Dicamba Restricted Use
Required Applicator Training

2019

Application Requirements Training and Education
The following formulations of dicamba are approved for use in the Roundup Ready® Xtend Crop System and are covered by this training:

- XtendiMax® herbicide with VaporGrip® Technology (Bayer)
- FeXapan® herbicide Plus VaporGrip® Technology (Corteva)
- Engenia® Herbicide (BASF)

- The application requirements in this training apply to all labeled uses of these products in Oklahoma.
- These products are **Restricted Use Pesticides** for retail sale to and use only by Certified Applicators and only for those uses covered by the Certified Applicator’s certification.
- Some slides contain language from XtendiMax®/FeXapan® labels; Engenia® label language may vary. Always read and follow the specific product label.
- Enlist Duo™ and Enlist ONE™ or the use of Dicamba in other crops are NOT currently a part of this required training nor is this training required for their use in Oklahoma.
Always follow the individual product labeling available at:

- XtendiMax® herbicide with VaporGrip® Technology (Bayer)
  xtendimaxapplicationrequirements.com

- FeXapan® herbicide Plus VaporGrip® Technology (Corteva)
  www.fexapanapplicationrequirements.dupont.com

- Engenia® Herbicide (BASF)
  Stewardship: http://engeniastewardship.com
  Tank Mix: www.engeniatankmix.com
MANDATORY DICAMBA APPLICATOR TRAINING

- This training is designed to satisfy the federal requirement for mandatory dicamba applicator training.

- This training satisfies the Oklahoma Department of Agriculture, Food, and Forestry requirement for dicamba specific training.

- This training is not a substitute for the state-specific Certified Applicator training which is required to purchase and use Restricted Use Pesticides
  - Retail sale to and use only by Certified Applicators
  - Refer to specific state and local requirements for certification process
  - Other familiar products categorized as RUP include paraquat and atrazine
WHY IS THIS TRAINING MANDATORY AND IMPORTANT?

- In response to an elevated number of off-target movement claims in many states, this training has been mandated by the EPA for application of newly formulated dicamba products.

- It is important to understand the potential impacts these products can have on sensitive and susceptible plants.

- It is extremely important to understand the factors that can cause off-target movement and how to effectively manage it.

- EPA has extended the application of these products for 2 years.

- Future renewal of these labels will depend on continued proper use of these products.

- As a weed management tool, the loss of this technology would be detrimental to growers in Oklahoma.
New Information for 2019
CHANGES FOR 2019 – Certified Applicators

1) Only **CERTIFIED APPLICATORS** may **PURCHASE** and **APPLY** Engenia, FeXapan, or Xtendimax.

2) **ALL APPLICATORS** must complete a new training in 2019.
CHANGES FOR 2019 – Applications

1) Over-the-top applications can only be made up to **45 days** after planting on soybean and up to **60 days** after planting on cotton

2) Only **2 over-the-top** applications may be made to cotton or soybean

3) The minimum spray volume is now **15 GPA** for all formulations

4) **DO NOT** apply if expected rainfall amount may exceed soil field capacity and result in runoff in the next 24 hours

5) Recommended to **test spray solution pH** and add a buffering agent if solution pH is less than 5

6) Applications will be allowed only from **1 hour after sunrise** to **2 hours before sunset**
CHANGES FOR 2019 – Sensitive Crops

1) “Residential Areas” are now combined with “Sensitive Crops”

2) **DO NOT** apply when wind is blowing in the direction of neighboring downwind “Residential Areas” or “Sensitive Crops”

3) If wind shifts occur during application towards residential area or sensitive crop, the applicator must **STOP** the application at that time
CHANGES FOR 2019 – Buffer Requirements

There are no listed endangered terrestrial dicot plant species in Oklahoma that fall under these requirements at this time.
CHANGES FOR 2019 – Record Keeping

1) Records must be generated within **72 hours** of application

2) **Planting Date** must be recorded
Things to Consider
Off-Target Vegetation Sensitivity
Synthetic Auxin Herbicides

- Most dicot plants are very sensitive to synthetic auxin herbicides
- Extremely low doses (below 1% of a full rate) can cause auxin like symptoms
- Product labels must be carefully followed to prevent both drift to sensitive species or spray system contamination

Following application requirements are critical to mitigate off-target movement
## Soybean Sensitivity To Herbicides

<table>
<thead>
<tr>
<th>Dosage</th>
<th>Dicamba</th>
<th>Other Herbicides</th>
<th>Glufosinate</th>
<th>Glyphosate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/100 of field rate</td>
<td>Severe Growth Regulator Effect</td>
<td>Slight to No Effect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/1000 of field rate</td>
<td>Very Visual Growth Regulator Effect</td>
<td>No Effect</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Soybeans are extremely sensitive to dicamba relative to other herbicides**
Exercise extreme care with dicamba applications with nearby broadleaf crops.
RECORDKEEPING REQUIREMENTS
RECORDKEEPING REQUIREMENTS

- Record keeping is required for each application of these products. The certified applicator must keep required documentation for a period of two years; records must be generated as soon as practical but no later than 72 hours after application.
  - e.g., if 10 fields are sprayed, 10 sets of records are required, including if the same field is sprayed twice

- Planting date must also be included in the records

- Check label for additional record keeping requirements

- Records must be made available to State Pesticide Control Official(s), USDA, and EPA upon request.
BUFFER REQUIREMENTS AND PROTECTION OF SUSCEPTIBLE/SENSITIVE CROPS
Goal: To locate sensitive areas and crops around your dicamba tolerant crop field and to develop an application plan

- Survey surroundings for potential neighboring sensitive areas and crops
- Visit with your neighbors on their cropping plans around your fields
- Consult sensitive crop registries for location of specialty crops and other sensitive sites
- Record areas of potential buffer zones around all edges of the field
- ODAFF Environmental Sensitive Area Registry
- Document your efforts to identify sensitive crops

Improve decision making with prior knowledge of your surroundings
PROTECTION OF ADJACENT SUSCEPTIBLE/SENSITIVE CROPS:

DO NOT APPLY this product when the wind is blowing toward adjacent non-dicamba tolerant susceptible crops; this includes NON-DICAMBA TOLERANT SOYBEAN AND COTTON.

- Susceptible crops include but are not limited to tomatoes and other fruiting vegetables (EPA crop group 8), fruit trees, cucurbits (EPA crop group 9), grapes, beans, flowers, ornamentals, peas, potatoes, sunflower, tobacco, other broadleaf plants, and including plants in a greenhouse.

CONTACT WITH FOLIAGE, GREEN STEMS, OR FRUIT OF CROPS, OR ANY DESIRABLE PLANTS THAT DO NOT CONTAIN A DICAMBA TOLERANCE GENE OR ARE NOT NATURALLY TOLERANT TO DICAMBA, COULD RESULT IN SEVERE PLANT INJURY OR DESTRUCTION.
COLOR LEGEND

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>XtendFlex® Cotton</td>
</tr>
<tr>
<td>Green</td>
<td>Non-Dicamba Tolerant Cotton</td>
</tr>
<tr>
<td>Yellow</td>
<td>Corn</td>
</tr>
<tr>
<td>Brown</td>
<td>Agricultural Fields Prepared for Planting</td>
</tr>
</tbody>
</table>

THESE TRAINING MATERIALS ARE DESIGNED TO SATISFY FEDERAL TRAINING REQUIREMENTS AND THE TRAINING AND APPLICATION REQUIREMENTS IMPOSED BY THE OKLAHOMA DEPARTMENT OF AGRICULTURE, FOOD, and FORESTRY.
CHEMISTRY, MIXING, & HANDLING
CHEMISTRY, MIXING AND HANDLING

- Use only approved, low-volatility formulations of dicamba
- Use only approved herbicides, other pesticides, and additives as tank-mix partners which have been found not to adversely affect off-target movement (OTM) potential
- Some tank-mix partners with dicamba require an approved drift reduction agent (DRA).
- Approved tank-mix partners and required DRAs are included at each specific product labeling website.
  - Applicator must check the list of approved products no more than 7 days before applying
- Follow the tank mix order recommended for the specific DRA selected
  - Before mixing components, always perform a compatibility jar test
- Agitation is recommended following the addition of each component within a tank mix
- DO NOT add ammonium sulfate or other acidifying adjuvants to the tank when applying dicamba
  - AMS will increase volatility of dicamba even in small amounts

Refer to the specific product website for approved tank mix partners
Impact of AMS on Dicamba Volatility

Test Conditions:
- Duration: 24 hours
- Air flow: 0.5 l/min using 2.5 l tank
- RH: 35%
- Substrate: glass

AMS increases potential volatility by 20 times

Low volatility dicamba formulation* at 0.5lb ae/ac
AMS – 0.5% w/v at 10 GPA

* BASF Lab Study
Engenia herbicide: 12.8 fl oz/A
EQUIPMENT PREPARATION
Use only approved nozzles within specified operating pressure range

Nozzle Selection: Droplet Size

- The smaller the droplets, the slower they fall, and the farther they can drift
- Large spray droplets improve on-target application and reduce the likelihood of drift
- Nozzle selection is only part of the equation
  - Nozzle selection and pressure combined determine droplet size and percentage of driftable fines (<141 microns)

Avoiding spray drift at the application site is the responsibility of the applicator
Nozzle Selection
First & most important decision made by an applicator

**dicamba + glyphosate**

<table>
<thead>
<tr>
<th>Driftable Fines</th>
<th>Nozzle Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 150 µm</td>
<td>XR 11004</td>
</tr>
<tr>
<td>35%</td>
<td>AIXR 11004</td>
</tr>
<tr>
<td>7%</td>
<td>TTI 11004</td>
</tr>
<tr>
<td>&lt;1%</td>
<td></td>
</tr>
</tbody>
</table>

Go to registrant websites for list of approved nozzles
Nozzle Selection
First & most important decision made by an applicator

Incorrect nozzles can increase drift by 66 times*

*Based on AGDISP modelling comparing approved TTI 11004 vs. unapproved TT 11004 each at 60 PSI
TTI 11004 NOZZLE AT VARIABLE OPERATING PRESSURE RANGE

Dicamba (0.5 lb ae/acre) + Roundup PowerMAX® herbicide (1.125 lb ae/acre) + DRA (0.5% V/V)

Both pressures shown below are within approved range; yet higher PSI improves coverage

20 PSI

INCOMPLETE PATTERN

60 PSI

FULL PATTERN
APPLICATION
APPLICATION

- Apply when wind speeds are between 3 - 10 mph
- Do not exceed a ground speed of 15 mph
- Minimum of 15 GPA
Wind Speed
Influence on physical spray drift

Doubling wind speed (i.e. from 10 to 20 MPH) can increase potential drift by 3.4 times*

*Based on AGDISP modelling comparing 10 vs. 20 mph with approved TTI 11004 at 60 PSI
Boom Height Requirement
Key for consistency of nozzle performance

24” Maximum Boom Height Above Target

48” height can increase drift potential by 5.6 times*

*Based on AGDISP modelling comparing 24” vs. 48” above target with approved TTI 11004 at 60 PSI
WINDOW OF APPLICATION

- Target weeds when they are < 4” tall
APPLICATION

- Do not apply this product between 2 hours before sunset and 1 hour after sunrise
- Do not apply this product during a temperature inversion
- Do not make application of this product if rain resulting in runoff is expected in the next 24 hours
- You must ensure that the spray system used to apply dicamba is clean before using the product
- Do not apply this product aerially
VERTICAL MIXING OF AIR

Smoke test demonstration in 4-8 mph winds at 11:00 a.m. (Nebraska)

INVERSION LAYER NEAR SURFACE

Smoke test demonstration in < 1 mph winds at 7:15 a.m. (Nebraska)
SPRAY SYSTEM HYGIENE
**SPRAYER SYSTEM EQUIPMENT CLEANOUT**

- Clean equipment immediately after using dicamba
  - refer to specific product label for cleanout procedure
- Do not allow the spray solution to remain in the system overnight prior to flushing
- Failure to properly clean the entire system can result in inadvertent contamination of the spray system
- Small quantities of dicamba may cause injury to non-dicamba tolerant soybeans or other susceptible crops
- All rinse water must be disposed of in compliance with local, state, and federal guidelines
Complex Handling and Mixing Model
Multiple points of potential contamination

Overhead transfer and filling

Sprayer and Sprayer Parts

Nurse truck “hot loads”

In-field mixing and filling

Dedicated system(s) recommended to prevent contamination
How much dicamba does it take to potentially contaminate a sprayer?

3 ml of formulated product

12 fl oz of spray solution

Commercial sprayer with 1000 gallon tank
Application volume: 10 GPA

Hygiene is critical to preventing spray system contamination
Contacts

Oklahoma Department of Agriculture Food and Forestry

Debbie Mandrell – 405.522.5949 – Debbie.Mandrell@ag.ok.gov

Oklahoma Cooperative Extension Service

Local Oklahoma Cooperative Extension Service County Office

Todd Baughman - 580.224.0623 – todd.baughman@okstate.edu
Questions?