

Managing 2,4-D and Dicamba in Enlist E3[®] and Xtend[®] Soybeans



USE THESE FACTS AND BEST MANAGEMENT PRACTICES FOR SYNTHETIC AUXIN HERBICIDES

Enlist E3[®] and Xtend[®] traits are engineered to provide resistance to the group 4 synthetic auxin herbicides 2,4-D and dicamba, respectively. These traits allow POST applications for control of broadleaf weeds in soybeans. However, many broadleaf plants are inherently sensitive to 2,4-D and dicamba, and the use of the Enlist and Xtend technologies requires proactive stewardship.



Figure 1. Soybeans damaged by dicamba. Notice the newest trifoliates are distinctly cupped upward.



Figure 2. Soybeans injured by off-target movement of 2,4-D. Notice the twisted stems and petioles.



Figure 3. Tomato plants damaged by off-target movement of dicamba from a nearby soybean field.

NEED TO KNOW

1. 2,4-D and dicamba are not interchangeable. Enlist E3[®] soybeans tolerate 2,4-D but are sensitive to dicamba, while Xtend soybeans tolerate dicamba but are sensitive to 2,4-D.
2. Enlist One[®] and Enlist Duo[®] are the only 2,4-D formulations that do not have preplant application restrictions and can be used POST on Enlist E3[®] soybeans. Tavium can be applied without preplant application restrictions and as a POST application on Xtend crops. Growers and commercial applicators may use existing stocks of Engenia[®], FeXapan[®] and XtendiMax[®] herbicide with VaporGrip[®] Technology that were in their possession on June 3, 2020, the effective date of the court decision. Such use must be consistent with the product's previously approved label, and may not continue after July 31, 2020. Applications of these herbicides may be subject to further use restrictions in certain states.
3. Most broadleaf plants, non-2,4-D- and non-dicamba-tolerant soybeans, cotton, tomatoes and watermelons, are extremely sensitive to low doses of 2,4-D and dicamba (Figures 1-3).
4. The person applying the herbicide is responsible for ensuring the application is made in accordance to the approved labeling and under allowable weather conditions. Only certified applicators may apply the new dicamba products, and certification is required regardless if these products are applied PRE or POST.
5. To delay the onset of 2,4-D or dicamba resistance in weeds, an integrated weed management program is necessary. 2,4-D and dicamba should not be used as POST-only approaches but as part of an integrated residual herbicide program. The Enlist One, Enlist Duo, XtendiMax, Engenia, FeXapan and Tavium herbicide labels mandate scouting for herbicide nonperformance following an application.
6. The Environmental Protection Agency (EPA) is currently reviewing new registrations for dicamba-containing herbicides for 2021 and beyond.

BMPs for APPLICATIONS

1. USE ONLY APPROVED 2,4-D OR DICAMBA HERBICIDE FORMULATIONS WHEN APPLYING TO ENLIST OR XTEND CROPS.

These formulations are less volatile than older formulations. Some states may have specific cutoff dates or cutoff air temperatures for making applications. Applicators must follow the most restrictive regulations.

2. READ THE HERBICIDE LABEL. The Enlist One, Enlist Duo, Engenia, XtendiMax, FeXapan and Tavium labels are very specific on application parameters. Each herbicide has supplemental label(s), and updates to the labels will be posted on the product website. Engenia, XtendiMax, FeXapan and Tavium labels are very specific on training, licensing and record-keeping requirements. These dicamba-containing herbicides are restricted-use pesticides. The 2018 labels are to be followed for Engenia, XtendiMax and FeXapan applications made through July 31, 2020.

3. CHECK THE WEATHER.

- **Wind:** The new 2,4-D and dicamba formulations will not minimize the risk of physical drift of herbicide droplets due to wind. Enlist One or Enlist Duo can be applied only when wind speeds do not exceed 15 mph. Engenia, XtendiMax, FeXapan and Tavium can be applied only when wind speeds are between 3 and 10 mph.
- **Rain:** Do not apply Enlist One or Enlist Duo when rain is forecasted within the next 24 hours. The rainfast period is four hours for Engenia, XtendiMax, FeXapan and Tavium. However, due to risk for movement in surface water, these dicamba-containing products cannot be applied if expected rainfall amount may exceed soil field capacity and result in soil runoff in the next 24 hours.
- **Temperature and Humidity:** High temperatures and low humidity favor herbicide volatilization, which can lead to vapor drift. Use only the approved low-volatile 2,4-D and dicamba formulations, and set equipment to produce larger droplets when making applications.
- **Temperature Inversions:** Avoid making applications during weather

patterns that result in stable air masses in which small herbicide particles can become suspended. Applications should not be made when wind speeds are < 3 mph to avoid spraying during an inversion. Inversions typically form near dusk on clear evenings and break up as the sun begins to rise the next morning (Figure 4). **XtendiMax, Engenia, FeXapan and Tavium applications may only occur one hour after sunrise through two hours before sunset to minimize the likelihood of spraying during inversions.** Some states may have specific times of day when applications can be made to avoid inversions. Applicators must follow the most restrictive regulations.

4. OBSERVE BUFFERS. Maintain the proper distance when spraying near sensitive areas that are downwind (Figure 5). Some state regulations on buffer distances are stricter than the EPA's. Applicators must follow the most restrictive regulations. When any of the following are immediately adjacent to a treated field, they may be considered part of the buffer:

- a. Roads (paved or gravel surfaces).
- b. Mowed and/or managed areas adjacent to fields such as rights of way.
- c. Fields of corn, sorghum, proso millet, small grains and sugarcane.
- d. Fields that are prepared for planting but not yet planted.
- e. Areas covered by the footprint of a building or other man-made structure with walls and/or a roof and similarly treated crops.
- f. Fields that are planted to similarly treated crops.

Applicators must account for sensitive, threatened or endangered species that may be growing within these areas. If an endangered species is present in the county where application of one of these approved dicamba products occurs, then in addition to the downwind buffer, a 57-foot in-field buffer is required around the other three sides of the field. Applicators are responsible for consulting the proper sources to determine if an endangered species is present. Due to the difficulty many have had keeping these herbicides in the target field, there are some fields near high-value sensitive crops or vegetation

Figure 4. Temperature Inversions

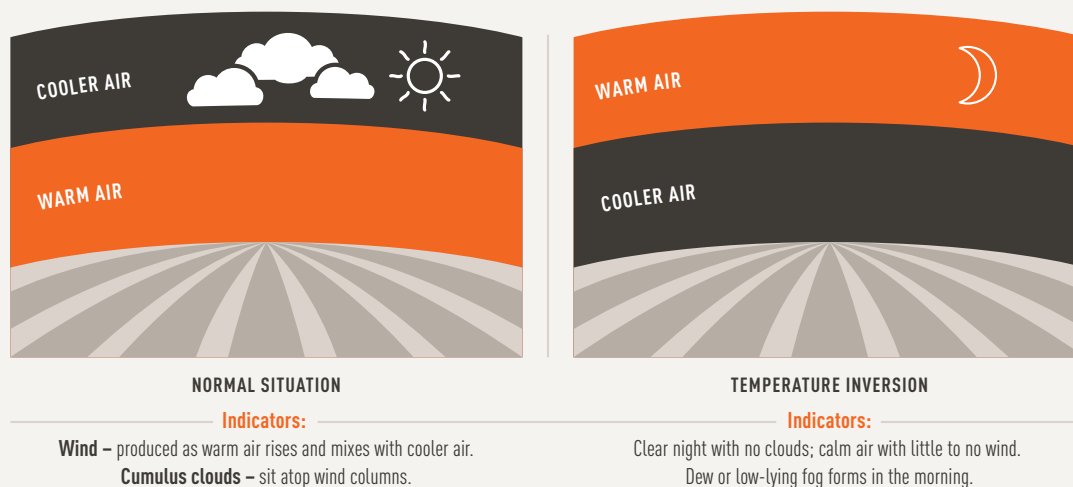
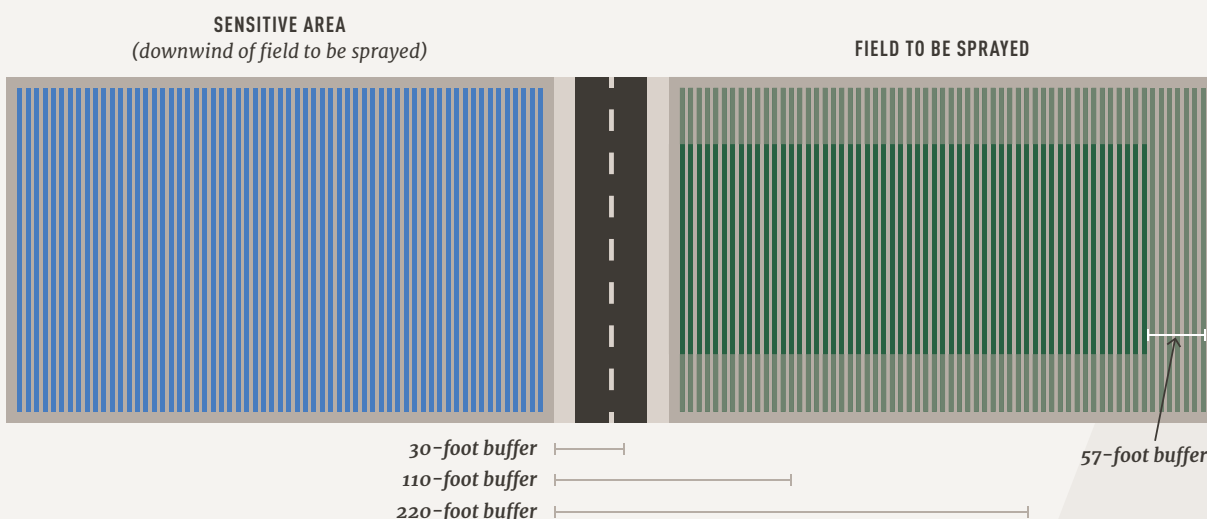


Figure 5. For XtendiMax and FeXapan, the buffer between the last treated soybean row and the downwind sensitive area must be maintained as follows: 22 oz/A = 110-foot buffer and 44 oz/A = 220-foot buffer. For Engenia and Tavium applications, the buffer distance is 110 feet. **These dicamba products cannot be applied when the wind is blowing toward an adjacent sensitive crop, including fruiting vegetables, melons, sensitive soybeans and more.** For Enlist One or Enlist Duo applications, the buffer distance is 30 feet. **These 2,4-D products cannot be applied when the wind is blowing toward adjacent commercially grown fruiting vegetables, melons, grapes or sensitive cotton.** In counties where endangered species are present, a 57-foot buffer is required around the other sides of the field for dicamba applications.



where these herbicides should not be sprayed in June and July. Find more information at epa.gov/endangered-species or by phone at (844) 447-3813.

- 5. BE AWARE OF YOUR SURROUNDINGS.** Many ornamental vegetable and tree species are extremely sensitive to 2,4-D and dicamba. Applicators must consult a sensitive crop registry or survey neighboring fields prior to applying these chemicals. Additionally, Flag the Technology is a quick and inexpensive method to identify the planted trait and prevent misapplication of 2,4-D or dicamba (Figure 6).
- 6. ONLY USE APPROVED NOZZLES.** Refer to each product label's website to find approved nozzles that may be used with Enlist One, Enlist Duo, Engenia, XtendiMax, FeXapan or Tavium. Nozzles approved for use with one herbicide may not be approved for use with another.
- 7. KNOW TANK-MIX RESTRICTIONS.** Refer to each product label's website to find approved adjuvants, drift reduction agents and other herbicides to mix with Enlist One, Enlist Duo, Engenia, XtendiMax, FeXapan or Tavium.
- 8. MAKE TIMELY APPLICATIONS.** Don't spray weeds that are too large. It's important to note over-the-top application of dicamba is prohibited on soybeans later than 45 days after planting.
- 9. USE FULL RATES.** Combined with timely applications, this will delay the onset of resistance.
- 10. CLEAN ENTIRE SPRAYER PROPERLY.** With so many herbicide-tolerant traits available, properly cleaning out the spray tank and other sprayer components is necessary to avoid contamination when

switching between herbicides and crops. Each label has specific steps for cleaning the sprayer.

Figure 6. Flag the Technology

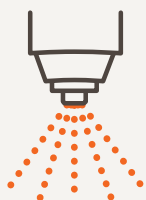
	RED - Signifies conventional varieties with no herbicide technology traits. <i>Extreme caution.</i>
	WHITE - Represents the Roundup Ready® technology that is tolerant to glyphosate herbicide.
	BRIGHT GREEN - Indicates the LibertyLink® technology. This technology is tolerant to glufosinate (Liberty®) herbicide.
	BRIGHT YELLOW - Denotes Clearfield® rice technology and STS® soybeans.
	TEAL - Indicates tolerance to both 2,4-D and FOP (ACCase) herbicides or the Enlist technology. White stripes indicate glyphosate tolerance. For Enlist cotton and soybean fields, a green flag should be added (for Liberty).
	BLACK - Indicates tolerance to dicamba herbicide or Xtend technology. Black and white checks indicate tolerance to both dicamba and glyphosate. A green flag should be added to cotton for glufosinate (Liberty) tolerance.

Getting to Know the Synthetic Auxin Herbicide Labels

KNOWING AND FOLLOWING THE LABEL IS ESSENTIAL FOR ALL PESTICIDE APPLICATIONS.

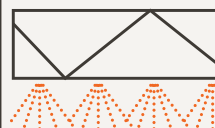
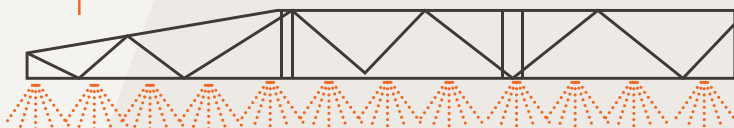
Be sure to read, know and follow the label thoroughly, and then refer to it again before each application to ensure no changes have been made to regulations. The 2018 labels are to be used for Engenia, XtendiMax and FeXapan applications.

As you look over the label and prepare for application, be on the lookout for:



SPRAYER SETUP

- Approved nozzles and droplet size.
- Gallons-per-acre application volume requirements.
- Minimum and maximum product rate per application.
- Sprayer speed limits.
- Boom height requirements.



TANK TO-DOS

- Guidelines on proper tank-mix partners.
- Parameters of tank cleaner usage.
- Instructions for rinsing the tank.



APPLICATION ENVIRONMENT

- Size of targeted weeds.
- Wind speed restrictions.
- Time of day restrictions.
- Downwind buffer requirements.
- Endangered species buffer requirements.
- Neighboring sensitive crops.
- Rainfast period and in-crop application windows.

All approved dicamba products have extensive record-keeping requirements that must be generated no later than 72 hours after each application. These records must be made available to state pesticide control officials, USDA and EPA upon request. Check the labels of each product carefully for specific requirements.

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