



SYNTHETIC AUXIN HERBICIDE

APPLICATOR TRAINING PROGRAM

Preventing Off-Target Movement with Dicamba

Module 3

In this module:

- ✦ List specific label requirements for approved products
- ✦ Describe best management practices (BMPs) for application
- ✦ Understand your responsibility as the applicator

Who's responsible for avoiding drift at the site of application?



Applicator

**Herbicide
salesperson**

**Land owner of
treated field**

**Herbicide
product**

**Sprayer
manufacturer**

The applicator is responsible for avoiding drift at the site of application!



✓ **Applicator**

✗ **Herbicide
salesperson**

✗ **Land owner of
treated field**

✗ **Herbicide
product**

✗ **Sprayer
manufacturer**

Approved Products

Only Use Approved Herbicides

- + Three approved dicamba herbicide products in Missouri
 - Engenia
 - XtendiMax
 - FeXapan
- + All registered as Restricted Use Pesticides with EPA
- + Only certified applicators with training may purchase and apply
- + MDA issued a 24c Special Local Need label with state-specific requirements

Use Rate & Application Window

Tank Mixtures & Handling

Equipment & Sprayer Settings

Proper Cleaning & Hygiene

Buffer Zones & Sensitive

Weather Conditions & Timing

Record Keeping & Notice



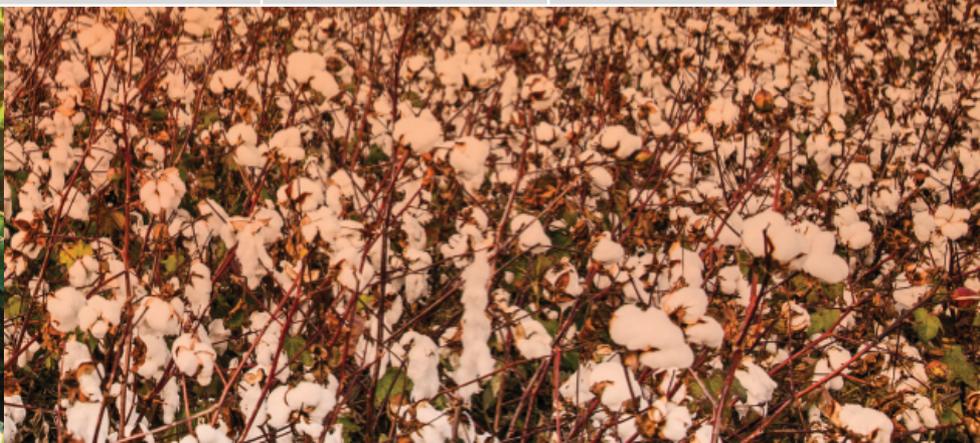
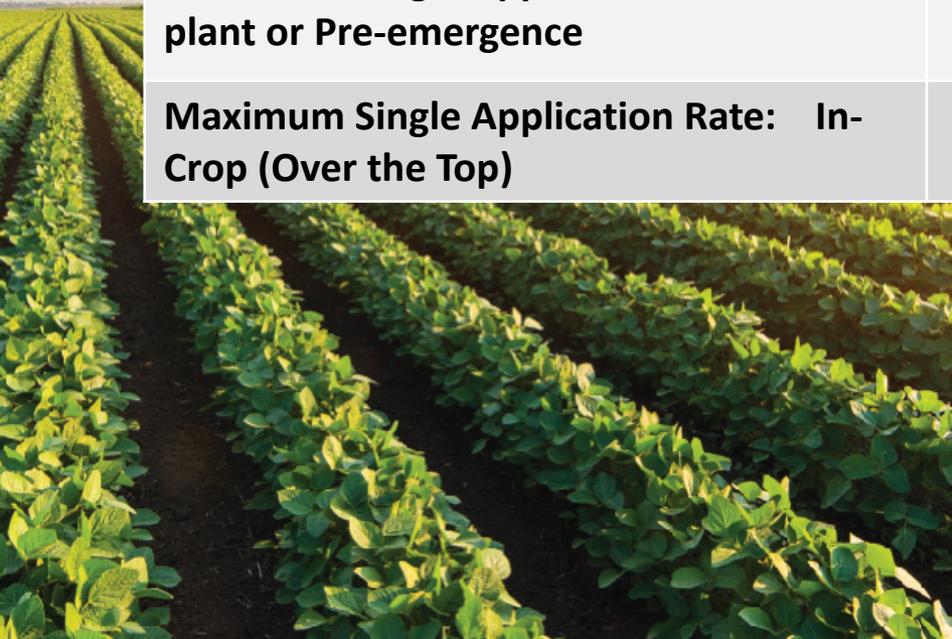


Use Rate & Application Window

Application Rate Guidelines

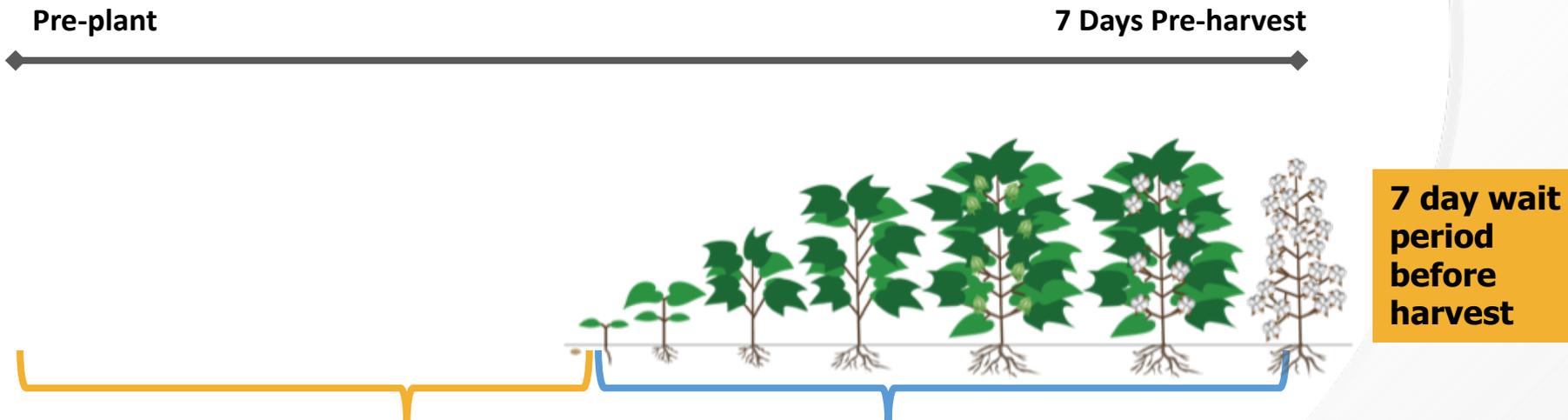
Minimum and Maximum Single Application Rates

Application Type	Engenia	FeXapan	XtendiMax
Minimum Single Application Rate: Anytime	12.8 oz/A	22 oz/A	22 oz/A
Maximum Single Application Rate: Pre-plant or Pre-emergence	12.8 oz/A	44 oz/A	44 oz/A
Maximum Single Application Rate: In-Crop (Over the Top)	12.8 oz/A	22 oz/A	22 oz/A



Application Rate Guidelines

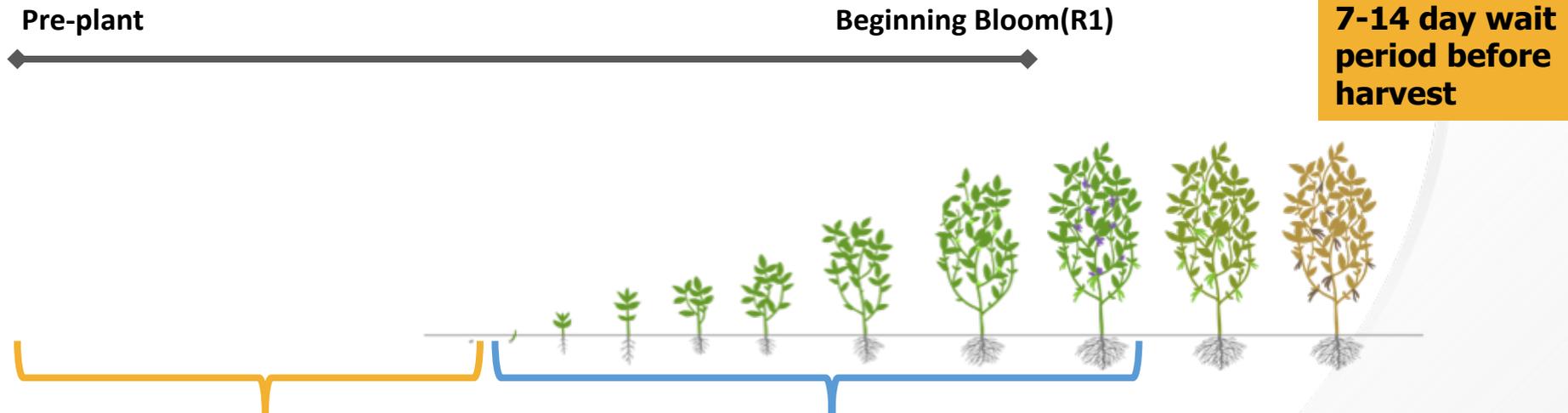
Application Timing and Maximum Rates with Dicamba-Tolerant Cotton



	Total All Pre-plant and Pre-emergence Applications	Total All Post-emergence Applications	Total All Applications Per Season Combined
Engenia	25.6 oz/A	51.2 oz/A	51.2 oz/A
FeXapan	44 oz/A	88 oz/A	88 oz/A
XtendiMax	44 oz/A	88 oz/A	88 oz/A

Application Rate Guidelines

Application Timing and Maximum Rates with Dicamba-Tolerant Soybean



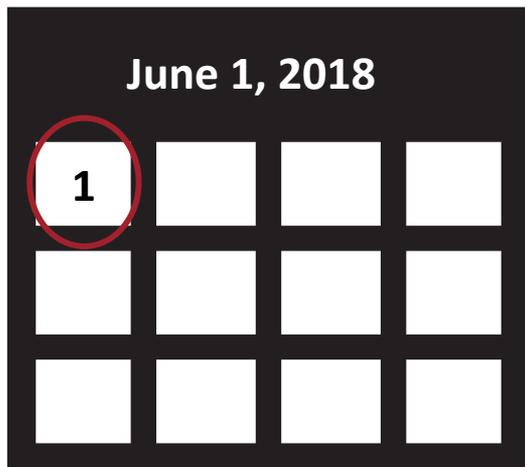
	Total All Pre-plant and Pre-emergence Applications	Total All Post-emergence Applications	Total All Applications Per Season Combined
Engenia™	25.6 oz/A	25.6 oz/A	51.2 oz/A
FeXapan™	44 oz/A	44 oz/A	88 oz/A
XtendiMax®	44 oz/A	44 oz/A	88 oz/A

Cutoff Dates

Missouri-Specific Application Window Restrictions

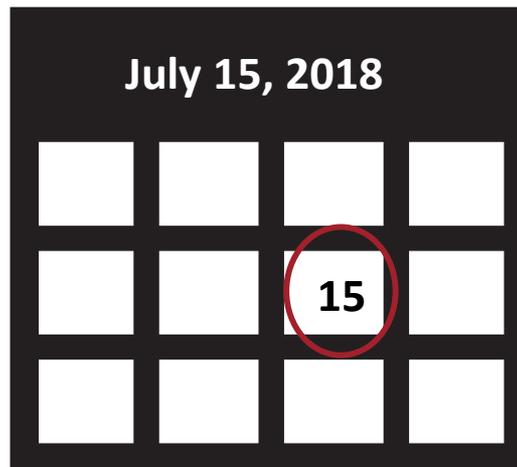


Application of Engenia, XtendiMax, and FeXapan is prohibited after:



**Southeast
Missouri Counties**

*Dunklin, Pemiscot, New Madrid,
Stoddard, Scott, Mississippi, Butler,
Ripley, Bollinger and Cape Girardeau*



**All Remaining
Missouri Counties**



Tank Mixtures & Handling

Tank Mixtures

Do's and Don't's with Tank Mixing



DO!

- ✦ Refer to the product website for approved tank mix partners

Engenia | www.EngeniaTankMix.com

XtendiMax | xtendimaxapplicationrequirements.com

FeXapan | www.fexapanapplicationrequirements.dupont.com

- ✦ Only use products registered for use in Missouri
- ✦ Use approved drift reduction agents (DRAs), if required
- ✦ Ensure system is properly cleaned before mixing
- ✦ Follow the tank mix order and check compatibility



DON'T!

- ✦ Use ammonium salts (e.g., AMS, UAN)
- ✦ Use acidifying water conditioners

Best Practice for Handling and Mixing

Limit Points of Potential Contamination When Mixing Products

Mix product directly in
the sprayer



Product applied directly on the
field



If there is no “upstream” product handling, then the sprayer is the sole source of contamination!



Equipment & Sprayer Settings

Equipment Requirement

Only Use Ground Sprayers At Approved Sprayer Speeds



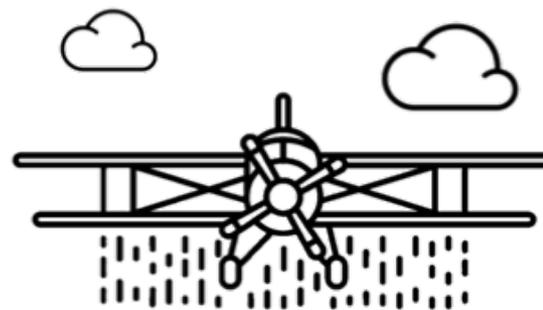
DO!



≤ 15 mph



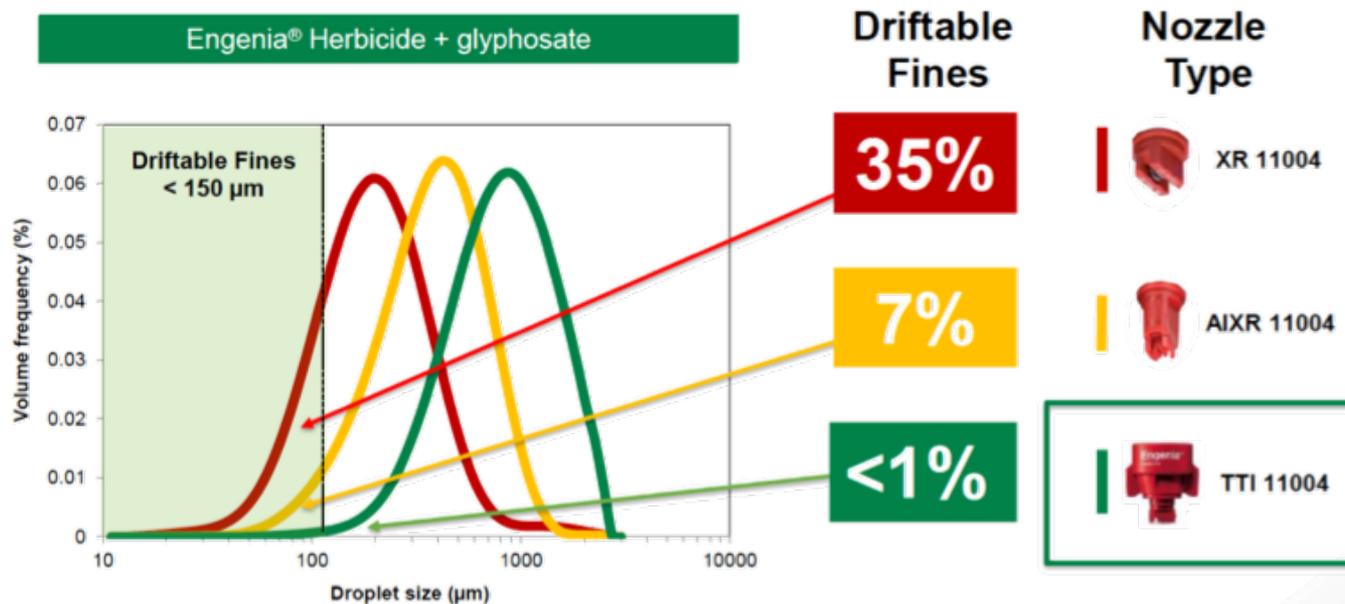
DON'T!



Aerial application

Nozzle Type & Pressure Requirement

Ensures Droplets That Are Less Prone to Drift



Nozzles & Pressure

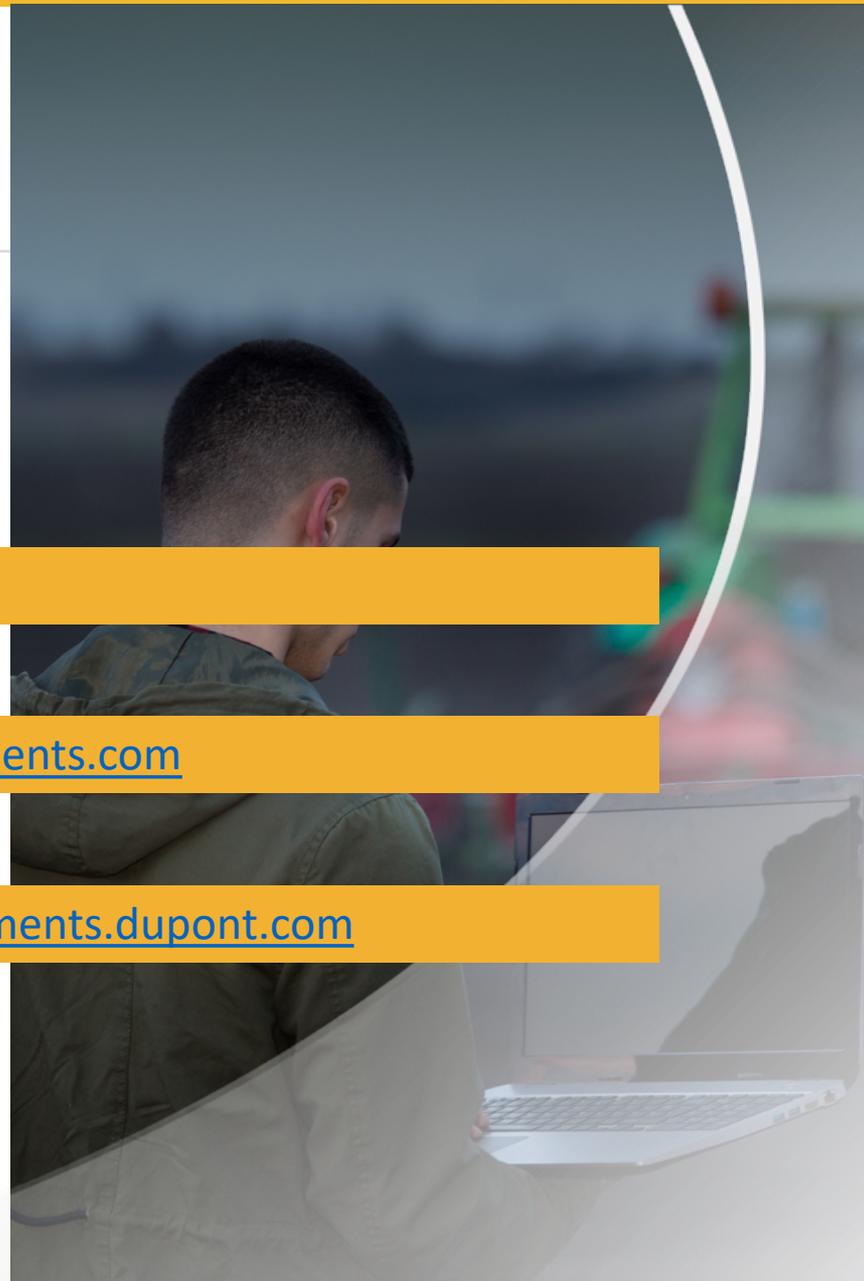
Use Approved Nozzles At Approved Pressure

Check with manufacturers on the approved nozzles and proper pressure type at these websites

Engenia | www.EngeniaTankMix.com

XtendiMax | xtendimaxapplicationrequirements.com

FeXapan | www.fexapanapplicationrequirements.dupont.com



Boom Height Requirement

Ensures Consistent Nozzle Performance



DO!



$\leq 24''$
boom height

**Decreased Drift
Potential**



DON'T!



$> 24''$
boom height

**Increased Drift
Potential**

Spray Volume Requirement

Minimum Spray Volume Per Acre

Engenia	FeXapan	XtendiMax
≥ 10 GPA <i>15-20 GPA recommended</i>	≥ 15 GPA	≥ 15 GPA





Proper Cleaning & System Hygiene

Required Cleaning & System Hygiene

Being Mindful of System Hygiene Prevents Contamination



✦ Clean the tank **before** application and triple-rinse **after** each application

DO!

✦ Use a strong cleaning solution as the second step

- Commercial detergent
- Spray cleaner

✦ Ensure the following are thoroughly cleaned

- Pumps
- Hoses
- Tanks
- Other mixing and loading equipment

✦ Consider having a dedicated system for all equipment



Best Practices to Avoid Contamination

Identify and Clean Potential Points of "Upstream" Contamination

✦ Potential points of "upstream" contamination

- Storage tanks/shuttles
- Hoses and pumps at the shed and in the field
 - Especially unlined EPDM hoses
- Mixing and loading equipment
- Nurse trucks

Remember! Anything the formulated product and/or spray solution touches prior to the sprayer can be a source of contamination and must be cleaned.



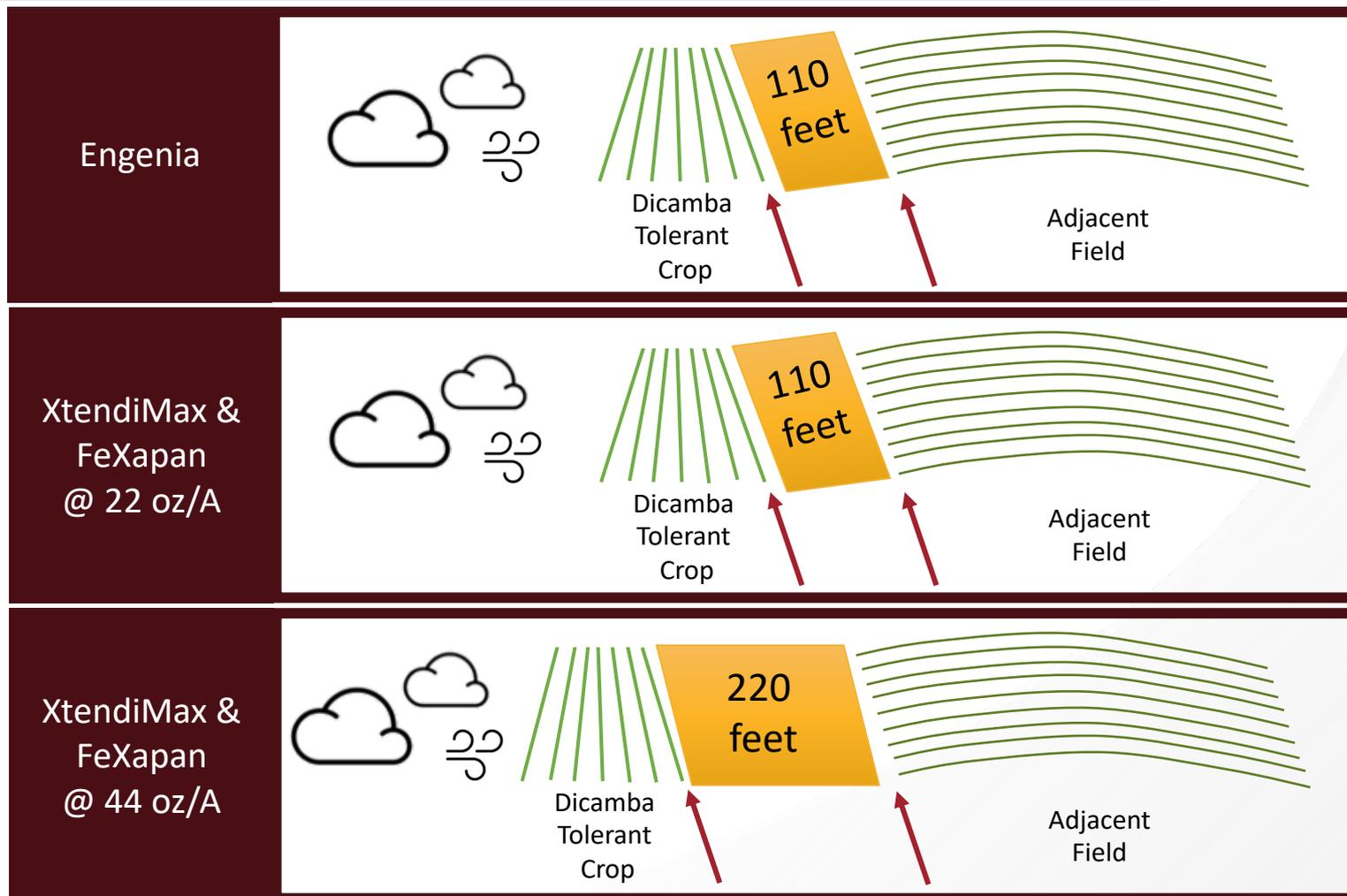


Buffer Zone & Sensitive Species



Buffer Zones

Respect the Required Buffers at Different Rates



Calculating Buffer Zones

Include These Areas in Your Buffer Zone Calculations

The following areas can be included as part of the buffer zone:

- ✦ Agricultural fields prepared for planting
- ✦ Fields planted to dicamba tolerant soybeans or cotton
- ✦ Fields planted to corn, sorghum, proso millet small grains and sugarcane
- ✦ Roads, paved or gravel surfaces
- ✦ Areas covered by the footprint of a building, shade house, silo, feed crib, or other man made structure with walls and/or roof



Sensitive vs. Non-Sensitive Areas

Survey the Application Site to Identify Potential Sensitive Areas Before Spraying

	Type	Examples	Spray Guidelines
Sensitive Areas	Sensitive Crops	Non-DT soybeans and cotton Alfalfa Sunflowers Fruiting vegetables (e.g., tomatoes) Tobacco Cucurbits Grapes Tree fruit Residential areas	DO NOT spray if any wind is blowing toward neighboring fields/areas
	Threatened and Endangered Species	Native vegetation Woodland Bodies of water	Only spray with required downwind buffer* (110' or 220') and 3-10 MPH wind
Non-Sensitive Areas		Corn, sorghum, wheat DT soybean and cotton Unplanted ag fields	No downwind buffer needed as long as there is a 3-10 MPH wind



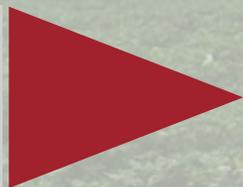
Know your surroundings before making a dicamba application.

**FeXapan and XtendiMax @ 22 oz/A requires 110' buffer and @ 44 oz/A requires 220' buffer; Engenia @ 12.8 oz/A requires 110' buffer*

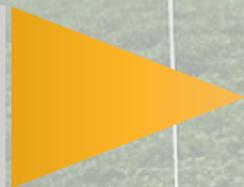
Best Practice: Communicate!

Improve Decision Making by Communicating with Neighbors

- ✦ Visit with neighbors regarding their cropping plans
- ✦ Use the flag the technology system to help communicate what is planted
- ✦ Consult sensitive crop registries for location of specialty crops and other sensitive sites
- ✦ Record areas of potential buffer zones around all edges of the fields



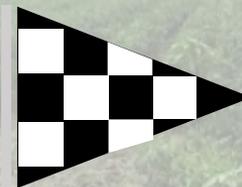
Conventional
Crop: Use
extreme caution



Clearfield
Rice & STS
Soybean traits;
ALS tolerant



Roundup Ready
trait;
glyphosate
tolerant



Xtend trait;
dicamba,
glyphosate
tolerant



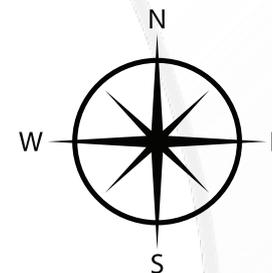
Enlist trait;
2,4-D, glufosinate,
and glyphosate
tolerant



Liberty Link
trait;
glufosinate
tolerant

Buffer Zone Examples

Spray or Not?



Today's Conditions

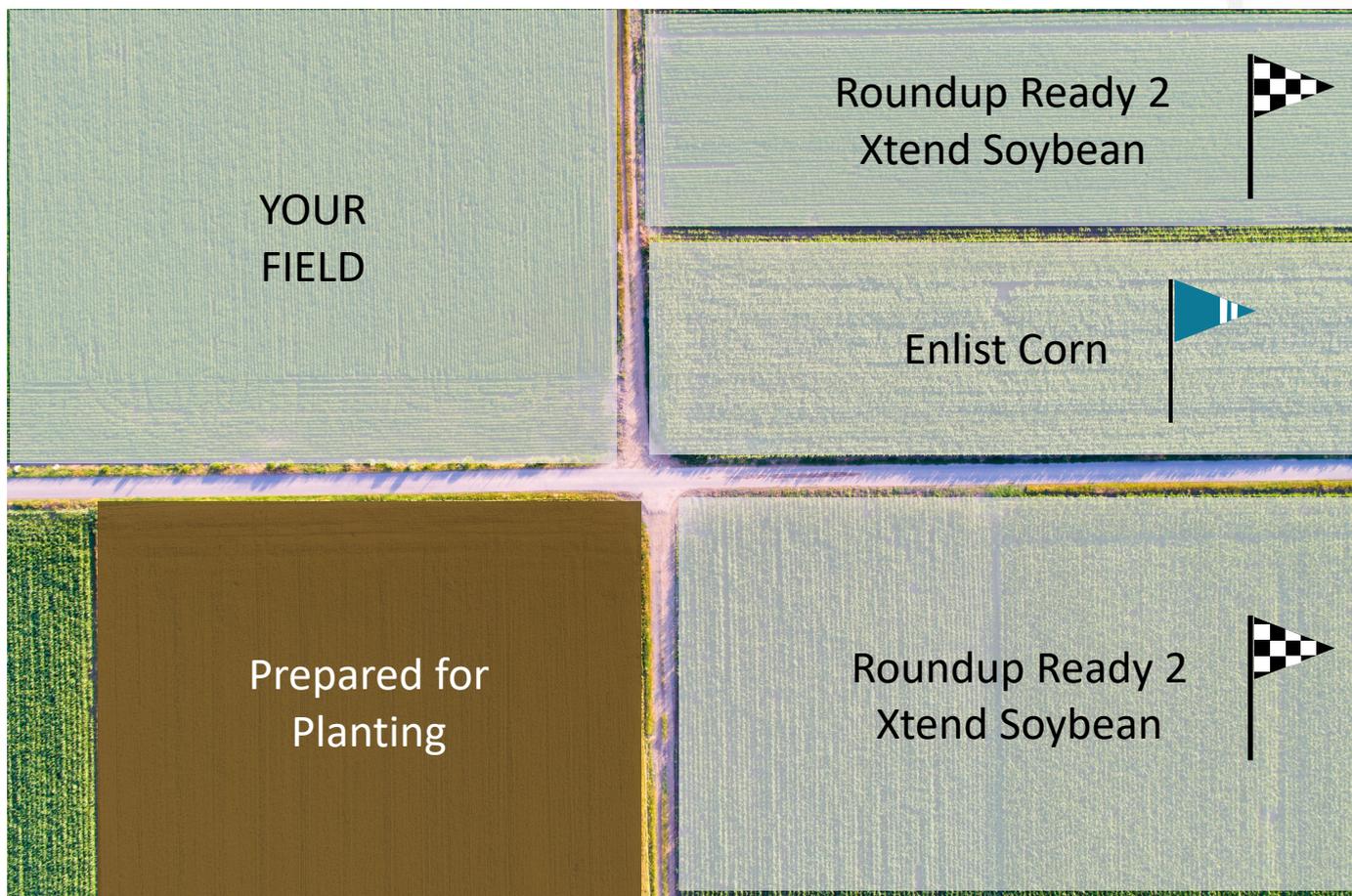
Wind from West

3 to 10 MPH

110' downwind
buffer (e.g.,
road)

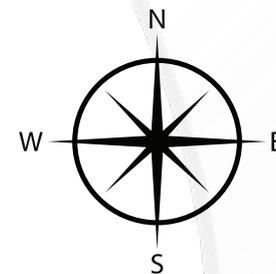


Spray!



Buffer Zone Examples

Spray or Not?



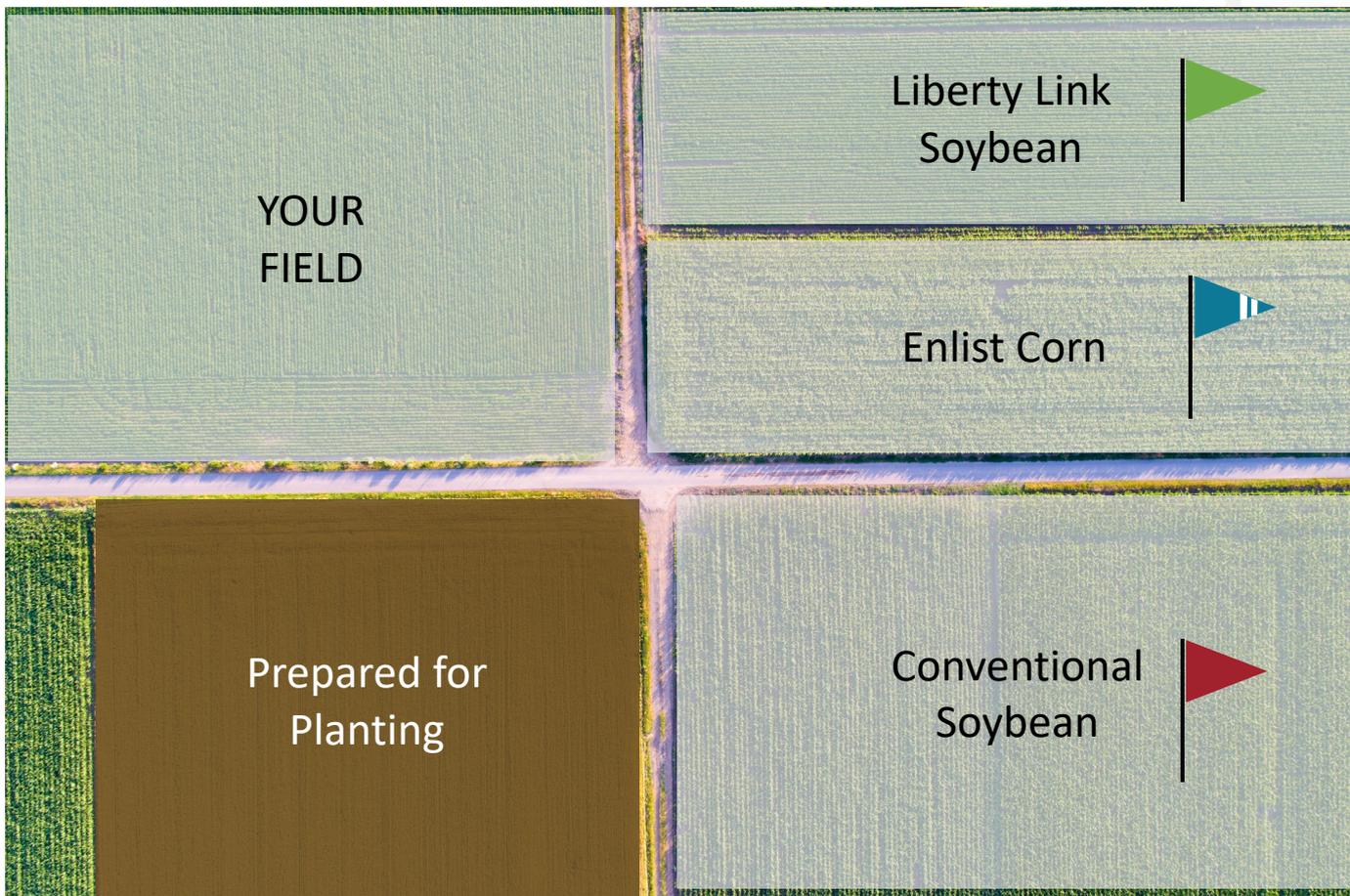
Today's Conditions

Wind from NW ↘

3 to 10 MPH

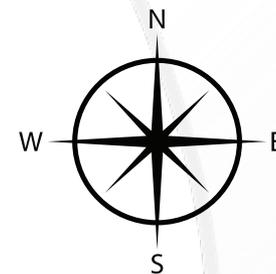
90' downwind
buffer (e.g.,
road)

 **DON'T
SPRAY!**



Buffer Zone Examples

Spray or Not?

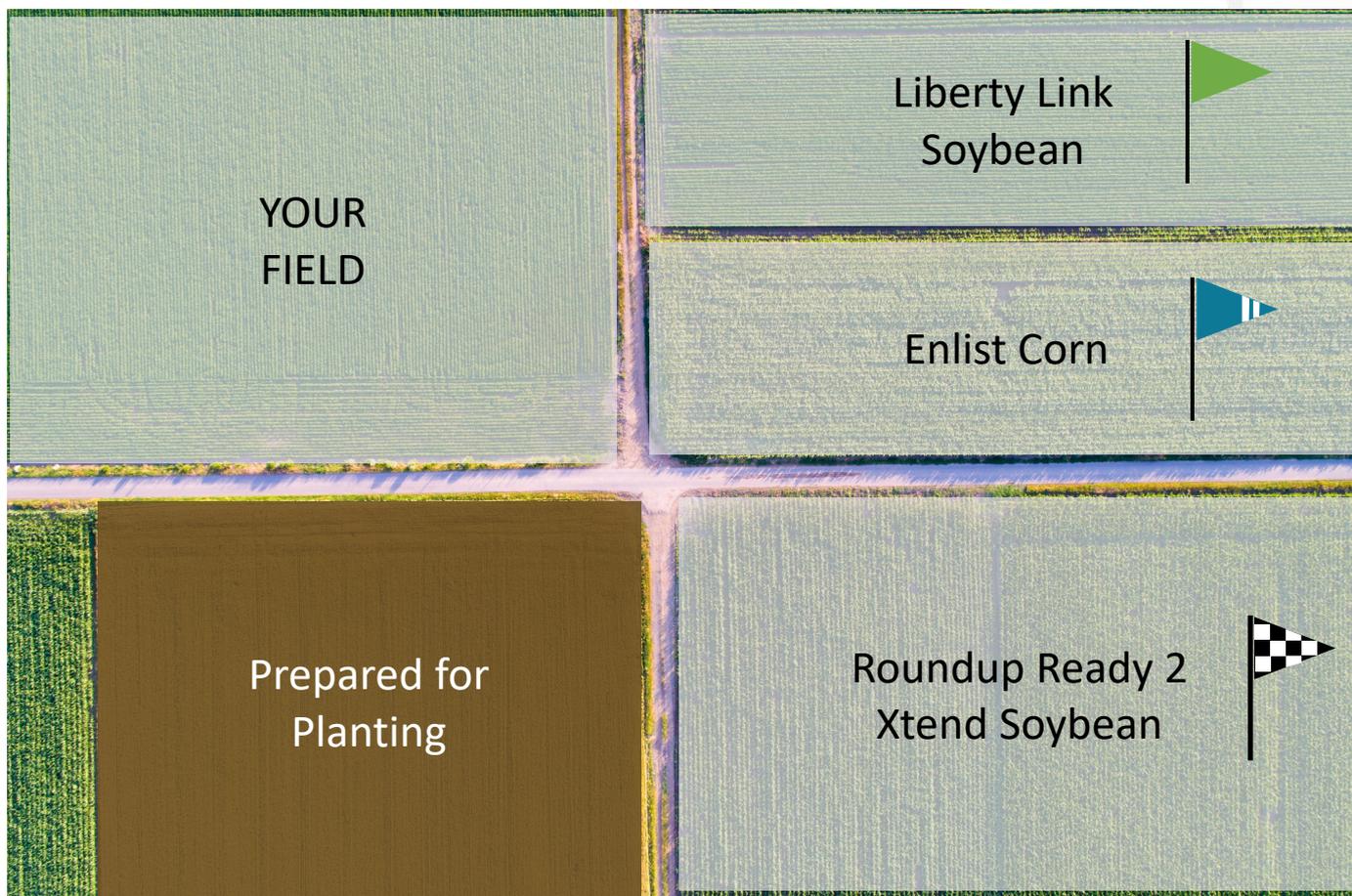


Today's Conditions

Wind from West

3 to 10 MPH

90' downwind
buffer (e.g.,
road)



**DON'T
SPRAY!**



Weather Conditions & Time of Day

Weather Conditions

Follow Weather Guidelines to Ensure Conditions are Conducive for Application



Wind Speed

- ✦ >3 mph and <10 mph
- ✦ Must be recorded at boom height at the start and end of application



Precipitation

- ✦ cannot be applied if rain is expected in the next 24 hours



Temperature & Humidity

- ✦ Temperature must be recorded at the beginning and end of application
- ✦ No temperature inversions

Time of Day Requirement

Missouri-Specific Application Window Restrictions



7:30 a.m.

Spray

5:30 p.m.



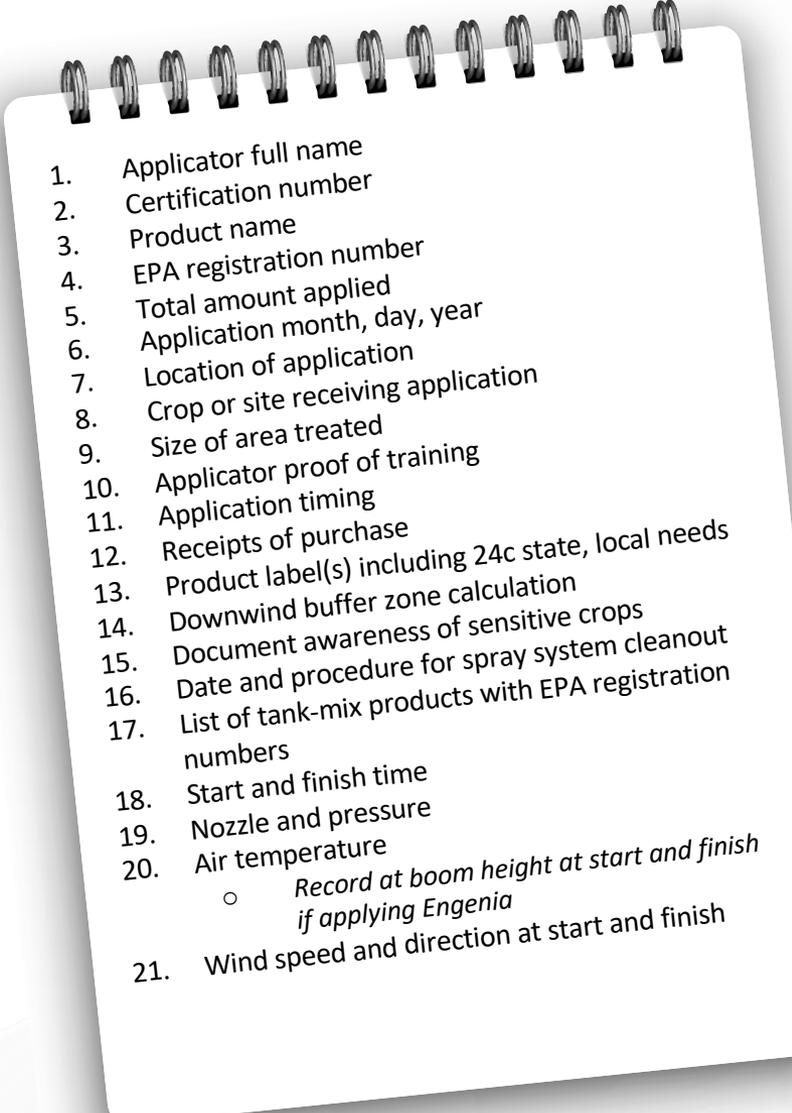


Record Keeping & Notice of Application

Record Keeping Requirements

Keep Good Records of Spray Applications

- :- Make daily entries to spray logs.
- :- Be sure to record environmental conditions.
- :- Reduces mistakes.
- :- Protects you from legal action.

- 
1. Applicator full name
 2. Certification number
 3. Product name
 4. EPA registration number
 5. Total amount applied
 6. Application month, day, year
 7. Location of application
 8. Crop or site receiving application
 9. Size of area treated
 10. Applicator proof of training
 11. Application timing
 12. Receipts of purchase
 13. Product label(s) including 24c state, local needs
 14. Downwind buffer zone calculation
 15. Document awareness of sensitive crops
 16. Date and procedure for spray system cleanout
 17. List of tank-mix products with EPA registration numbers
 18. Start and finish time
 19. Nozzle and pressure
 20. Air temperature
 - o Record at boom height at start and finish if applying Engenia
 21. Wind speed and direction at start and finish

Notice of Application Requirement

Missouri-Specific Requirement: File a Notice of Application



Notice of Application | <http://agriculture.mo.gov/plants/pesticides/dicamba-notice.php>

MISSOURI Dept. of Agriculture

MO.gov Gov. Eric Greitens Find an Agency Online Services Search

Follow Us Like Us Get updates

Ag Business Animals & Livestock Grains Plants & Pests Weights & Measures Consumers

Pesticide Control

Home » plants » pesticides » dicamba-notice

DICAMBA NOTICE OF APPLICATION

Submit this form once each day a Dicamba application is made.

Applicator's Name (first & last): *

Certified Applicator License #: *

Dicamba Product Trade Name: *

EPA Registration Number:

SUBMIT

Plants & Pests

- Plants & Pests
- Feed
- Integrated Pest Management
 - Noxious Weeds
- Nurseries & Greenhouses
- Pesticide Control
 - Certification & Licensing
 - Database Searches
 - Endangered Species
 - Enforcement & Inspections
 - Registering Pesticides
 - Worker Protection
- Plant Pest
- Seed
- Treated Timber

Review & Application

Module Essentials

- + Follow the label
- + Use best management practices for application
- + Ultimately, the applicator is responsible for proper application and use
- + For the most up-to-date information visit the Missouri Department of Agriculture's Website

Use Rate & Application Window

Tank Mixtures & Handling

Equipment & Sprayer Settings

Proper Cleaning & Hygiene

Buffer Zones & Sensitive

Weather Conditions & Timing

Record Keeping & Notice

Dicamba Facts

<http://agriculture.mo.gov/plants/pesticides/dicamba-facts.php>

Helpful Tool:
Reference
Guide



SYNTHETIC AUXIN HERBICIDE

APPLICATOR TRAINING PROGRAM

Preventing Off-Target Movement with Dicamba

Module 3

In this module:

- ✦ List specific label requirements for approved products
- ✦ Describe best management practices (BMPs) for application
- ✦ Understand your responsibility as the applicator

Acknowledgements

Module Authors

Dr. Kevin Bradley

Dr. Mandy Bish

Division of Plant Sciences

University of Missouri-Columbia



Other Contributors

Dr. Stanley Culpepper, University of Georgia

Dr. Greg Kruger, University of Nebraska

Dr. Larry Steckel, University of Tennessee

Missouri Department of Agriculture

BASF Company

Monsanto Company

Sources

Engenia Herbicide U.S. EPA Section 3 Label (EPA Registration Number 7969-345)

Engenia Herbicide Missouri Department of Agriculture 24c Special Local Need Label

FeXapan Herbicide U.S. EPA Section 3 Label (EPA Registration Number 352-913)

FeXapan Herbicide Missouri Department of Agriculture 24c Special Local Need Label

XtendiMax Herbicide U.S. EPA Section 3 Label (EPA Registration Number 524-617)

XtendiMax Herbicide Missouri Department of Agriculture 24c Special Local Need Label