**Evaluation of Tolvera compared with other herbicides for weed control in spring wheat at Hettinger, ND.**

A trial was conducted at Hettinger, ND to evaluate weed control with the herbicide Tolvera (tolpyralate plus bromoxynil) along with other herbicides used for weed control in spring wheat. Tolvera is a newly labelled herbicide registered for weed control in wheat in 2024. It has been demonstrated in the past to control many common broadleaf weeds as well as some annual grass, such as green and yellow foxtail, and barnyardgrass, that are problematic in spring wheat production in North Dakota. Wheat was seeded using a no-till drill on April 29, 2024 at a depth of 2 inches. One week prior to planting, glyphosate was applied to the entire plot area to control emerged weeds. Wheat emerged on May 13. Herbicide treatments (Table 1) were applied on June 7 when weeds were 2 to 3 inches in height on average. Weeds present included kochia, common lambsquarters, and wild buckwheat. At 2 weeks after treatment, kochia control with Tolvera was higher when 14.7 oz/A was applied compared with 11 oz/A. However, there was no difference in kochia control when comparing these two rates at 4 WAT. At 4 WAT, kochia control was improve when either OpenSky (fluroxypyr plus pyroxsulam) or Axial Star (fluroxypyr plus pinoxaden) compared with Tolvera alone. Kochia control with Tolvera was similar to Huskie FX (bromoxynil plus fluroxypyr plus pyrasulfotole) and Batalium Amped (fluroxypyr plus flucarbazone plus bromoxynil) and was greater than control with Talinor. Common lambsquarters control was similar for all treatments except Talinor and Battalium Amped where control was less when compared with other treatments. Similar to kochia, wild buckwheat control was greater when comparing Tolvera at 14.7 oz/A with 11 oz/A, but only at the 2 WAT evaluation. Again, wild buckwheat control was improved with the addition of OpenSky or Axial Star. Also wild buckwheat control was greater when either Huskie FX or Battalium Amped were applied compared with Tolvera alone. Control of buckwheat resulting from Talinor application was less than Tolvera at 14.7 oz/A. Hot and dry conditions occurred in the weeks following herbicide application in this trial. These environmental conditions are known to reduce the effects of herbicides for weed control. The impact of these drought conditions can also be seen in the resulting wheat yields, which were greatly impacted by the dry conditions. Under these conditions, we didn't observe any differences in wheat yield when comparing treatments. Tolvera should be a good addition to the herbicide options for weed control in spring wheat in North Dakota, especially given its reported control of green and yellow foxtail in addition to common broadleaf weeds.

Table 1. Evaluation of herbicides for weed control in spring wheat at Hettinger, ND, 2024.

| | | | Kochia | | Lambsquarters | | Wild buckwheat | | Wheat | |
|---|---|---|---|---|---|---|---|---|---|---|
| Treatment | | Rate | 2 WAT | 4 WAT | 2 WAT | 4 WAT | 2 WAT | 4 WAT | Yield | Test wt |
| | | oz/A | % control | | | | | | Bu/A | LB/BU |
| 1 | Untreated | | 0e | 0e | 0e | 0e | 0f | 0f | 15.7- | 57.9- |
| 2 | Tolvera | 11 | 79cd | 84bc | 90ab | 96a | 75de | 77de | 16.0- | 58.7- |
| 3 | Tolvera | 14.7 | 87a | 85bc | 93a | 99a | 83bc | 79cd | 18.7- | 59.1- |
| 4 | Tolvera | 11 | 82bc | 88a | 85c | 91b | 81cd | 89ab | 17.1- | 59.2- |
| | OpenSky | 16 | | | | | | | | |
| 5 | Tolvera | 11 | 84ab | 90a | 90ab | 96a | 85abc | 90a | 18.0- | 59.0- |
| | Axial Star | 16.4 | | | | | | | | |
| 6 | Tolvera | 11 | 82bc | 83c | 90ab | 98a | 84abc | 80c | 17.9- | 59.4- |
| | Harmony SG | 0.3 | | | | | | | | |
| | Express 50 SG | 0.3 | | | | | | | | |
| 7 | Huskie FX | 15.5 | 83abc | 84bc | 93a | 95ab | 87ab | 87b | 21.7- | 58.3- |
| 8 | Talinor | 13.7 | 78d | 77d | 87bc | 84c | 72e | 76e | 18.5- | 59.2- |
| 9 | Batalium Amped | 16 | 82bc | 87ab | 78d | 77d | 90a | 89ab | 19.2- | 59.3- |
| LSD P=.05 | | | 4.1 | 3.7 | 4.0 | 4.9 | 5.3 | 3.1 | 2.45 | 1.97 |
| Standard Deviation | | | 2.8 | 2.5 | 2.7 | 3.3 | 3.7 | 2.1 | 1.65 | 1.35 |
| CV | | | 3.81 | 3.35 | 3.52 | 4.07 | 5.01 | 2.87 | 10.61 | 2.29 |
| Treatment F | | | 389.644 | 508.406 | 466.913 | 358.063 | 232.516 | 711.323 | 1.532 | 0.474 |
| Treatment Prob(F) | | | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.2147 | 0.8625 |

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Herbicide treatments were tank-mixed with adjuvants according to label guidelines.

Table 2. Application environment and equipment for postemergence application of herbicide treatments for weed control in spring wheat.

| Application Description | | Application equipment | |
|---|---|---|---|
| Date | Jun-7-2024 | Equipment Type | Tractor mounted |
| Start Time | 7:30 AM | Operation Pressure | 42 PSI |
| Stop Time | 7:50 AM | Nozzle Model | 11002DG |
| Air Temperature Start, Stop | 62.9, 64.4 F | Nozzle Spacing | 20 IN |
| % Relative Humidity Start, Stop | 47.8, 47.9 | Boom Length | 100 IN |
| Wind Velocity+Dir. Start | 4.2 MPH, S | Boom Height | 20 IN |
| Wind Velocity+Dir. Stop | 5.2 MPH, S | Ground Speed | 4.2 MPH |
| Wind Velocity+Dir. Max | 5.6 MPH, S | Carrier | WATER |
| Wet Leaves (Y/N) | No | Application Amount | 10 GAL/AC |
| Soil Temperature | 45 F | Propellant | CO2 |
| % Cloud Cover | 30 | Tank Mix (Y/N) | Yes |

# North Dakota State University

**GF-5036 university trials**

Protocol Intent:

Trial ID:SW03 (Tolvera) ND24RHC051
Protocol ID:NA24Y8A010H Location: Trial Year:2003
Program: Project:Y8A AIC:
Main Material: HERBICIDE
Study Director: Sponsor Contact:
Investigator: Trial Origin:

| Trt No. | Treatment Name | Rate | Rate Unit | Other Rate | Other Rate Unit | Appl Code | Jun-20-2024 Fallopia convol> CONTROL 13 DA-A 10* | Jul-6-2024 Fallopia convol> 29 DA-A 13* | Aug-10-2024 YIELD 64 DA-A 17* | Aug-10-2024 Test Wt 64 DA-A 16* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | UNTREATED | | | | | A | 0f | 0f | 15.7- | 57.9- |
| 2 | Tolvera | 165g | ae/ha | 11fl | oz/a | A | 75de | 77de | 16.0- | 58.7- |
| 3 | Tolvera | 220g | ae/ha | 14.7fl | oz/a | A | 83bc | 79cd | 18.7- | 59.1- |
| 4 | Tolvera | 165g | ae/ha | 11fl | oz/a | A | 81cd | 89ab | 17.1- | 59.2- |
| | OpenSky | 148g | ae/ha | 16fl | oz/a | A | | | | |
| 5 | Tolvera | 165g | ae/ha | 11fl | oz/a | A | 85abc | 90a | 18.0- | 59.0- |
| | AXIAL STAR | 165g | ae/ha | 16.4fl | oz/a | A | | | | |
| 6 | Tolvera | 165g | ae/ha | 11fl | oz/a | A | 84abc | 80c | 17.9- | 59.4- |
| | HARMONY SG | 10.5g | ai/ha | 0.3fl | oz/a | A | | | | |
| | EXPRESS 50 SG | 10.5g | ai/ha | 0.3fl | oz/a | A | | | | |
| 7 | Huskie FX | 323g | ai/ha | 15.5fl | oz/a | A | 87ab | 87b | 21.7- | 58.3- |
| 8 | Talinor | 222g | ai/ha | 13.7fl | oz/a | A | 72e | 76e | 18.5- | 59.2- |
| 9 | Batalium Amped | 452g | ai/ha | 16fl | oz/a | A | 90a | 89ab | 19.2- | 59.3- |
| LSD P=.05 | | | | | | | 5.3 | 3.1 | 2.45 | 1.97 |
| Standard Deviation | | | | | | | 3.7 | 2.1 | 1.65 | 1.35 |
| CV | | | | | | | 5.01 | 2.87 | 10.61 | 2.29 |
| Treatment F | | | | | | | 232.516 | 711.323 | 1.532 | 0.474 |
| Treatment Prob(F) | | | | | | | 0.0001 | 0.0001 | 0.2147 | 0.8625 |

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Due to missing data, larger LSD values (col. 9: >=4.0 and <=4.9) are used for mean comparisons of treatment pairs with missing data.
* Adjusted means
^Calculated from residual.

# North Dakota State University

**GF-5036 university trials**

Protocol Intent:

Trial ID:SW03 (Tolvera) ND24RHC051
Protocol ID:NA24Y8A010H Location: Trial Year:2003
Program: Project:Y8A AIC:
Main Material: HERBICIDE
Study Director: Sponsor Contact:
Investigator: Trial Origin:

Rating Type
YIELD = yield
ARM Action Codes
TY1 = 1.91052632*[C14]*(100-[C15])/87
SPa = Quadratic spatial trend
SPb = Nearest row neighbor and column neighbor
SPc = Linear spatial trend
SPd = Cubic spatial trend