# The Ohio State University

**Glyphosate - Glufosinate Dose Response**

Trial ID: 20DOSE Location: Trial Year: 2020
Protocol ID: 20DOSE Investigator: Dr. Mark M. Loux
Project ID: Study Director:
Sponsor Contact:

**General Trial Information**
**Study Director:** Anthony Dobbels
**Investigator:** Dr. Mark M. Loux

**Trial Status:** E established
**ARM Trial Created On:** Mar-25-2020
**Initiation Date:** May-13-2020

**Trial Location**
**Address (Location):** 7721 South Charleston Pike
**City:** South Charleston **Country:** USA United States
**State/Prov.:** Ohio
**Postal Code:** 45368

**Latitude of LL Corner °:** 39.86085 N
**Longitude of LL Corner °:** -83.67143 W
**Altitude of LL Corner:** 1093.00 FT

**Conducted Under GLP:** No
**Conducted Under GEP:** No

**Contacts**
**Study Director:** Anthony Dobbels

**Investigator:** Dr. Mark M. Loux

**Crop Description**
**Crop 1:** C GLXMA Glycine max Soybean **BBCH Scale:** BSOY
**Entry Date:** May-14-2020 **Stage Scale:** BBCH
**Variety:** Seed Consultants SC7370E
**Attributes:** 2,4-D Choline, Glyphosate, Glufosinate Tol
**Planting Date:** May-13-2020 **Planting Rate:** 160000 S/A
**Depth:** 2 IN
**Rows per Plot:** 8 **Planting Method:** PLANTD planted
**Row Spacing:** 15 IN **Planting Equipment:** FE field equipment
**Seed Bed:** MEDIUM medium
**Soil Temperature:** 62 F **Soil Moisture:** NORMAL normal, adequate
**Emergence Date:** May-25-2020

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**Pest Description**

**Pest 1 Type:** W **Code:** SETFA Setaria faberi
**Common Name:** foxtail, giant **Entry Date:** May-14-2020

**Pest 2 Type:** W **Code:** ECHCG Echinochloa crus-galli
**Common Name:** barnyardgrass **Entry Date:** Jun-16-2020

**Pest 3 Type:** W **Code:** AMBTR Ambrosia trifida
**Common Name:** ragweed, giant **Entry Date:** Jun-16-2020

**Pest 4 Type:** W **Code:** POLPY Polygonum pensylvanicum
**Common Name:** smartweed, Pennsylvania **Entry Date:** Jun-16-2020

**Pest 5 Type:** W **Code:** CHEAL Chenopodium album
**Common Name:** lambsquarters, common **Entry Date:** Jun-16-2020

**Pest 6 Type:** W **Code:** HIBTR Hibiscus trionum
**Common Name:** mallow, Venice **Entry Date:** Jun-16-2020

**Pest 7 Type:** W **Code:** SOLPT Solanum ptychanthum
**Common Name:** Eastern black nightshade **Entry Date:** Jun-16-2020

**Pest 8 Type:** W **Code:** AMARE Amaranthus retroflexus
**Common Name:** pigweed, redroot **Entry Date:** Jun-16-2020

**Pest 9 Type:** W **Code:** VERAG Veronica agrestis
**Common Name:** speedwell, field **Entry Date:** Jun-16-2020

**Pest10 Type:** W **Code:** SIDSP Sida spinosa
**Common Name:** sida, prickly **Entry Date:** Jun-16-2020

**Pest11 Type:** W **Code:** AMBEL Ambrosia artemisiifolia
**Common Name:** ragweed, common **Entry Date:** Jun-16-2020

**Pest12 Type:** W **Code:** ABUTH Abutilon theophrasti
**Common Name:** velvetleaf **Entry Date:** Jun-16-2020

**Pest13 Type:** W **Code:** ERICA Conyza canadensis
**Common Name:** horseweed **Entry Date:** Jul-9-2020

**Pest14 Type:** W **Code:** SETPU Setaria helvola
**Common Name:** yellow foxtail **Entry Date:** Jul-9-2020

**Site and Design**

**Treated Plot Width:** 6.67 FT **Site Type:** FIELD field
**Treated Plot Length:** 30 FT **Experimental Unit:** 1 PLOT plot
**Treated Plot Area:** 200.1 FT2 **Treatments:** 16 **Tillage Type:** CONTIL conventional-till
**Replications:** 3 **Study Design:** RACOBL Randomized Complete Block (RCB)

| No. | Previous Crop | Year |
|---|---|---|
| 1. | SOYBEAN | 2019 |

**Soil Description**

**Description Name:** F-7 West
**% Sand:** 33 **% OM:** 3.8 **Texture:** SIL silt loam
**% Silt:** 53 **pH:** 7 **Soil Name:** Kokomo
**% Clay:** 15 **CEC:** 20.5 **Fert. Level:** G good

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Project ID: Study Director:
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**Application Description**

| | A |
|---|---|
| **Application Date** | Jun-16-2020 |
| **Appl. Start Time** | 7:54 AM |
| **Appl. Stop Time** | 8:30 AM |
| **Application Method** | SPRAY |
| **Application Timing** | POST |
| **Application Placement** | BROFOL |
| **Applied By** | Kimmet |
| **Appl. Entry Date** | Jun-16-2020 |
| **Air Temperature Start, Stop** | 68 68 F |
| **% Relative Humidity Start, Stop** | 71 71 |
| **Wind Velocity+Dir. Start** | 3 MPH E |
| **Wind Velocity+Dir. Stop** | 3 MPH E |
| **Wind Velocity+Dir. Max** | 3 MPH E |
| **Wet Leaves (Y/N)** | N no |
| **Soil Temperature** | 64 F |
| **Soil Moisture** | DRY |
| **Soil Surface Condition** | MEDIUM |
| **% Cloud Cover** | 10 |
| **Next Moisture Occurred On** | Jun-18-2020 |
| **Time to Next Moisture** | 2 DAY |
| **Moisture 6 Hours after Appl.** | 0 IN |
| **Moisture 1 Week after Appl.** | 0.88 IN |

**Crop Stage At Each Application**

| | A |
|---|---|
| **Crop 1 Code, BBCH Scale** | GLXMA BSOY |
| **Days after Emergence** | 22 |
| **Stage Majority, Percent** | 12 100 |
| **Height Average** | 6 IN |

**Pest Stage At Each Application**

| | A |
|---|---|
| **Pest 1 Code, Type, Scale** | SETFA W |
| **Stage Majority, Percent** | 14 80 |
| **Stage Minimum, Percent** | 12 10 |
| **Stage Maximum, Percent** | 16 10 |
| **Height Average** | 3 IN |
| **Height Minimum, Maximum** | 1 6 |
| **Density Average** | 47 PLA/m2 |
| **Density Min, Max** | 15 81 |
| **Pest 2 Code, Type, Scale** | ECHCG W |
| **Stage Majority, Percent** | 14 80 |
| **Stage Minimum, Percent** | 12 10 |
| **Stage Maximum, Percent** | 16 10 |
| **Height Average** | 3 IN |
| **Height Minimum, Maximum** | 1 6 |
| **Density Average** | 0 PLA/m2 |
| **Density Min, Max** | 0 0 |
| **Pest 3 Code, Type, Scale** | AMBTR W |
| **Stage Majority, Percent** | 14 80 |
| **Stage Minimum, Percent** | 12 10 |
| **Stage Maximum, Percent** | 16 10 |
| **Height Average** | 4 IN |
| **Height Minimum, Maximum** | 1 8 |
| **Density Average** | 2 PLA/m2 |
| **Density Min, Max** | 0 3 |
| **Pest 4 Code, Type, Scale** | POLPY W |
| **Stage Majority, Percent** | 16 80 |
| **Stage Minimum, Percent** | 14 10 |
| **Stage Maximum, Percent** | 18 10 |
| **Height Average** | 3 IN |
| **Height Minimum, Maximum** | 2 7 |
| **Pest 5 Code, Type, Scale** | CHEAL W |
| **Stage Majority, Percent** | 17 80 |
| **Stage Minimum, Percent** | 14 10 |
| **Stage Maximum, Percent** | 21 10 |
| **Height Average** | 3 IN |
| **Height Minimum, Maximum** | 1 4 |
| **Density Average** | 83 PLA/m2 |
| **Density Min, Max** | 27 132 |
| **Pest 6 Code, Type, Scale** | HIBTR W |
| **Stage Majority, Percent** | 13 80 |
| **Stage Minimum, Percent** | 12 10 |

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| | | |
|---|---|---|
| **Stage Maximum, Percent** | 14 | 10 |
| **Height Average** | 3 | IN |
| **Height Minimum, Maximum** | 1 | 4 |
| **Pest 7 Code, Type, Scale** | SOLPT | W |
| **Stage Majority, Percent** | 13 | 80 |
| **Stage Minimum, Percent** | 12 | 10 |
| **Stage Maximum, Percent** | 14 | 10 |
| **Height Average** | 3 | IN |
| **Height Minimum, Maximum** | 1 | 4 |
| **Density Average** | 8 | PLA/m2 |
| **Density Min, Max** | 0 | 24 |
| **Pest 8 Code, Type, Scale** | AMARE | W |
| **Stage Majority, Percent** | 13 | 80 |
| **Stage Minimum, Percent** | 12 | 10 |
| **Stage Maximum, Percent** | 14 | 10 |
| **Height Average** | 2 | IN |
| **Height Minimum, Maximum** | 1 | 3 |
| **Density Average** | 9 | PLA/m2 |
| **Density Min, Max** | 0 | 18 |
| **Pest 9 Code, Type, Scale** | VERAG | W |
| **Stage Majority, Percent** | 25 | 90 |
| **Stage Minimum, Percent** | 19 | 10 |
| **Stage Maximum, Percent** | 25 | 90 |
| **Height Average** | 4 | IN |
| **Height Minimum, Maximum** | 2 | 6 |
| **Pest10 Code, Type, Scale** | SIDSP | W |
| **Stage Majority, Percent** | 13 | 80 |
| **Stage Minimum, Percent** | 12 | 10 |
| **Stage Maximum, Percent** | 14 | 10 |
| **Height Average** | 2 | IN |
| **Height Minimum, Maximum** | 1 | 2 |
| **Density Average** | 2 | PLA/m2 |
| **Density Min, Max** | 0 | 6 |
| **Pest11 Code, Type, Scale** | AMBEL | W |
| **Stage Majority, Percent** | 13 | 80 |
| **Stage Minimum, Percent** | 12 | 10 |
| **Stage Maximum, Percent** | 14 | 10 |
| **Height Average** | 2 | IN |
| **Height Minimum, Maximum** | 1 | 3 |
| **Pest12 Code, Type, Scale** | ABUTH | W |
| **Stage Majority, Percent** | 13 | 80 |
| **Stage Minimum, Percent** | 12 | 10 |
| **Stage Maximum, Percent** | 14 | 10 |
| **Height Average** | 2 | IN |
| **Height Minimum, Maximum** | 1 | 4 |
| **Pest13 Code, Type, Scale** | ERICA | W |
| **Density Average** | 1 | PLA/m2 |
| **Density Min, Max** | 0 | 3 |
| **Pest14 Code, Type, Scale** | SETPU | W |
| **Density Average** | 10 | PLA/m2 |
| **Density Min, Max** | 0 | 30 |

**Application Equipment**

| | A |
|---|---|
| **Appl. Equipment** | 6 FT |
| **Equipment Type** | BACCAI |
| **Operation Pressure** | 44 PSI |
| **Nozzle Type** | XR |
| **Nozzle Size** | 8002 |
| **Nozzle Spacing** | 18 IN |
| **Boom Length** | 6.67 FT |
| **Boom Height** | 20 IN |
| **Ground Speed** | 3 MPH |
| **Carrier** | WATER |
| **Application Amount** | 20 GAL/AC |
| **Mix Size** | 2 L |
| **Propellant** | COMCO2 |

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Project ID: Study Director:
Sponsor Contact:

| Context | Date | By | Notes |
|---|---|---|---|
| STATUS | Mar-25-2020 | Dr. Mark M. Loux | Automatically added by ARM: Trial Status updated to 'S' during trial creation. |
| STATUS | May-14-2020 | Dr. Mark M. Loux | Automatically added by ARM: Trial Status updated to 'E' when Planting Date entered. |
| STATUS | Mar-25-2020 | Dr. Mark M. Loux | Automatically added by ARM: Trial Status updated to 'S' during trial creation. |
| STATUS | Mar-25-2020 | Dr. Mark M. Loux | Automatically added by ARM: Trial Status updated to 'S' during trial creation. |
| STATUS | Mar-27-2020 | Dr. Mark M. Loux | Automatically added by ARM: Trial Status updated to 'S' during trial creation. |
| STATUS | Mar-27-2020 | Dr. Mark M. Loux | Automatically added by ARM: Trial Status updated to 'S' during trial creation. |
| STATUS | May-14-2020 | Dr. Mark M. Loux | Automatically added by ARM: Trial Status updated to 'E' when Planting Date entered. |

| | | | | | |
|---|---|---|---|---|---|
| Pest Type | W Weed | W Weed | W Weed | W Weed | W Weed |
| Pest Code | SETFA | ECHCG | AMBTR | CHEAL | AMARE |
| Pest Scientific Name | Setaria faberi | Echinochloa cr> | Ambrosia trifi> | Chenopodium al> | Amaranthus ret> |
| Pest Name | foxtail, giant | barnyardgrass | ragweed, giant | lambsquarters,> | pigweed, redro> |
| Rating Date | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 |
| Rating Type | CONTRO | CONTRO | CONTRO | CONTRO | CONTRO |
| Rating Unit | % | % | % | % | % |
| Number of Subsamples | 1 | 1 | 1 | 1 | 1 |
| Data Entry Date | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 |
| Days After First/Last Applic. | 14 14 | 14 14 | 14 14 | 14 14 | 14 14 |
| Trt-Eval Interval | 14 DA-A | 14 DA-A | 14 DA-A | 14 DA-A | 14 DA-A |
| Plant-Eval Interval | 48 DP-1 | 48 DP-1 | 48 DP-1 | 48 DP-1 | 48 DP-1 |
| Days After Emergence | 36 DE-1 | 36 DE-1 | 36 DE-1 | 36 DE-1 | 36 DE-1 |
| Number of Decimals | 0 | 0 | 0 | 0 | 0 |

| Trt No. | Treatment Name | Rate | Rate Unit | Other Rate | Other Rate Unit | Appl Code | 1* | 2* | 3* | 4* | 5* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Liberty | 1.17 | lb ai/a | 64 | oz/a | A | 100 a | 100 a | 99 a | 80 b | 98 ab |
| 1 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 2 | Liberty | 0.585 | lb ai/a | 32 | oz/a | A | 100 a | 97 a | 98 ab | 77 b | 90 abc |
| 2 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 3 | Liberty | 0.293 | lb ai/a | 16 | oz/a | A | 93 a | 67 c | 76 bcd | 57 c | 79 bcd |
| 3 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 4 | Liberty | 0.146 | lb ai/a | 8 | oz/a | A | 97 a | 47 d | 63 cde | 13 e | 63 d |
| 4 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 5 | Liberty | 0.073 | lb ai/a | 4 | oz/a | A | 65 b | 17 e | 17 f | 7 e | 23 e |
| 5 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 6 | Roundup Powermax | 2.25 | lb ae/a | 64 | oz/a | A | 100 a | 100 a | 100 a | 100 a | 100 a |
| 6 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 7 | Roundup Powermax | 1.13 | lb ae/a | 32 | oz/a | A | 100 a | 100 a | 81 abc | 89 ab | 100 a |
| 7 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 8 | Roundup Powermax | 0.56 | lb ae/a | 16 | oz/a | A | 100 a | 100 a | 65 cde | 75 b | 100 a |
| 8 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 9 | Roundup Powermax | 0.28 | lb ae/a | 8 | oz/a | A | 100 a | 93 a | 62 cde | 53 c | 100 a |
| 9 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 10 | Roundup Powermax | 0.14 | lb ae/a | 4 | oz/a | A | 70 b | 43 d | 43 e | 7 e | 60 d |
| 10 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 11 | Liberty | 1.17 | lb ai/a | 64 | oz/a | A | 100 a | 100 a | 100 a | 100 a | 100 a |
| 11 | Roundup Powermax | 2.25 | lb ae/a | 64 | oz/a | A | | | | | |
| 11 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 12 | Liberty | 0.585 | lb ai/a | 32 | oz/a | A | 100 a | 100 a | 100 a | 90 ab | 100 a |
| 12 | Roundup Powermax | 1.13 | lb ae/a | 32 | oz/a | A | | | | | |
| 12 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 13 | Liberty | 0.293 | lb ai/a | 16 | oz/a | A | 100 a | 99 a | 97 ab | 77 b | 98 ab |
| 13 | Roundup Powermax | 0.56 | lb ae/a | 16 | oz/a | A | | | | | |
| 13 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |

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Project ID: Study Director:
Sponsor Contact:

| Trt No. | Treatment Name | Rate | Rate Unit | Other Rate | Other Rate Unit | Appl Code | 1* | 2* | 3* | 4* | 5* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Type | | | | | | W Weed | W Weed | W Weed | W Weed | W Weed |
| | Pest Code | | | | | | SETFA | ECHCG | AMBTR | CHEAL | AMARE |
| | Pest Scientific Name | | | | | | Setaria faberi | Echinochloa cr> | Ambrosia trifi> | Chenopodium al> | Amaranthus ret> |
| | Pest Name | | | | | | foxtail, giant | barnyardgrass | ragweed, giant | lambsquarters,> | pigweed, redro> |
| | Rating Date | | | | | | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 |
| | Rating Type | | | | | | CONTRO | CONTRO | CONTRO | CONTRO | CONTRO |
| | Rating Unit | | | | | | % | % | % | % | % |
| | Number of Subsamples | | | | | | 1 | 1 | 1 | 1 | 1 |
| | Data Entry Date | | | | | | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 | Jun-30-2020 |
| | Days After First/Last Applic. | | | | | | 14 14 | 14 14 | 14 14 | 14 14 | 14 14 |
| | Trt-Eval Interval | | | | | | 14 DA-A | 14 DA-A | 14 DA-A | 14 DA-A | 14 DA-A |
| | Plant-Eval Interval | | | | | | 48 DP-1 | 48 DP-1 | 48 DP-1 | 48 DP-1 | 48 DP-1 |
| | Days After Emergence | | | | | | 36 DE-1 | 36 DE-1 | 36 DE-1 | 36 DE-1 | 36 DE-1 |
| | Number of Decimals | | | | | | 0 | 0 | 0 | 0 | 0 |
| 14 | Liberty | 0.146 | lb ai/a | 8 | oz/a | A | 100 a | 86 ab | 53 de | 43 cd | 77 cd |
| 14 | Roundup Powermax | 0.28 | lb ae/a | 8 | oz/a | A | | | | | |
| 14 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 15 | Liberty | 0.073 | lb ai/a | 4 | oz/a | A | 90 a | 72 bc | 47 e | 33 d | 63 d |
| 15 | Roundup Powermax | 0.14 | lb ae/a | 4 | oz/a | A | | | | | |
| 15 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 16 | utc | | | | | | 0 c | 0 e | 0 f | 0 e | 0 f |
| | LSD P=.05 | | | | | | 14.8 | 18.0 | 23.3 | 15.6 | 19.9 |
| | Standard Deviation | | | | | | 8.9 | 10.8 | 14.0 | 9.3 | 11.9 |
| | CV | | | | | | 10.06 | 14.12 | 20.34 | 16.57 | 15.25 |
| | Grand Mean | | | | | | 88.4 | 76.3 | 68.8 | 56.3 | 78.3 |
| | Levene's F | | | | | | 1.308 | 1.447 | 0.999 | 0.629 | 1.496 |
| | Levene's Prob(F) | | | | | | 0.254 | 0.185 | 0.479 | 0.829 | 0.165 |
| | Rank X2 | | | | | | . | . | . | . | . |
| | P(Rank X2) | | | | | | . | . | . | . | . |
| | Skewness | | | | | | -2.6429* | -1.2729* | -0.7569* | -0.4009 | -1.4088* |
| | Kurtosis | | | | | | 6.2351* | 0.3075 | -0.5122 | -1.2224 | 0.809 |
| | Replicate F | | | | | | 0.375 | 1.555 | 0.059 | 0.569 | 2.721 |
| | Replicate Prob(F) | | | | | | 0.6904 | 0.2278 | 0.9426 | 0.5721 | 0.0820 |
| | Treatment F | | | | | | 25.632 | 27.845 | 14.913 | 42.321 | 19.209 |
| | Treatment Prob(F) | | | | | | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |

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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pest Type | | | | | | W Weed | W Weed | W Weed | W Weed | W Weed |
| Pest Code | | | | | | POLPY | 3WEEDT | SETFA | ECHCG | AMBTR |
| Pest Scientific Name | | | | | | Polygonum pens> | weeds | Setaria faberi | Echinochloa cr> | Ambrosia trifi> |
| Pest Name | | | | | | smartweed, Pen> | weeds | foxtail, giant | barnyardgrass | ragweed, giant |
| Rating Date | | | | | | Jun-30-2020 | Jul-1-2020 | Jul-15-2020 | Jul-15-2020 | Jul-15-2020 |
| Rating Type | | | | | | CONTRO | BIOMAS | CONTRO | CONTRO | CONTRO |
| Rating Unit | | | | | | % | GRAMS/M2 | % | % | % |
| Number of Subsamples | | | | | | 1 | 1 | 1 | 1 | 1 |
| Data Entry Date | | | | | | Jun-30-2020 | Jul-13-2020 | Jul-15-2020 | Jul-15-2020 | Jul-15-2020 |
| Days After First/Last Applic. | | | | | | 14 14 | 15 15 | 29 29 | 29 29 | 29 29 |
| Trt-Eval Interval | | | | | | 14 DA-A | 15 DA-A | 29 DA-A | 29 DA-A | 29 DA-A |
| Plant-Eval Interval | | | | | | 48 DP-1 | 49 DP-1 | 63 DP-1 | 63 DP-1 | 63 DP-1 |
| Days After Emergence | | | | | | 36 DE-1 | 37 DE-1 | 51 DE-1 | 51 DE-1 | 51 DE-1 |
| Number of Decimals | | | | | | 0 | 2 | 0 | 0 | 0 |
| Trt No. | Treatment Name | Rate | Rate Unit | Other Rate | Other Rate Unit | Appl Code | 6* | 7* | 8* | 9* | 10* |
| 1 | Liberty | 1.17 | lb ai/a | 64 | oz/a | A | 102 a | 1.09 de | 100 a | 99 a | 97 abc |
| 1 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 2 | Liberty | 0.585 | lb ai/a | 32 | oz/a | A | 89 abc | 1.08 de | 100 a | 89 ab | 100 a |
| 2 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 3 | Liberty | 0.293 | lb ai/a | 16 | oz/a | A | 82 abc | 6.77 de | 93 ab | 60 cd | 73 de |
| 3 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 4 | Liberty | 0.146 | lb ai/a | 8 | oz/a | A | 42 e | 43.15 c | 83 b | 43 e | 37 f |
| 4 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 5 | Liberty | 0.073 | lb ai/a | 4 | oz/a | A | 12 f | 106.60 b | 7 c | 7 f | 0 g |
| 5 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 6 | Roundup Powermax | 2.25 | lb ae/a | 64 | oz/a | A | 102 a | 0.13 e | 100 a | 100 a | 99 ab |
| 6 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 7 | Roundup Powermax | 1.13 | lb ae/a | 32 | oz/a | A | 102 a | 3.27 de | 100 a | 100 a | 83 a-d |
| 7 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 8 | Roundup Powermax | 0.56 | lb ae/a | 16 | oz/a | A | 83 abc | 0.37 e | 100 a | 100 a | 77 bcd |
| 8 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 9 | Roundup Powermax | 0.28 | lb ae/a | 8 | oz/a | A | 72 cd | 32.41 cd | 100 a | 99 a | 75 cde |
| 9 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 10 | Roundup Powermax | 0.14 | lb ae/a | 4 | oz/a | A | 42 e | 48.09 c | 100 a | 57 de | 40 f |
| 10 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 11 | Liberty | 1.17 | lb ai/a | 64 | oz/a | A | 102 a | 0.08 e | 100 a | 98 a | 100 a |
| 11 | Roundup Powermax | 2.25 | lb ae/a | 64 | oz/a | A | | | | | |
| 11 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 12 | Liberty | 0.585 | lb ai/a | 32 | oz/a | A | 102 a | 0.15 e | 100 a | 100 a | 100 a |
| 12 | Roundup Powermax | 1.13 | lb ae/a | 32 | oz/a | A | | | | | |
| 12 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 13 | Liberty | 0.293 | lb ai/a | 16 | oz/a | A | 99 ab | 2.13 de | 100 a | 98 a | 93 a-d |
| 13 | Roundup Powermax | 0.56 | lb ae/a | 16 | oz/a | A | | | | | |
| 13 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |

# The Ohio State University

**Glyphosate - Glufosinate Dose Response**

Trial ID: 20DOSE Location: Trial Year: 2020
Protocol ID: 20DOSE Investigator: Dr. Mark M. Loux
Project ID: Study Director:
Sponsor Contact:

| Trt No. | Treatment Name | Rate | Rate Unit | Other Rate | Other Rate Unit | Appl Code | 6* | 7* | 8* | 9* | 10* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Type | | | | | | W Weed | W Weed | W Weed | W Weed | W Weed |
| | Pest Code | | | | | | POLPY | 3WEEDT | SETFA | ECHCG | AMBTR |
| | Pest Scientific Name | | | | | | Polygonum pens> | weeds | Setaria faberi | Echinochloa cr> | Ambrosia trifi> |
| | Pest Name | | | | | | smartweed, Pen> | weeds | foxtail, giant | barnyardgrass | ragweed, giant |
| | Rating Date | | | | | | Jun-30-2020 | Jul-1-2020 | Jul-15-2020 | Jul-15-2020 | Jul-15-2020 |
| | Rating Type | | | | | | CONTRO | BIOMAS | CONTRO | CONTRO | CONTRO |
| | Rating Unit | | | | | | % | GRAMS/M2 | % | % | % |
| | Number of Subsamples | | | | | | 1 | 1 | 1 | 1 | 1 |
| | Data Entry Date | | | | | | Jun-30-2020 | Jul-13-2020 | Jul-15-2020 | Jul-15-2020 | Jul-15-2020 |
| | Days After First/Last Applic. | | | | | | 14 14 | 15 15 | 29 29 | 29 29 | 29 29 |
| | Trt-Eval Interval | | | | | | 14 DA-A | 15 DA-A | 29 DA-A | 29 DA-A | 29 DA-A |
| | Plant-Eval Interval | | | | | | 48 DP-1 | 49 DP-1 | 63 DP-1 | 63 DP-1 | 63 DP-1 |
| | Days After Emergence | | | | | | 36 DE-1 | 37 DE-1 | 51 DE-1 | 51 DE-1 | 51 DE-1 |
| | Number of Decimals | | | | | | 0 | 2 | 0 | 0 | 0 |
| 14 | Liberty | 0.146 | lb ai/a | 8 | oz/a | A | 79 bc | 10.09 de | 100 a | 92 a | 53 ef |
| 14 | Roundup Powermax | 0.28 | lb ae/a | 8 | oz/a | A | | | | | |
| 14 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 15 | Liberty | 0.073 | lb ai/a | 4 | oz/a | A | 57 de | 54.91 c | 97 ab | 73 bc | 33 f |
| 15 | Roundup Powermax | 0.14 | lb ae/a | 4 | oz/a | A | | | | | |
| 15 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | | |
| 16 | utc | | | | | | 0 f | 165.40 a | 0 c | 0 f | 10 g |
| | LSD P=.05 | | | | | | 17.3 | 31.916 | 14.0 | 16.4 | 22.4 |
| | Standard Deviation | | | | | | 10.0 | 19.140 | 8.4 | 9.8 | 13.4 |
| | CV | | | | | | 14.35 | 64.37 | 9.74 | 12.9 | 20.05 |
| | Grand Mean | | | | | | 69.6 | 29.733 | 86.3 | 76.0 | 66.9 |
| | Levene's F | | | | | | 20.056 | 1.343 | 0.871 | 0.991 | 0.887 |
| | Levene's Prob(F) | | | | | | 0.001* | 0.235 | 0.60 | 0.487 | 0.584 |
| | Rank X2 | | | | | | . | . | . | . | . |
| | P(Rank X2) | | | | | | . | . | . | . | . |
| | Skewness | | | | | | -0.9393* | 2.073* | -2.1832* | -1.3044* | -0.7155* |
| | Kurtosis | | | | | | -0.3692 | 4.4304* | 3.1051* | 0.3504 | -0.8279 |
| | Replicate F | | | | | | 1.300 | 0.055 | 1.063 | 3.957 | 0.519 |
| | Replicate Prob(F) | | | | | | 0.2999 | 0.9462 | 0.3581 | 0.0299 | 0.6002 |
| | Treatment F | | | | | | 25.355 | 18.006 | 45.409 | 35.547 | 18.921 |
| | Treatment Prob(F) | | | | | | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |

# The Ohio State University

**Glyphosate - Glufosinate Dose Response**

Trial ID: 20DOSE Location: Trial Year: 2020
Protocol ID: 20DOSE Investigator: Dr. Mark M. Loux
Project ID: Study Director:
Sponsor Contact:

| Trt No. | Treatment Name | Rate | Rate Unit | Other Rate | Other Rate Unit | Appl Code | 11* | 12* | 13* | 14 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pest Type | | | | | | W Weed | W Weed | W Weed | |
| | Pest Code | | | | | | CHEAL | AMARE | POLPY | |
| | Pest Scientific Name | | | | | | Chenopodium al> | Amaranthus ret> | Polygonum pens> | |
| | Pest Name | | | | | | lambsquarters,> | pigweed, redro> | smartweed, Pen> | |
| | Rating Date | | | | | | Jul-15-2020 | Jul-15-2020 | Jul-15-2020 | |
| | Rating Type | | | | | | CONTRO | CONTRO | CONTRO | |
| | Rating Unit | | | | | | % | % | % | |
| | Number of Subsamples | | | | | | 1 | 1 | 1 | 1 |
| | Data Entry Date | | | | | | Jul-15-2020 | Jul-15-2020 | Jul-15-2020 | |
| | Days After First/Last Applic. | | | | | | 29 29 | 29 29 | 29 29 | |
| | Trt-Eval Interval | | | | | | 29 DA-A | 29 DA-A | 29 DA-A | |
| | Plant-Eval Interval | | | | | | 63 DP-1 | 63 DP-1 | 63 DP-1 | |
| | Days After Emergence | | | | | | 51 DE-1 | 51 DE-1 | 51 DE-1 | |
| | Number of Decimals | | | | | | 0 | 0 | 0 | |
| 1 | Liberty | 1.17 | lb ai/a | 64 | oz/a | A | 72 de | 100 a | 100 a | |
| 1 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 2 | Liberty | 0.585 | lb ai/a | 32 | oz/a | A | 58 ef | 72 bc | 100 a | |
| 2 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 3 | Liberty | 0.293 | lb ai/a | 16 | oz/a | A | 47 fg | 60 c | 77 ab | |
| 3 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 4 | Liberty | 0.146 | lb ai/a | 8 | oz/a | A | 0 h | 63 c | 67 ab | |
| 4 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 5 | Liberty | 0.073 | lb ai/a | 4 | oz/a | A | 7 h | 13 d | 33 b | |
| 5 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 6 | Roundup Powermax | 2.25 | lb ae/a | 64 | oz/a | A | 100 a | 100 a | 100 a | |
| 6 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 7 | Roundup Powermax | 1.13 | lb ae/a | 32 | oz/a | A | 90 abc | 100 a | 100 a | |
| 7 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 8 | Roundup Powermax | 0.56 | lb ae/a | 16 | oz/a | A | 78 bcd | 97 a | 100 a | |
| 8 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 9 | Roundup Powermax | 0.28 | lb ae/a | 8 | oz/a | A | 50 fg | 90 ab | 93 a | |
| 9 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 10 | Roundup Powermax | 0.14 | lb ae/a | 4 | oz/a | A | 7 h | 90 ab | 83 a | |
| 10 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 11 | Liberty | 1.17 | lb ai/a | 64 | oz/a | A | 93 ab | 100 a | 100 a | |
| 11 | Roundup Powermax | 2.25 | lb ae/a | 64 | oz/a | A | | | | |
| 11 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 12 | Liberty | 0.585 | lb ai/a | 32 | oz/a | A | 75 cde | 100 a | 97 a | |
| 12 | Roundup Powermax | 1.13 | lb ae/a | 32 | oz/a | A | | | | |
| 12 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 13 | Liberty | 0.293 | lb ai/a | 16 | oz/a | A | 73 cde | 97 a | 100 a | |
| 13 | Roundup Powermax | 0.56 | lb ae/a | 16 | oz/a | A | | | | |
| 13 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |

# The Ohio State University

**Glyphosate - Glufosinate Dose Response**

Trial ID: 20DOSE Location: Trial Year: 2020
Protocol ID: 20DOSE Investigator: Dr. Mark M. Loux
Project ID: Study Director:
Sponsor Contact:

| | | | | | |
|---|---|---|---|---|---|
| Pest Type | | | W Weed | W Weed | W Weed |
| Pest Code | | | CHEAL | AMARE | POLPY |
| Pest Scientific Name | | | Chenopodium al> | Amaranthus ret> | Polygonum pens> |
| Pest Name | | | lambsquarters,> | pigweed, redro> | smartweed, Pen> |
| Rating Date | | | Jul-15-2020 | Jul-15-2020 | Jul-15-2020 |
| Rating Type | | | CONTRO | CONTRO | CONTRO |
| Rating Unit | | | % | % | % |
| Number of Subsamples | | | 1 | 1 | 1 1 |
| Data Entry Date | | | Jul-15-2020 | Jul-15-2020 | Jul-15-2020 |
| Days After First/Last Applic. | | | 29 29 | 29 29 | 29 29 |
| Trt-Eval Interval | | | 29 DA-A | 29 DA-A | 29 DA-A |
| Plant-Eval Interval | | | 63 DP-1 | 63 DP-1 | 63 DP-1 |
| Days After Emergence | | | 51 DE-1 | 51 DE-1 | 51 DE-1 |
| Number of Decimals | | | 0 | 0 | 0 |

| Trt No. | Treatment Name | Rate | Rate Unit | Other Rate | Other Rate Unit | Appl Code | 11* | 12* | 13* | 14 |
|---|---|---|---|---|---|---|---|---|---|---|
| 14 | Liberty | 0.146 | lb ai/a | 8 | oz/a | A | 47 fg | 72 bc | 80 a | |
| 14 | Roundup Powermax | 0.28 | lb ae/a | 8 | oz/a | A | | | | |
| 14 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 15 | Liberty | 0.073 | lb ai/a | 4 | oz/a | A | 40 g | 73 bc | 78 ab | |
| 15 | Roundup Powermax | 0.14 | lb ae/a | 4 | oz/a | A | | | | |
| 15 | N PAK-AMS | 2.5 | % v/v | 2.5 | % v/v | A | | | | |
| 16 | utc | | | | | | 0 h | 0 d | 33 b | |
| LSD P=.05 | | | | | | | 17.4 | 18.4 | 45.1 | . |
| Standard Deviation | | | | | | | 10.4 | 11.0 | 27.1 | . |
| CV | | | | | | | 19.96 | 14.36 | 32.27 | . |
| Grand Mean | | | | | | | 52.3 | 76.7 | 83.9 | . |
| Levene's F | | | | | | | 0.566 | 0.998 | 0.659 | . |
| Levene's Prob(F) | | | | | | | 0.879 | 0.481 | 0.803 | . |
| Rank X2 | | | | | | | . | . | . | . |
| P(Rank X2) | | | | | | | . | . | . | . |
| Skewness | | | | | | | -0.2618 | -1.3883* | -2.0192* | . |
| Kurtosis | | | | | | | -1.1449 | 0.9249 | 2.7151* | . |
| Replicate F | | | | | | | 5.657 | 0.533 | 2.472 | |
| Replicate Prob(F) | | | | | | | 0.0082 | 0.5925 | 0.1014 | |
| Treatment F | | | | | | | 31.734 | 23.560 | 2.070 | |
| Treatment Prob(F) | | | | | | | 0.0001 | 0.0001 | 0.0439 | |

# The Ohio State University

**Glyphosate - Glufosinate Dose Response**

Trial ID: 20DOSE Location: Trial Year: 2020
Protocol ID: 20DOSE Investigator: Dr. Mark M. Loux
Project ID: Study Director:
Sponsor Contact:

Pest Type
W, Weed = Weed or volunteer crop
Pest Code
SETFA, Setaria faberi, foxtail, giant = US
ECHCG, Echinochloa crus-galli, barnyardgrass = US
AMBTR, Ambrosia trifida, ragweed, giant = US
CHEAL, Chenopodium album, lambsquarters, common = US
AMARE, Amaranthus retroflexus, pigweed, redroot = US
POLPY, Polygonum pensylvanicum, smartweed, Pennsylvania = US
3WEEDT, weeds, weeds = US
Rating Type
CONTRO = control / burndown or knockdown
BIOMAS = biomas
Rating Unit
% = percent
Plant-Eval Interval
48 DP-1 = 1 GLXMA May-13-2020
49 DP-1 = 1 GLXMA May-13-2020
63 DP-1 = 1 GLXMA May-13-2020