 85.0 | 83.8 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 5 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 87.8 | 89.0 | 87.5 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 6 | Chateau SW | 51 | WDG | 0.383 | lb ai/a | Fall | 90.8 | 91.8 | 91.8 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 7 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 83.8 | 78.8 | 81.5 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 8 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 72.5 | 72.5 | 74.5 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |

# Apple Fall-Spring Weed Control with Pre and Postemergence Herbicides – HTRC – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | TOTAL BL | HOWE | WICA |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | |
| Rating Date | | | | | | | 2-Sep-2021 | 2-Sep-2021 | 2-Sep-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC |
| 9 | Matrix | 25 | DF | 0.063 | lb ai/a | Fall | 57.3 | 62.5 | 52.5 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 10 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 77.0 | 82.5 | 62.5 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 11 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 71.3 | 73.8 | 61.3 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 12 | Alion 200 | 1.67 | SC | 0.065 | lb ai/a | Fall | 80.0 | 81.3 | 73.8 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 13 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 72.5 | 71.3 | 63.8 |
| | Embed Extra | 3.8 | L | 1.9 | lb ae/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 14 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 70.8 | 71.8 | 67.5 |
| | Stinger | 3 | L | 0.188 | lb ae/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 15 | Karmex | 80 | DF | 3 | lb ai/a | Fall | 67.5 | 64.5 | 63.8 |
| | Quinstar | 3.8 | L | 0.25 | lb ai/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| 16 | Roundup PowerMax | 5.5 | L | 2 | lb ai/a | Fall | 61.3 | 58.8 | 60.0 |
| | N Pak (AMS) | 100 | L | 2.5 | lb ai/a | Fall | | | |
| | Alion 200 | 1.67 | SC | 0.085 | lb ai/a | Spring | | | |
| | Rely 280 | 2.34 | L | 1 | lb ai/a | Spring | | | |
| | NIS | 100 | SL | 0.25 | % v/v | Spring | | | |
| LSD P=.05 | | | | | | | 21.86 | 20.52 | 23.62 |
| Standard Deviation | | | | | | | 15.30 | 14.36 | 16.53 |
| CV | | | | | | | 22.47 | 20.76 | 25.47 |

# Pome Fruit Tolerance to High Rates of DCC-3825 – Summer Application – CRC - 2021

**Project Code: 128-21-2** **Location: Clarksville, MI**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Apple** **Variety: Schlet Spur Red Delicious on M26 rootstock**
**Planting Method: Transplanted** **Planting Date: 2007**
**Plant Spacing: 6′** **Row Spacing: 15′**
**Tillage Type: NA** **Study Design: RCB** **Replications: 4**
**Plot Size: 11 ft wide x 30 ft long (5 trees/plot)**

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

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| POST | 6/4/21 | 9:40-10:40 am | 76/63 F | Dry | SW 2-5 mph | 46% | 80% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 6/4/21 | DAND = Dandelion | 4-8″ | Vegetative | Many |
| 6/4/21 | WHCL = White Clover | 3-6″ | Vegetative | Many |
| 6/4/21 | WICA = Wild Carrot | 4-5″ | Vegetative | Moderate |
| 6/4/21 | COCW = Common Chickweed | 4-5″ | Vegetative | Many |
| 6/4/21 | Grasses(mowed) | 4-6″ | Vegetative | Many |

**Additional Weeds Observed Throughout Season**

**TOTAL BL = include overall control of all broadleaf spp.**
**TOTAL WC = overall control of broadleaves, and 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. Grasses were mowed prior to application.**
**4. Other weeds species were also present including wild carrot and black medic.**
**4. Injury symptoms from tiafenacil (DCC-3825) reported as necrotic spots on leaves. This injury was reported only on lower leaves where accidentally herbicide spray solution drifted on leaves.**
**5. Injury symptoms from Loyant and Elevore reported as leaf curling and strapping on only lower leaves.**

# Michigan State University

**Pome Fruit Tolerance to High Rates of DCC-3825 - Summer Application - CRC - 2021**

Trial ID:128-21-2 Location:Clarksville, MI Trial Year:2021

Protocol ID:128-21-2 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | DAND | COCW | WHCL | TOTAL BL |
| Crop Name | | | | | | | APPLE | | | | |
| Rating Date | | | | | | | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 | 10-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Untreated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | DCC-3825 | 70 | WDG | 0.066 | lb ai/a | POST | 7.5 | 71.3 | 70.0 | 75.0 | 73.8 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 3 | DCC-3825 | 70 | WDG | 0.131 | lb ai/a | POST | 7.5 | 78.8 | 77.5 | 77.5 | 80.0 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.196 | lb ai/a | POST | 6.3 | 81.3 | 78.8 | 78.8 | 80.0 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 5 | Treevix | 70 | WG | 0.044 | lb ai/a | POST | 0.0 | 85.0 | 78.8 | 65.0 | 78.8 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 6 | Treevix | 70 | WG | 0.087 | lb ai/a | POST | 2.5 | 82.5 | 77.5 | 77.5 | 81.3 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 7 | Elevore | 0.572 | WG | 0.0044 | lb ai/a | POST | 5.0 | 72.5 | 67.5 | 70.0 | 71.3 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 8 | Loyant | 0.21 | L | 0.035 | lb ai/a | POST | 11.3 | 81.3 | 80.0 | 78.8 | 80.0 |
| LSD P=.05 | | | | | | | 5.50 | 10.48 | 9.36 | 16.78 | 9.11 |
| Standard Deviation | | | | | | | 3.74 | 7.12 | 6.36 | 11.41 | 6.20 |
| CV | | | | | | | 74.8 | 10.31 | 9.6 | 17.47 | 9.1 |

# Pome Fruit Tolerance to High Rates of DCC-3825 – Summer Application – CRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | DAND | COCW | WHCL | TOTAL WC |
| Crop Name | | | | | | | APPLE | | | | |
| Rating Date | | | | | | | 18-Jun-2021 | 18-Jun-2021 | 18-Jun-2021 | 18-Jun-2021 | 18-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC |
| 1 | Untreated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | DCC-3825 | 70 | WDG | 0.066 | lb ai/a | POST | 2.5 | 71.3 | 76.5 | 77.5 | 76.3 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 3 | DCC-3825 | 70 | WDG | 0.131 | lb ai/a | POST | 5.0 | 76.3 | 80.0 | 82.5 | 81.3 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.196 | lb ai/a | POST | 2.5 | 75.0 | 78.8 | 81.3 | 80.0 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 5 | Treevix | 70 | WG | 0.044 | lb ai/a | POST | 0.0 | 74.5 | 80.0 | 75.0 | 77.5 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 6 | Treevix | 70 | WG | 0.087 | lb ai/a | POST | 2.5 | 82.5 | 87.5 | 86.3 | 86.3 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 7 | Elevore | 0.572 | WG | 0.0044 | lb ai/a | POST | 2.5 | 66.3 | 75.0 | 70.0 | 73.8 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | |
| 8 | Loyant | 0.21 | L | 0.035 | lb ai/a | POST | 6.3 | 90.0 | 92.5 | 85.0 | 88.8 |
| LSD P=.05 | | | | | | | 5.71 | 9.38 | 13.08 | 11.61 | 9.34 |
| Standard Deviation | | | | | | | 3.88 | 6.37 | 8.89 | 7.90 | 6.35 |
| CV | | | | | | | 146.13 | 9.52 | 12.48 | 11.33 | 9.02 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | DAND | WHCL | TOTAL WC | | TOTAL WC |
| Crop Name | | | | | | | APPLE | | | | APPLE | |
| Rating Date | | | | | | | 1-Jul-2021 | 1-Jul-2021 | 1-Jul-2021 | 1-Jul-2021 | 1-Aug-2021 | 1-Aug-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC | SC | SC | SC | SC | SC |
| 1 | Untreated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | DCC-3825 | 70 | WDG | 0.066 | lb ai/a | POST | 0.0 | 65.0 | 68.8 | 65.0 | 0.0 | 41.3 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | | |
| 3 | DCC-3825 | 70 | WDG | 0.131 | lb ai/a | POST | 0.0 | 67.5 | 73.8 | 67.5 | 0.0 | 48.3 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.196 | lb ai/a | POST | 0.0 | 63.8 | 77.5 | 72.5 | 0.0 | 51.3 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | | |
| 5 | Treevix | 70 | WG | 0.044 | lb ai/a | POST | 0.0 | 56.3 | 61.3 | 63.8 | 0.0 | 43.8 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | | |
| 6 | Treevix | 70 | WG | 0.087 | lb ai/a | POST | 0.0 | 71.3 | 75.0 | 71.3 | 0.0 | 54.5 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | | |
| 7 | Elevore | 0.572 | WG | 0.0044 | lb ai/a | POST | 0.0 | 57.5 | 68.8 | 61.3 | 0.0 | 37.5 |
| | MSO | 100 | SL | 1 | % v/v | POST | | | | | | |
| 8 | Loyant | 0.21 | L | 0.035 | lb ai/a | POST | 0.0 | 93.8 | 83.8 | 90.0 | 0.0 | 72.0 |
| LSD P=.05 | | | | | | | 0.00 | 19.34 | 19.03 | 18.43 | 0.00 | 18.58 |
| Standard Deviation | | | | | | | 0.00 | 13.15 | 12.94 | 12.53 | 0.00 | 12.63 |
| CV | | | | | | | 0.0 | 22.15 | 20.35 | 20.41 | 0.0 | 29.0 |

# Pome Fruit Tolerance to High Rates of DCC-3825 – Early Spring Application on Dormant Pears – TNRC - 2021

**Project Code: 128-21-3** **Location: Fennville, MI**

**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**

**Crop: Pear** **Variety: Bartlett**
**Planting Method: Transplanted** **Planting Date: 1985**
**Plant Spacing: 18′; 2 plants per plot** **Row Spacing: 20″**
**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 |
|---|---|---|---|---|---|---|---|---|
| EPRE | 4/12/21 | 12:40-1:20pm | 54/49 F | Wet | SW 3-5 mph | 75% | 98% | Light |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 4/12/21 | Pear | 10′ | Bud-break | Good |
| 4/12/21 | DAND = Dandelion | 2-3″ | Vegetative | Many |
| 4/12/21 | WHCL = White Clover | 0.5-2″ | Vegetative | Moderate |
| 4/12/21 | RESO = Red Sorrel | 3-5″ | Flower | Few-Moderate |
| 4/12/21 | PEST = Perennial Sowthistle | 2-3″ | Vegetative | Many |
| 4/12/21 | PUDN = Purple Deadnettle | 1-2″ | Vegetative | Few |

**Additional Weeds Observed Throughout Season**

**CATH = Canada Thistle**
**RECL = Red Clover**
**WICA = Wild Carrot**
**WLDSTBE = Wild Strawberry**
**TOTAL WC = overall control of broadleaves, sedges, and 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. Spring maintenance application of Chateau (8 oz/ac) plus Sinbar (2 lb/ac) applied on March 28, 2021.**
**4. Initial crop and weed control injury data were not taken due to the frost events in late April and early May because it was difficult to separate any herbicide or frost damage at that point.**
**5. Overall, there was no injury reported on pear from any of the herbicide evaluated in this trial.**

# Michigan State University

**Pome Fruit Tolerance to High Rates of DCC-3825 - Early Spring Application on Dormant Pears - TNRC - 2021**

Trial ID:128-21-3 Location:Fennville, MI Trial Year:2021

Protocol ID:128-21-3 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | DAND | WLDSTBE | WICA | PEST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Name | | | | | | | PEAR | | | | |
| Rating Date | | | | | | | 11-May-2021 | 11-May-2021 | 11-May-2021 | 11-May-2021 | 11-May-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH | MH | MH | MH | MH |
| 1 | Untreated | | | | | | 1.3 | 43.8 | 96.3 | 57.5 | 95.0 |
| 2 | DCC-3825 | 70 | WDG | 0.066 | lb ai/a | EPRE | 8.8 | 89.5 | 87.5 | 96.3 | 88.5 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 3 | DCC-3825 | 70 | WDG | 0.131 | lb ai/a | EPRE | 5.0 | 96.3 | 97.5 | 100.0 | 87.8 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.196 | lb ai/a | EPRE | 6.3 | 66.3 | 92.5 | 100.0 | 86.8 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 5 | Treevix | 70 | WG | 0.044 | lb ai/a | EPRE | 5.0 | 77.0 | 93.0 | 87.5 | 93.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 6 | Treevix | 70 | WG | 0.087 | lb ai/a | EPRE | 1.3 | 84.5 | 98.8 | 95.0 | 92.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 7 | Loyant | 0.21 | L | 0.018 | lb ai/a | EPRE | 8.8 | 94.5 | 92.5 | 91.0 | 93.8 |
| 8 | Loyant | 0.21 | L | 0.035 | lb ai/a | EPRE | 0.0 | 92.8 | 94.8 | 97.5 | 97.5 |
| LSD P=.05 | | | | | | | 6.88 | 24.71 | 12.47 | 12.83 | 16.74 |
| Standard Deviation | | | | | | | 4.68 | 16.80 | 8.48 | 8.72 | 11.38 |
| CV | | | | | | | 103.31 | 20.85 | 9.01 | 9.63 | 12.4 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | | PEAR | DAND | WHCL | PEST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | WICA | | | | |
| Rating Date | | | | | | | 11-May-2021 | 24-May-2021 | 24-May-2021 | 24-May-2021 | 24-May-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH | MH,CG | MH,CG | MH,CG | MH,CG |
| 1 | Untreated | | | | | | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | DCC-3825 | 70 | WDG | 0.066 | lb ai/a | EPRE | . | 0.0 | 50.0 | 71.3 | 37.5 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 3 | DCC-3825 | 70 | WDG | 0.131 | lb ai/a | EPRE | 100.0 | 0.0 | 76.3 | 100.0 | 61.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.196 | lb ai/a | EPRE | 85.0 | 0.0 | 65.0 | 95.0 | 67.5 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 5 | Treevix | 70 | WG | 0.044 | lb ai/a | EPRE | 80.0 | 0.0 | 32.5 | 86.3 | 5.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 6 | Treevix | 70 | WG | 0.087 | lb ai/a | EPRE | . | 0.0 | 47.5 | 93.8 | 43.8 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 7 | Loyant | 0.21 | L | 0.018 | lb ai/a | EPRE | 86.5 | 0.0 | 100.0 | 87.5 | 98.8 |
| 8 | Loyant | 0.21 | L | 0.035 | lb ai/a | EPRE | . | 0.0 | 98.8 | 100.0 | 100.0 |
| LSD P=.05 | | | | | | | . | 0.00 | 45.75 | 27.79 | 36.65 |
| Standard Deviation | | | | | | | . | 0.00 | 31.11 | 18.90 | 24.92 |
| CV | | | | | | | . | 0.0 | 52.95 | 23.85 | 48.18 |

# Pome Fruit Tolerance to High Rates of DCC-3825 – Early Spring Application on Dormant Pears – TNRC - 2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CATH | RECL | PEAR | DAND | PEST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | | | |
| Crop Name | | | | | | | | | PEAR | | |
| Rating Date | | | | | | | 24-May-2021 | 24-May-2021 | 11-Jun-2021 | 11-Jun-2021 | 11-Jun-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH,CG | MH,CG | MH,CG | MH,CG | MH,CG |
| 1 | Untreated | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | DCC-3825 | 70 | WDG | 0.066 | lb ai/a | EPRE | 76.3 | 100.0 | 1.3 | 61.3 | 40.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 3 | DCC-3825 | 70 | WDG | 0.131 | lb ai/a | EPRE | 70.0 | 97.5 | 1.3 | 37.5 | 47.5 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 4 | DCC-3825 | 70 | WDG | 0.196 | lb ai/a | EPRE | 81.3 | 97.5 | 2.5 | 60.0 | 56.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 5 | Treevix | 70 | WG | 0.044 | lb ai/a | EPRE | 56.3 | 97.5 | 1.3 | 21.3 | 21.3 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 6 | Treevix | 70 | WG | 0.087 | lb ai/a | EPRE | 73.8 | 100.0 | 1.3 | 50.0 | 50.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | | | |
| 7 | Loyant | 0.21 | L | 0.018 | lb ai/a | EPRE | 92.5 | 98.8 | 8.8 | 95.0 | 92.5 |
| 8 | Loyant | 0.21 | L | 0.035 | lb ai/a | EPRE | 98.8 | 100.0 | 8.8 | 97.5 | 96.3 |
| LSD P=.05 | | | | | | | 32.99 | 4.72 | 5.01 | 41.33 | 44.05 |
| Standard Deviation | | | | | | | 22.43 | 3.21 | 3.41 | 28.10 | 29.95 |
| CV | | | | | | | 32.7 | 3.72 | 109.02 | 53.21 | 59.34 |

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | CATH | PEAR | TOTAL WC |
|---|---|---|---|---|---|---|---|---|---|
| Pest Code | | | | | | | | | |
| Crop Name | | | | | | | | PEAR | |
| Rating Date | | | | | | | 11-Jun-2021 | 30-Jul-2021 | 30-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | MH,CG | SC | SC |
| 1 | Untreated | | | | | | 0.0 | 0.0 | 6.3 |
| 2 | DCC-3825 | 70 | WDG | 0.066 | lb ai/a | EPRE | 92.5 | 0.0 | 23.8 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | |
| 3 | DCC-3825 | 70 | WDG | 0.131 | lb ai/a | EPRE | 75.0 | 0.0 | 23.8 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | |
| 4 | DCC-3825 | 70 | WDG | 0.196 | lb ai/a | EPRE | 87.5 | 0.0 | 30.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | |
| 5 | Treevix | 70 | WG | 0.044 | lb ai/a | EPRE | 85.0 | 0.0 | 15.0 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | |
| 6 | Treevix | 70 | WG | 0.087 | lb ai/a | EPRE | 72.5 | 0.0 | 28.8 |
| | MSO-Noble | 100 | SL | 1 | % v/v | EPRE | | | |
| 7 | Loyant | 0.21 | L | 0.018 | lb ai/a | EPRE | 96.3 | 0.0 | 37.5 |
| 8 | Loyant | 0.21 | L | 0.035 | lb ai/a | EPRE | 100.0 | 0.0 | 36.3 |
| LSD P=.05 | | | | | | | 19.22 | 0.00 | 18.08 |
| Standard Deviation | | | | | | | 13.07 | 0.00 | 12.29 |
| CV | | | | | | | 17.17 | 0.0 | 48.86 |

# Fall Weed Control in Strawberry – HTRC – 2020-2021

**Project Code: 126-21-1** **Location: Holt, MI**
**Block: 122**
**Personnel: Dr. Sushila Chaudhari, Dr. Bernard Zandstra, Nicole Soldan, Monique Hemker Mose**
**Crop: Strawberry** **Variety: Jewel**
**Planting Method: Transplanted** **Planting Date: 5/11/18**
**Harvest Date: 4 harvests; 6/11/21, 6/14/21, 6/18/21, 6/21/21**
**Plant Spacing: 18″** **Row Spacing: 8′**
**Tillage Type: NA** **Study Design: RCB** **Replications: 4**
**Plot Size: 5.3 ft wide x 25 ft long**

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

**Herbicide Application Information**

| Timing | Date | Time | Air/Soil Temp | Soil Surf | Wind | RH | Cloud Cover | Dew |
|---|---|---|---|---|---|---|---|---|
| FALL | 10/29/20 | 9:30-10:30am | 43/43 F | Wet | N 2-3mph | 72% | 100% | No |

**Crop and Weed Information at Application**

| Date | Crop or Weed | Height or Diameter | Growth Stage | Density |
|---|---|---|---|---|
| 10/29/21 | STBE = Strawberry | 4-6″ | | Good |
| 10/29/21 | No weeds | | | |

**Additional Weeds Observed Throughout Season**

WIRA= Wild radish
MECW = Mouseear chickweed
CORW = Common ragweed
LATH = Lady's thumb
PRKW = Prostrate knotweed
COMW = Common milkweed
GRASSES = Quackgrass, annual bluegrass, and large crabgrass
TOTAL BL = include 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. Herbicides applied in the Fall of 2020 and harvested in June 2021.
4. Stinger plus Poast was applied to whole study area in fall; therefore, treatment 11 is considered as nontreated check.

# Michigan State University

**Fall Weed Control in Strawberry - HTRC - 2020-2021**

Trial ID:126-21-1 Location:HTRC Trial Year:2021

Protocol ID:126-21-1 Investigator:Dr. Sushila Chaudhari

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | STBE | WIRA | MECW | CORW | LATH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Code | | | | | | | | | | | |
| Crop Name | | | | | | | STBE | | | | |
| Rating Date | | | | | | | 26-May-2021 | 26-May-2021 | 26-May-2021 | 26-May-2021 | 26-May-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC, MH | SC, MH | SC, MH | SC, MH | SC, MH |
| 1 | Sinbar | 80 | WDG | 0.4 | lb ai/a | FALL | 0.0 | 25.0 | 25.0 | 25.0 | 25.0 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 2 | Spartan | 4 | F | 0.25 | lb ai/a | FALL | 0.0 | 91.3 | 100.0 | 92.5 | 95.0 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 3 | Ultra Blazer | 2 | L | 0.375 | lb ai/a | FALL | 5.0 | 98.8 | 95.0 | 87.5 | 91.3 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 4 | Devrinol DF-XT | 50 | DF | 4 | lb ai/a | FALL | 6.3 | 92.5 | 100.0 | 95.0 | 86.3 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.4 | lb ai/a | FALL | 3.3 | 96.2 | 100.0 | 88.9 | 87.5 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 6 | Alion | 1.67 | SC | 0.065 | lb ai/a | FALL | 15.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 7 | Alion | 1.67 | SC | 0.085 | lb ai/a | FALL | 3.8 | 100.0 | 100.0 | 100.0 | 100.0 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 8 | Trellis SC | 4.16 | SC | 1 | lb ai/a | FALL | 7.5 | 100.0 | 100.0 | 100.0 | 93.8 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 9 | Reflex | 2 | SL | 0.375 | lb ai/a | FALL | 6.3 | 100.0 | 93.8 | 98.8 | 96.3 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 10 | Chateau | 51 | WDG | 0.094 | lb ai/a | FALL | 1.3 | 100.0 | 100.0 | 100.0 | 100.0 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| 11 | Stinger | 3 | L | 0.25 | lb ai/a | FALL | 2.5 | 51.3 | 51.3 | 50.0 | 46.3 |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | |
| LSD P=.05 | | | | | | | 8.62 | 34.87 | 34.93 | 35.25 | 33.40 |
| Standard Deviation | | | | | | | 5.96 | 24.11 | 24.15 | 24.38 | 23.10 |
| CV | | | | | | | 129.19 | 27.77 | 27.53 | 28.6 | 27.58 |

# Fall Weed Control in Strawberry – HTRC – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | TOTAL BL | GRASSES | STBE | LATH | MECW | TOTAL BL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Code | | | | | | | | | | | | |
| Crop Name | | | | | | | | | | | | |
| Rating Date | | | | | | | 26-May-2021 | 26-May-2021 | 2-Jul-2021 | 2-Jul-2021 | 2-Jul-2021 | 2-Jul-2021 |
| Rating Type | | | | | | | RATING | RATING | RATING | RATING | RATING | RATING |
| Rating Unit | | | | | | | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 | 0-100 |
| Assessed By | | | | | | | SC, MH | SC, MH | SC, MH | SC, MH | SC, MH | SC, MH |
| 1 | Sinbar | 80 | WDG | 0.4 | lb ai/a | FALL | 25.0 | 25.0 | 3.8 | 67.5 | 86.3 | 72.5 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 2 | Spartan | 4 | F | 0.25 | lb ai/a | FALL | 91.3 | 96.3 | 0.0 | 86.3 | 100.0 | 78.8 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 3 | Ultra Blazer | 2 | L | 0.375 | lb ai/a | FALL | 85.0 | 93.8 | 1.3 | 87.5 | 87.5 | 76.3 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 4 | Devrinol DF-XT | 50 | DF | 4 | lb ai/a | FALL | 88.8 | 96.3 | 6.3 | 83.8 | 97.5 | 76.3 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.4 | lb ai/a | FALL | 88.5 | 96.0 | 2.5 | 71.3 | 100.0 | 72.5 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 6 | Alion | 1.67 | SC | 0.065 | lb ai/a | FALL | 98.8 | 98.8 | 1.3 | 98.8 | 100.0 | 93.8 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 7 | Alion | 1.67 | SC | 0.085 | lb ai/a | FALL | 98.8 | 100.0 | 1.3 | 97.5 | 100.0 | 97.5 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 8 | Trellis SC | 4.16 | SC | 1 | lb ai/a | FALL | 95.0 | 95.0 | 1.3 | 81.3 | 93.8 | 75.0 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 9 | Reflex | 2 | SL | 0.375 | lb ai/a | FALL | 92.5 | 90.0 | 1.3 | 86.3 | 87.5 | 85.0 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 10 | Chateau | 51 | WDG | 0.094 | lb ai/a | FALL | 97.5 | 96.3 | 0.0 | 100.0 | 96.3 | 90.0 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 11 | Stinger | 3 | L | 0.25 | lb ai/a | FALL | 46.3 | 47.5 | 2.5 | 86.3 | 86.3 | 78.8 |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| LSD P=.05 | | | | | | | 33.42 | 33.64 | 4.15 | 22.82 | 10.99 | 13.82 |
| Standard Deviation | | | | | | | 23.11 | 23.26 | 2.87 | 15.81 | 7.61 | 9.57 |
| CV | | | | | | | 28.02 | 27.38 | 148.75 | 18.37 | 8.09 | 11.75 |

# Fall Weed Control in Strawberry – HTRC – 2020-2021

| Trt No. | Treatment Name | Form Conc | Form Type | Rate | Rate Unit | Growth Stage | GRASSES | STBE | STBE | STBE | STBE | STBE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop Code | | | | | | | | | | | | |
| Crop Name | | | | | | | | STBE | STBE | STBE | STBE | STBE |
| Rating Date | | | | | | | 2-Jul-2021 | 11-Jun-2021 | 14-Jun-2021 | 18-Jun-2021 | 21-Jun-2021 | |
| Rating Type | | | | | | | RATING | HARVEST | HARVEST | HARVEST | HARVEST | TOTAL |
| Rating Unit | | | | | | | 0-100 | KG/PLOT | KG/PLOT | KG/PLOT | KG/PLOT | KG/PLOT |
| Assessed By | | | | | | | SC, MH | NS, HT | HT, MC | HT | HT, RM | |
| 1 | Sinbar | 80 | WDG | 0.4 | lb ai/a | FALL | 92.5 | 2.08 | 2.73 | 2.38 | 1.85 | 9.03 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 2 | Spartan | 4 | F | 0.25 | lb ai/a | FALL | 90.0 | 2.15 | 3.04 | 3.33 | 2.05 | 10.57 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 3 | Ultra Blazer | 2 | L | 0.375 | lb ai/a | FALL | 91.3 | 2.00 | 2.63 | 2.72 | 1.53 | 8.88 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 4 | Devrinol DF-XT | 50 | DF | 4 | lb ai/a | FALL | 91.3 | 2.14 | 2.69 | 3.54 | 1.78 | 10.14 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 5 | Prowl H20 | 3.8 | CS | 1.4 | lb ai/a | FALL | 92.5 | 1.76 | 2.43 | 1.84 | 1.27 | 7.30 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 6 | Alion | 1.67 | SC | 0.065 | lb ai/a | FALL | 87.5 | 1.74 | 1.81 | 1.61 | 0.91 | 6.06 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 7 | Alion | 1.67 | SC | 0.085 | lb ai/a | FALL | 95.0 | 2.38 | 2.85 | 2.42 | 1.58 | 9.23 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 8 | Trellis SC | 4.16 | SC | 1 | lb ai/a | FALL | 87.5 | 2.39 | 2.58 | 2.68 | 1.54 | 9.19 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 9 | Reflex | 2 | SL | 0.375 | lb ai/a | FALL | 88.8 | 1.75 | 2.72 | 3.09 | 1.62 | 9.17 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 10 | Chateau | 51 | WDG | 0.094 | lb ai/a | FALL | 92.5 | 1.82 | 2.68 | 2.91 | 1.69 | 9.11 |
| | Stinger | 3 | L | 0.25 | lb ai/a | FALL | | | | | | |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| 11 | Stinger | 3 | L | 0.25 | lb ai/a | FALL | 90.0 | 2.35 | 2.88 | 3.15 | 1.72 | 10.11 |
| | Poast | 1.53 | EC | 0.19 | lb ai/a | FALL | | | | | | |
| LSD P=.05 | | | | | | | 9.14 | 0.82 | 1.40 | 2.14 | 1.08 | 4.13 |
| Standard Deviation | | | | | | | 6.33 | 0.57 | 0.97 | 1.48 | 0.74 | 2.86 |
| CV | | | | | | | 6.97 | 27.91 | 36.99 | 55.1 | 46.99 | 31.87 |