

## **Intrava DX Tank Mixtures for Weed Control in Corn**

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### **Summary**

Intrava DX is a new premix herbicide for potential use in fallow and corn. Data from Manhattan showed Intrava DX provided exceptional ( $\geq 95\%$ ) weed control of key weed species when applied preemergence (PRE) to corn. Corn injury was less than 6%, and no difference was observed in grain yield. At Garden City, most Intrava DX treatments provided greater than 90% visual weed control throughout the season. Weed densities were reduced by more than 90%, and grain yields were 3.8 to 4.2 times higher when corn received Intrava DX compared to the weedy controls. Intrava DX may be an important component of an integrated weed management system to combat resistance.

### **Introduction**

Novel herbicides are an important component of integrated weed management programs to combat herbicide-resistant weeds. Intrava DX is a premix of amicarbazone and metribuzin, two Group 5 herbicides that inhibit photosynthesis. Amicarbazone is not currently labeled in U. S. row crops, but may have utility as a burndown product in fallow fields and as a preemergence product in corn. Amicarbazone would be beneficial because no weeds are currently resistant to the herbicide, and it would allow for more strategic use of atrazine. These trials aimed to evaluate Intrava DX as a preemergence treatment for efficacy and crop response in corn.

### **Experimental Procedures**

Trials were conducted at Manhattan and Garden City, KS, in 2024 to evaluate Intrava DX plus tank mix partners for PRE efficacy in corn. All herbicides were applied using either a tractor-mounted, compressed-CO<sub>2</sub> sprayer delivering 19.4 gpa or a backpack compressed-CO<sub>2</sub> sprayer delivering 15 gpa. Application, environmental, and plant information is shown in Table 1. Plots were 10 by 30 or 35 ft, and arranged in a randomized complete block design replicated four times. Soil was a silt loam at each location. Visual weed control at Garden City was determined on June 13 and July 25, 2024. These dates were 28 days after the preemergence applications (DA) and 45 days after the postemergence applications (DB). Weed counts were determined at Garden City on June 14, which was 29 DA. Weed control at Manhattan was determined May 10, May 28, and June 6, 2024. These dates were 17 DA, 5 DB, and 14 DB, respectively. Corn yields were determined on September 17, 2024, at Manhattan and on October 17, 2024, at Garden City by mechanically harvesting the center two rows of each plot and adjusting grain weights to 15.5% moisture.

## Results and Discussion

Treatment structure differed between the two locations, so data are presented separately (Tables 2 and 3). At Manhattan, excellent weed control was observed when Intrava DX plus Moccasin II, Motif, or Coyote was applied PRE. Control of all species (Palmer amaranth, entireleaf morningglory, and common sunflower) remained 95% or more by 14 DB. Minor crop injury was observed at Manhattan at 29 DA, but was not significant (Table 2). Likewise, no differences in corn yield were observed between treatments.

Intrava DX applied PRE controlled Russian thistle and johnsongrass 96% or more regardless of rating date at Garden City (data not shown). Palmer amaranth control by Intrava DX was slightly better than Acuron PRE at 28 DA (Table 3), and control ranged from 88% to 95% at 45 DB. Kochia control with all PRE herbicides was greater than 95% at 28 DA, whereas Intrava DX plus Motif PRE followed by InterMoc post-emergence was the only treatment to control kochia less than 96% at 45 DB. Intrava DX treatments also reduced the densities of all weed species 92% to 100% at 29 DA. All herbicide-treated corn yielded 104 to 119 bu/a more grain than the untreated control plots (data not shown).

## Acknowledgments

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**Table 1. Application, environmental, and plant information for the Intrava DX trials in Kansas in 2024**

| Location                          | Garden City      |                   | Manhattan |           |
|-----------------------------------|------------------|-------------------|-----------|-----------|
|                                   | PRE <sup>1</sup> | POST <sup>1</sup> | PRE       | POST      |
| Application timing                | PRE <sup>1</sup> | POST <sup>1</sup> | PRE       | POST      |
| Application date                  | May 1            | June 13           | April 24  | May 23    |
| Air temperature (F)               | 77               | 83                | 64        | 74        |
| Relative humidity (%)             | 31               | 52                | 50        | 61        |
| Soil temperature (F)              | 67               | 74                | 57        | 70        |
| Wind speed (mph)                  | 1 to 4           | 4 to 7            | 2 to 3    | 2 to 3    |
| Wind direction                    | Northeast        | South             | Southeast | Southeast |
| Soil moisture                     | Good             | Good              | Good      | Good      |
| Corn                              |                  |                   |           |           |
| Height (inches)                   | ---              | 10 to 12          | ---       | 6 to 8    |
| Leaves (no.)                      | 0                | 4 to 5            | 0         | 3 to 4    |
| Palmer amaranth                   |                  |                   |           |           |
| Height (inches)                   | ---              | 1 to 3            | ---       | 0.5       |
| Density (plants/ft <sup>2</sup> ) | 0                | 0.1               | 0         | 0.1       |
| Kochia                            |                  |                   |           |           |
| Height (inches)                   | ---              | 1 to 4            | ---       | ---       |
| Density (plants/ft <sup>2</sup> ) | 0                | 0.1               | 0         | 0         |
| Johnsongrass                      |                  |                   |           |           |
| Height (inches)                   | ---              | 1 to 3            | ---       | ---       |
| Density (plants/ft <sup>2</sup> ) | 0                | 0.1               | 0         | 0         |
| Entireleaf morningglory           |                  |                   |           |           |
| Height (inches)                   | ---              | ---               | ---       | 0.5 to 1  |
| Density (plants/ft <sup>2</sup> ) | 0                | 0                 | 0         | 0.1       |
| Common sunflower                  |                  |                   |           |           |
| Height (inches)                   | ---              | ---               | ---       | 0.5 to 1  |
| Density (plants/ft <sup>2</sup> ) | 0                | 0                 | 0         | 0.1       |

<sup>1</sup> PRE is preemergence, POST is postemergence.

**Table 2. Weed control and crop response in the Intrava DX corn trial at Manhattan, KS**

| Treatment           | Rate   | Timing <sup>1</sup> | Weed control         |                    |                    | Corn               |       |
|---------------------|--------|---------------------|----------------------|--------------------|--------------------|--------------------|-------|
|                     |        |                     | AMAPA <sup>2</sup>   | IPOHG <sup>2</sup> | HELAN <sup>2</sup> | Injury             | Yield |
|                     |        |                     | 14 DB <sup>3</sup>   | 14 DB <sup>3</sup> | 14 DB <sup>3</sup> | 29 DA <sup>3</sup> |       |
|                     | oz/a   |                     | ----- % visual ----- |                    |                    |                    | bu/a  |
| Intrava DX          | 21     | PRE                 | 100                  | 95                 | 100                | 5                  | 256.2 |
| Moccasin II Plus    | 21     | PRE                 |                      |                    |                    |                    |       |
| Glyphosate          | 36     | PRE                 |                      |                    |                    |                    |       |
| Nonionic surfactant | 0.25%  | PRE                 |                      |                    |                    |                    |       |
| Ammonium sulfate    | 3.0 lb | PRE                 |                      |                    |                    |                    |       |
| InterMoc            | 64     | POST                |                      |                    |                    |                    |       |
| Ammonium sulfate    | 3.0 lb | POST                |                      |                    |                    |                    |       |
| Intrava DX          | 16     | PRE                 | 100                  | 98                 | 100                | 3                  | 256.6 |
| Motif               | 4.5    | PRE                 |                      |                    |                    |                    |       |
| Glyphosate          | 36     | PRE                 |                      |                    |                    |                    |       |
| Nonionic surfactant | 0.25%  | PRE                 |                      |                    |                    |                    |       |
| Ammonium sulfate    | 3.0 lb | PRE                 |                      |                    |                    |                    |       |
| InterMoc            | 64     | POST                |                      |                    |                    |                    |       |
| Ammonium sulfate    | 3.0 lb | POST                |                      |                    |                    |                    |       |
| Intrava DX          | 16     | PRE                 | 100                  | 100                | 100                | 1                  | 258.7 |
| Coyote              | 77     | PRE                 |                      |                    |                    |                    |       |
| Glyphosate          | 36     | PRE                 |                      |                    |                    |                    |       |
| Nonionic surfactant | 0.25%  | PRE                 |                      |                    |                    |                    |       |
| Ammonium sulfate    | 3.0 lb | PRE                 |                      |                    |                    |                    |       |
| InterMoc            | 64     | POST                |                      |                    |                    |                    |       |
| Ammonium sulfate    | 3.0 lb | POST                |                      |                    |                    |                    |       |
| LSD (0.05)          |        |                     | NSD                  | NSD                | NSD                | NSD                | NSD   |

<sup>1</sup> PRE is preemergence, POST is postemergence.

<sup>2</sup> AMAPA is Palmer amaranth, IPOHG is entireleaf morningglory, HELAN is common sunflower.

<sup>3</sup> DA is days after the preemergence applications, DB is days after the postemergence applications.

**Table 3. Visual weed control and density reductions in the Intrava DX corn trial at Garden City, KS**

| Treatment <sup>1</sup> | Rate   | Timing <sup>2</sup> | AMAPA <sup>3</sup>   |                    | KCHSC <sup>3</sup> |       | AMAPA                              | KCHSC | SASKR <sup>3</sup> | SORHA <sup>3</sup> |
|------------------------|--------|---------------------|----------------------|--------------------|--------------------|-------|------------------------------------|-------|--------------------|--------------------|
|                        |        |                     | 28 DA <sup>4</sup>   | 45 DB <sup>4</sup> | 28 DA              | 45 DB | ----- 29 DA -----                  |       |                    |                    |
|                        |        |                     | ----- % visual ----- |                    |                    |       | ----- No./meter <sup>2</sup> ----- |       |                    |                    |
| Untreated              | ---    | ---                 | ---                  | ---                | ---                | ---   | 47                                 | 16    | 3                  | 12                 |
| Intrava DX             | 21     | PRE                 | 100                  | 94                 | 96                 | 96    | 1                                  | 1     | 0                  | 1                  |
| Moccasin II Plus       | 21     | PRE                 |                      |                    |                    |       |                                    |       |                    |                    |
| Glyphosate             | 36     | PRE                 |                      |                    |                    |       |                                    |       |                    |                    |
| NIS                    | 0.25%  | PRE                 |                      |                    |                    |       |                                    |       |                    |                    |
| InterMoc               | 64     | POST                |                      |                    |                    |       |                                    |       |                    |                    |
| AMS                    | 3.0 lb | POST                |                      |                    |                    |       |                                    |       |                    |                    |
| Intrava DX             | 16     | PRE                 | 98                   | 88                 | 99                 | 91    | 0                                  | 0     | 0                  | 1                  |
| Motif                  | 4.5    | PRE                 |                      |                    |                    |       |                                    |       |                    |                    |
| Glyphosate             | 36     | PRE                 |                      |                    |                    |       |                                    |       |                    |                    |
| NIS                    | 0.25%  | PRE                 |                      |                    |                    |       |                                    |       |                    |                    |
| InterMoc               | 64     | POST                |                      |                    |                    |       |                                    |       |                    |                    |
| AMS                    | 3.0 lb | POST                |                      |                    |                    |       |                                    |       |                    |                    |
| Intrava DX             | 16     | PRE                 | 100                  | 95                 | 100                | 100   | 0                                  | 0     | 0                  | 0                  |
| Coyote                 | 77     | PRE                 |                      |                    |                    |       |                                    |       |                    |                    |
| Glyphosate             | 36     | PRE                 |                      |                    |                    |       |                                    |       |                    |                    |
| NIS                    | 0.25%  | PRE                 |                      |                    |                    |       |                                    |       |                    |                    |
| InterMoc               | 64     | POST                |                      |                    |                    |       |                                    |       |                    |                    |
| AMS                    | 3.0 lb | POST                |                      |                    |                    |       |                                    |       |                    |                    |
| Acuron                 | 48     | PRE                 | 93                   | 90                 | 100                | 100   | 2                                  | 0     | 0                  | 1                  |
| Acuron                 | 32     | POST                |                      |                    |                    |       |                                    |       |                    |                    |
| Liberty 280            | 32     | POST                |                      |                    |                    |       |                                    |       |                    |                    |
| AMS                    | 3.0 lb | POST                |                      |                    |                    |       |                                    |       |                    |                    |
| LSD (0.05)             |        |                     | 2                    | 6                  | 3                  | 3     | 13                                 | 2     | 2                  | 6                  |

<sup>1</sup> NIS is nonionic surfactant, AMS is ammonium sulfate.

<sup>2</sup> PRE is preemergence, POST is postemergence.

<sup>3</sup> AMAPA is Palmer amaranth, KCHSC is kochia, SASKR is Russian thistle, and SORHA is johnsongrass.

<sup>4</sup> DA is days after the preemergence treatments, DB is days after the postemergence treatments.