

Guidelines and Precautions for Dicamba Use in Roundup Ready 2 Xtend Soybean

Christy Sprague, Extension Weed Science

www.MSUweeds.com

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The Roundup Ready Xtend system in soybean was developed as a tool to help manage herbicide-resistant weeds. This system enables growers to apply registered dicamba formulations to soybean designated as Roundup Ready 2 Xtend. In addition to dicamba resistance these soybeans are also resistant to glyphosate. As we see an increase in glyphosate- and multiple-resistant weeds in Michigan, growers may choose to use the new Roundup Ready 2 Xtend system as an option to manage these resistant weeds. However, as with other herbicides it is important to keep in mind that every application of dicamba increases the selection for dicamba-resistance. If a grower decides to use this technology it will be important to use an integrated approach to control problematic and resistant weeds. An overreliance on this technology will lead to the development of dicamba-resistant weeds.

Approval of the new lower volatility dicamba formulations, *Engenia*, *FeXapan*, and *XtendiMax*, allowed for the first official registered use of dicamba on Roundup Ready 2 Xtend soybean on a large number of acres in 2017. The labels of these products were very detailed on how to protect sensitive/susceptible species and crops from off-target dicamba movement. However, in areas with high use of this technology in 2017 there were thousands of complaints of off-target movement that injured susceptible species in the United States. Some of these instances occurred because applicators took some of the label restrictions too lightly and did not follow the label when making applications. Some of these violations included not using the correct nozzles, spraying in too high of winds or during temperature inversions, not following the buffer requirements or tank mixture restrictions, and spraying when the wind was blowing toward susceptible crops. Improper sprayer and tank cleanout also lead to damage of susceptible crops. Other instances included dicamba movement in runoff waters following heavy rains and in some instances off-target movement could not easily be explained, leading some to believe dicamba volatility was occurring.

On October 12, 2017 the EPA approved revised labels of *Engenia*, *FeXapan*, and *XtendiMax* to help address some of the issues. Below is synopsis of some of the label changes and guidelines that must be followed if a grower decides to use dicamba in Roundup Ready 2 Xtend soybean. Remember it is the responsibility of the applicator to protect sensitive areas and susceptible crops from dicamba injury.

Label Guidelines and Restrictions:

1. Use only approved dicamba products. Currently, *Engenia*, *FeXapan*, and *XtendiMax* are the only dicamba products

registered for preplant, preemergence, or postemergence use in Roundup Ready 2 Xtend soybean. **Use of other dicamba formulations is a violation of state and federal law.**

- 2. The dicamba products *Engenia*, *FeXapan*, and *XtendiMax* are Restricted Use Pesticides.** This designation requires that only certified applicators, or those under their guidance be allowed to purchase and apply these herbicides.
- 3. Dicamba or auxin-specific training is required.** As part of the federal labels for *Engenia*, *FeXapan*, and *XtendiMax*, applicators are required to attend an annual dicamba or auxin-specific (Group 4) training prior to using these products.
- 4. Record keeping of all dicamba applications and spray system cleanout is required.** Records must be generated within 14 days of application and kept for 2 years. The full record keeping requirements are listed on the label. Additionally, specific sprayer and tank cleanout procedures are listed on the label.
- 5. Wind direction.** There is a strict requirement on the approved dicamba labels that states that dicamba should not be applied if the wind is blowing towards adjacent susceptible/sensitive crops. What this really means is that if you are in the **vicinity of a susceptible/sensitive crop and the wind is blowing toward that crop DO NOT spray dicamba**. Susceptible/sensitive crops include, but are not limited to non-dicamba resistant soybean, tomatoes, grapes, dry beans, sugar beets, fruiting trees and vegetables, cucurbits, potatoes, flowers and other broadleaf plants, including greenhouse plants. Currently, there is not an exact distance listed on the label between where the dicamba application is being made in relation to the adjacent susceptible/sensitive crop. However, realistically if you can see the susceptible/sensitive crop or if it is within 0.5 mile and the wind is blowing in that direction DO NOT apply dicamba until the wind is blowing away from that susceptible/sensitive crop. Additionally, there are sensitive crop registries, such as **DriftWatch.org**, that applicators must consult.
- 6. Buffer requirements.** Downwind buffers are required when making applications near sensitive areas. The buffers are set based on the dicamba application rate. The downwind buffer for *Engenia* (12.8 oz/A) or applications of *FeXapan* and *XtendiMax* at 22 oz/A is 110 feet. The downwind buffer is increased to 220 feet when *FeXapan* and *XtendiMax* are applied at 44 oz/A (PRE only application rate). Sensitive areas can include, but are not limited to, residential areas, bodies of water, and habitats for threatened and endangered species, such as ditch banks and fence rows.

Guidelines and Precautions for Dicamba Use

7. **Wind speed.** The label states dicamba applications can only be made when the wind speed is between **3 and 10 mph**. Temperature inversions often exist when the wind speed is less than 3 mph, which can lead to unpredictable off-target movement. Wind speeds above 10 mph increase the chances for particle drift. Applicators also need to be aware of wind gusts. If wind gusts exceed 10 mph it is strongly recommended not to apply dicamba.
8. **Temperature inversions.** The labels clearly states **DO NOT apply** these products **during a temperature inversion**. Under a temperature inversion the atmosphere is very stable and vertical air mixing is restricted. Herbicide particles can be trapped in the stable air and then move unpredictably when wind movement finally occurs. Temperature inversions occur when the air temperature at the earth's surface begins to cool and warmer air is trapped above it. Temperature inversions often begin at sunset and continue into morning. Ground fog is often a good indicator of a temperature inversion, however fog is not always present during an inversion. That is one reason for the wind speed and new time of day restrictions. New apps, such as Pocket Spray Smart, can be used to determine if a temperature inversion exists.
9. **Time of day.** The new labels now only allow for applications **between sunrise and sunset**. Again this is to avoid applications during times when temperature inversions are likely to occur.
10. **Rain free interval.** Additional label restrictions include: **DO NOT** apply dicamba when rain is expected within **24 hours** of application. This also includes the use of irrigation within 24 hours after application. This restriction is to help prevent the movement of dicamba in runoff water after heavy rainfall events.
11. **Tank-mixtures and spray additives.** Only approved spray additives and herbicides can be tank mixed with approved dicamba products. The list of these approved products are found on the respective dicamba products websites and change frequently. Many tank mixtures require the addition of a drift reduction agent (DRA), these requirements can be found on the label websites. These websites are part of the label and should be read within 7 days of making the application. The tank mixing of any products not listed on the websites is a direct violation of the label. Finally, **DO NOT add ammonium sulfate** or any products containing ammonium sulfate. The addition of ammonium sulfate and unapproved products increases the volatility of dicamba.

Approved dicamba label websites:

engeniatankmix.com
xtendimaxapplicationrequirements.com
fexapanapplicationrequirements.dupont.com

12. Sprayer application requirements.

- **Nozzles:** Nozzle section is based on reducing off-target movement by lowering the amount of fines from the spray droplet spectrum. **Only approved nozzles** can be used. Consult the approved dicamba product websites for approved nozzles and spray pressures.

- **Spray volume.** Applications must be made at a minimum of **15 GPA** (gallons of spray solution per acre).
- **Travel speed.** The maximum travel speed when applying approved dicamba products is **15 mph**.
- **Boom height.** The requirement on the label is to keep the boom height **24 inches** or less above the target pest or crop canopy. It is important to keep the boom close to this height to minimize the potential for off-target movement. Research has shown by simply reducing the boom height from 48 to 24 inches the travel distance of drift particles can be reduced by 50%. The slower travel speed mentioned above will help with keeping the boom level at this lower height.

Additional Recommendations:

1. **Follow label recommendations.** While the above is a synopsis of the label restrictions and guidelines, applicators of these products **must read the label and check the respective label websites** prior to making dicamba applications. Violations of any of these restrictions increases the chances for off-target movement and damage to susceptible species. Not following the label is a direct violation of state and federal law. Remember it is the responsibility of the applicator to protect sensitive areas and crops from off-target movement.
2. **Consider applying dicamba only preplant, preemergence or very early postemergence.** Over 90% of the off-target dicamba movement complaints occurred from postemergence applications. Postemergence applications have the greatest potential for coming into contact with susceptible vegetation. Additionally, applications later in the season will likely occur under higher temperatures, which may impact off-target movement. While there is not a strict temperature cutoff on the label, our recommendations are to avoid applications when temperatures exceed 80° F. If there is a possibility of volatility with some of these new lower volatility formulations it would likely increase with temperature.
3. **Communicate with neighbors.** It is important to have conversations with your neighbors to know what crops and technologies are being planted near your Roundup Ready 2 Xtend soybean fields. In 2017, off-target movement of dicamba to non-Xtend soybeans most frequently happened when neighbors planted Roundup Ready 2 Xtend soybeans next to non-Xtend fields. Communication prior to planting may have helped resolve some of these issues. Additionally, one of Michigan's agricultural strengths is its diversity. In order to maintain this strength we need to insure that our specialty crops are protected. Many of Michigan's specialty crops are susceptible to dicamba and do not have maximum residue limits (MRLs) established. Meaning if off-target movement occurs, these crops cannot be marketed and will need to be destroyed. The applicator will be responsible for the total loss of these crops. ***This is especially serious in perennial crops, such as vineyards, fruit trees, and orchards, where damage from dicamba will result in severe economic losses.***