

Managing 2,4-D and Dicamba in Enlist™ and Xtend® Soybeans



USE THESE FACTS AND BEST MANAGEMENT PRACTICES FOR SYNTHETIC AUXIN HERBICIDES

Enlist™ 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 soybean. 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 of the herbicides.



Figure 1. Soybeans that have been damaged by 1/20,000 of a standard use rate of dicamba. Notice the newest trifoliolates are distinctly cupped upwards.



Figure 2. Soybeans that have been 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 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 soybeans. XtendiMax®, Engenia™ and FeXapan™ are the only dicamba products that do not have preplant application restrictions and that can be used for POST applications on Xtend crops.
3. Most broadleaf plants, including non-2,4-D and non-dicamba tolerant soybean and cotton, tomato, watermelon and others, 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 that the application is made in accordance to the approved labeling and under allowable weather conditions. Only certified applicators may apply dicamba over the top.
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 and FeXapan herbicide labels mandate scouting for herbicide non-performance following an application.



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 cut-off dates or cut-off air temperatures for making applications of synthetic auxin herbicides. Applicators must follow the most stringent regulations.

2. READ THE HERBICIDE LABEL. The Enlist One, Enlist Duo, Engenia, XtendiMax and FeXapan 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 and FeXapan labels are very specific on training, licensing and record-keeping requirements. These dicamba-containing herbicides are restricted use pesticides.

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 only be applied when wind speeds do not exceed 15 mph. Engenia, XtendiMax and FeXapan can only be applied when wind speeds do not exceed 10 mph.
- **Rain:** Do not apply Enlist One or Enlist Duo when rain is forecasted within the next 24 hours following application. Due to the risk for movement in surface water, do not apply XtendiMax when rain is expected within the next 24 hours following application. The rainfast period is 4 hours for Engenia, XtendiMax and FeXapan.
- **Temperature and Humidity:** High temperatures and low humidity favor herbicide volatilization, which can lead to vapor drift. Use only the approved low-volatile dicamba and 2,4-D 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). Low-lying fog and dew are often present during an inversion. **XtendiMax, Engenia and FeXapan cannot be applied from two hours before sunset to one hour after sunrise to minimize the likelihood of spraying during an inversion.** Some states may have specific times of day when applications can be made to avoid inversions. Applicators must follow the most stringent regulations.

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

- Roads (paved or gravel surfaces).*
- Groomed ditches.*
- Fields of corn, sorghum, proso millet, small grains, sugarcane.*
- Fields that are prepared for planting but not yet planted.*
- Areas covered by the footprint of a building or other man-made structure with walls and/or a roof and similarly treated crops.*

Ditches and vegetative areas at the edges of fields need to be considered when calculating buffer distances. 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 occurs, a 57-foot in-field buffer is required around the perimeter 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 where these herbicides should not be sprayed in June and July.

Figure 4. Temperature Inversions

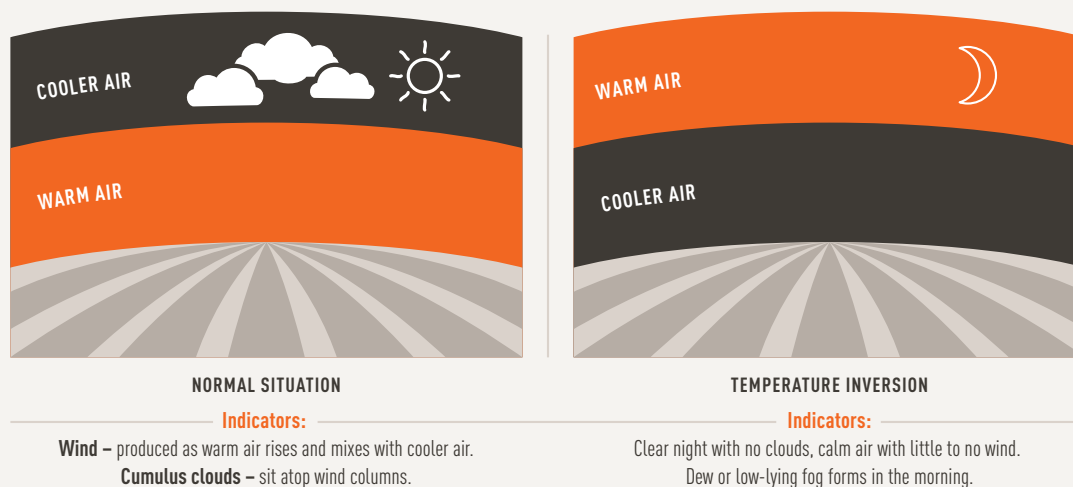
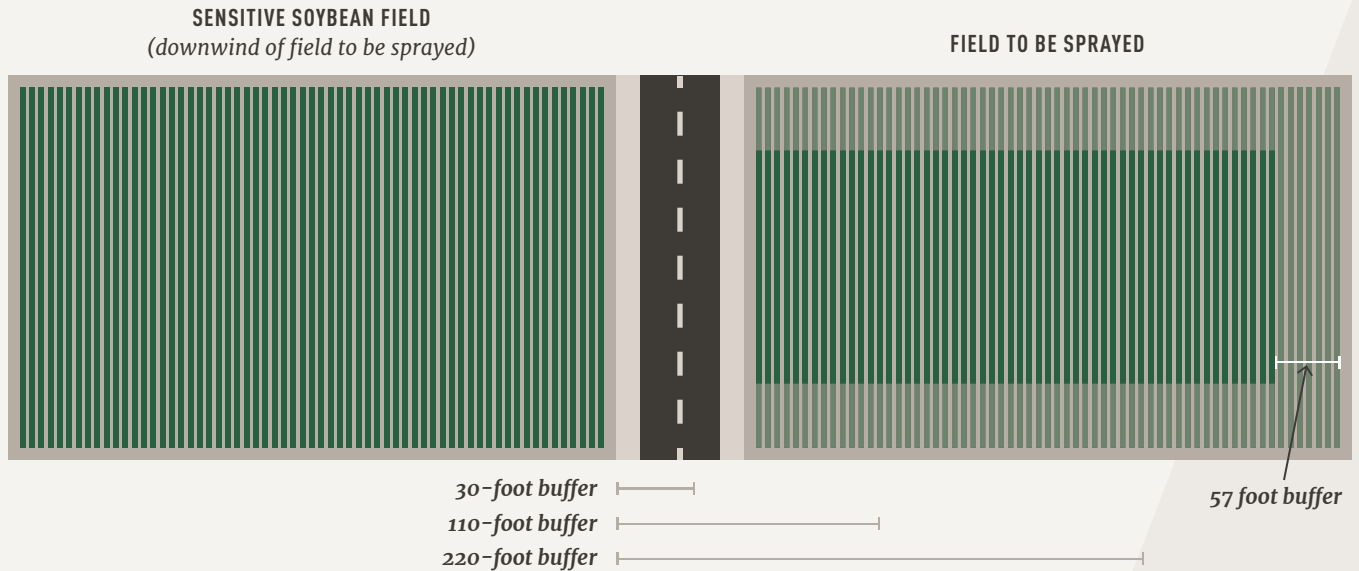


Figure 5. For XtendiMax and FeXapan, the buffer between the last treated soybean row and the downwind sensitive area must be maintained as follows: 22 oz/A = 110-foot buffer and 44 oz/A = 220-foot buffer. For Engenia applications, the buffer distance is 110 feet. For Enlist One or Enlist Duo applications, the buffer distance is 30 feet. In counties where endangered species are present, a 57-foot buffer is required around the other sides of the field.



- 5. BE AWARE OF YOUR SURROUNDINGS.** Many ornamental, vegetable and tree species are extremely sensitive to dicamba and 2,4-D. Applicators must consult a sensitive crop registry or survey neighboring fields prior to applying XtendiMax, Engenia or FeXapan. Additionally, Flag the Technology is a quick and inexpensive method to prevent misapplication of dicamba and 2,4-D between neighbors (Figure 6).
- 6. ONLY USE APPROVED NOZZLES.** Go online to find approved nozzles that may be used with Enlist One, Enlist Duo, Engenia, XtendiMax or FeXapan. Nozzles approved for use with one herbicide may not be approved for use with another.
- 7. KNOW TANK MIX RESTRICTIONS.** Go online to find approved adjuvants, drift reduction agents and other herbicides to mix with Enlist One, Enlist Duo, Engenia, XtendiMax or FeXapan.
- 8. MAKE TIMELY APPLICATIONS.** Avoid resistance. Don't spray weeds that are too large. It's also important to note that over the top application of dicamba is prohibited on soybeans 45 days after planting.
- 9. USE FULL RATES.** This delays 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 Liberty Link® technology. This technology is tolerant to glufosinate (Liberty®) herbicide.
	BRIGHT YELLOW - Denotes Clearfield® rice technology and STS® soybean.
	TEAL - Indicates tolerance to both 2,4-D and FOP (ACCase) herbicides or the Enlist technology. The white stripes indicate tolerance to glyphosate. For Enlist cotton and soybean fields, a green flag should be added to denote tolerance to glufosinate (Liberty).
	BLACK - Indicates tolerance to dicamba herbicide or Xtend technology. The black and white checks indicate tolerance to both dicamba and glyphosate (Roundup). A green flag should be added for cotton to denote glufosinate (Liberty) tolerance.

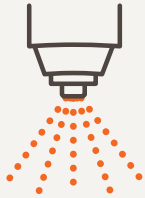
Synthetic Auxin Herbicide Label Checklist

THE KEY TO SUCCESSFUL PESTICIDE APPLICATION, NO MATTER THE FORMULATION, IS KNOWING AND FOLLOWING THE LABEL.



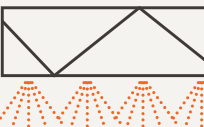
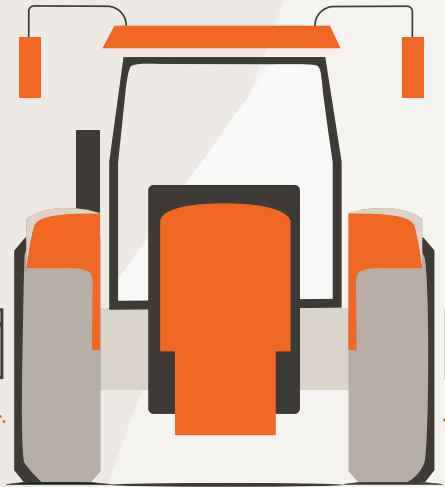
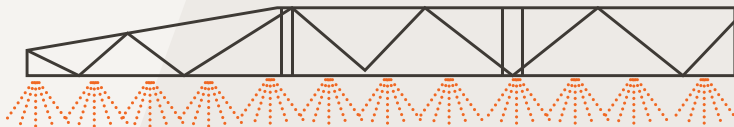
Be sure to read and know the label thoroughly, and then refer to it again before each application to ensure no changes have been made to regulations.

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



SPRAYER SET UP

- 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.

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