Weed Control in Grain Sorghum – 2026

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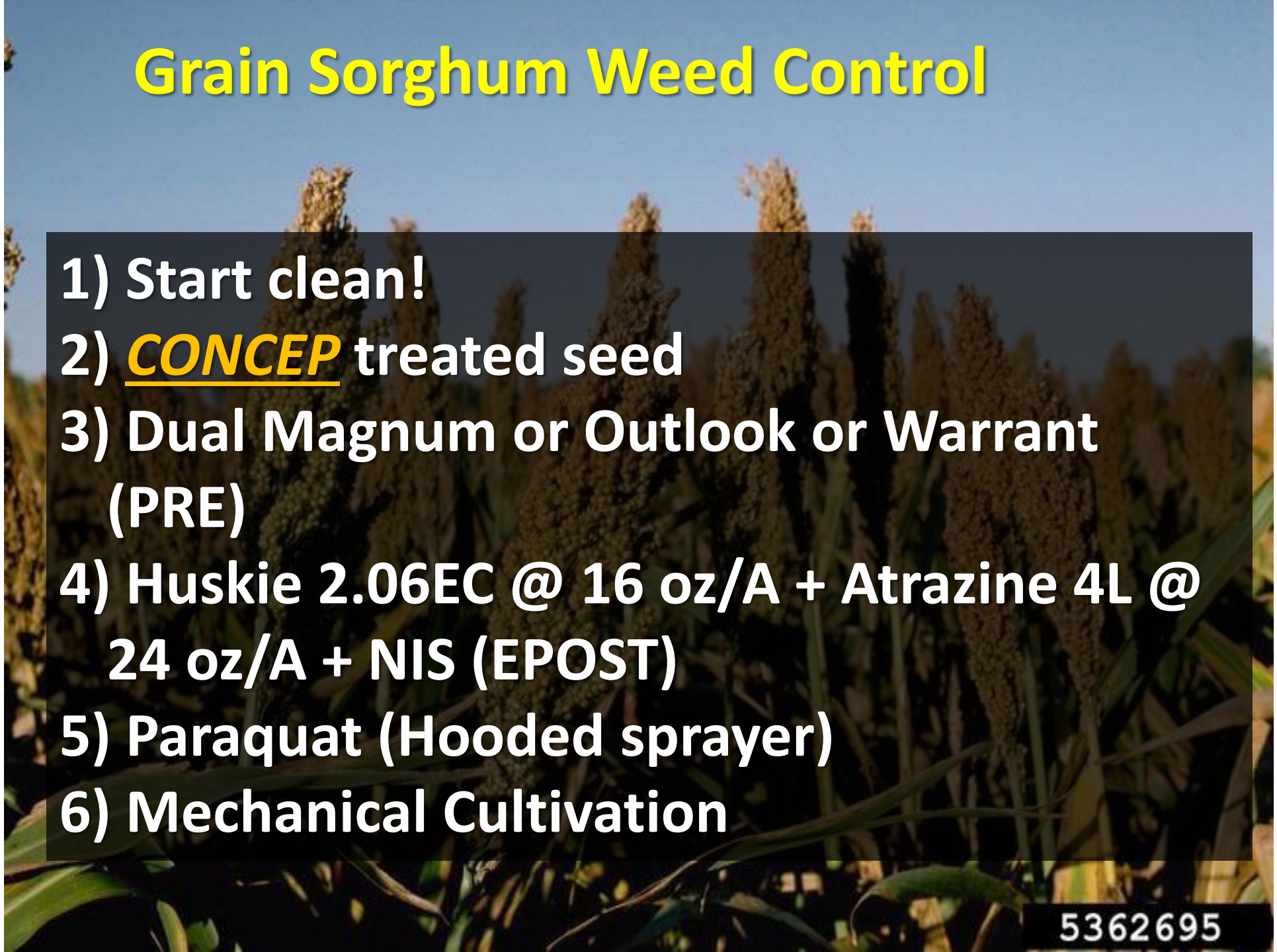
College of Agricultural & Environmental Sciences

Grain Sorghum Weed Control

1) Start clean!
2) ***CONCEP*** treated seed
3) Dual Magnum or Outlook or Warrant (PRE)
4) Huskie 2.06EC @ 16 oz/A + Atrazine 4L @ 24 oz/A + NIS (EPOST)
5) Paraquat (Hooded sprayer)
6) Mechanical Cultivation



Huskie Formulation Test – 2025

(AMAPA: 1-7” tall; 3.7” average, 50% plants > average)

NTC

Huskie 2.06EC @ 14 oz/A
Aatrex 4L @ 16 oz/A
Induce @ 0.25% v/v

GS-01-25
August 26
7 DAT

Huskie Injury on Sorghum

New Grain Sorghum Weed Control Technologies (Non-GMO)

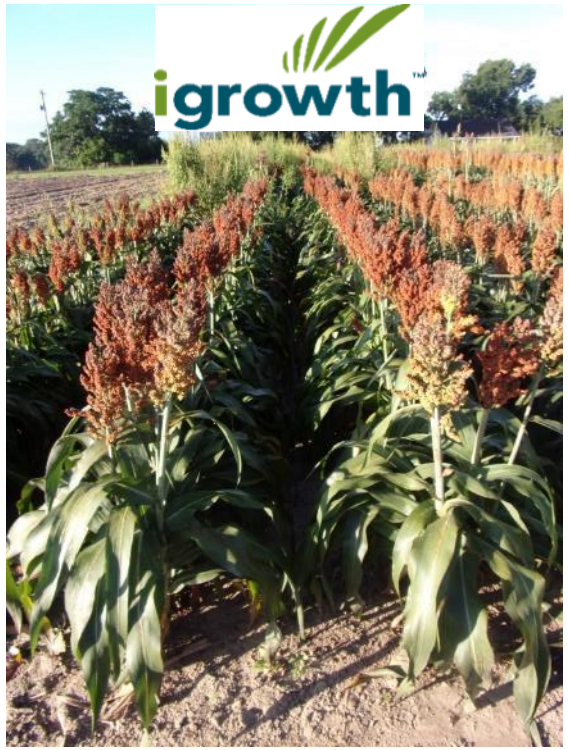
- **Igrowth®**
  - Alta/UPL
  - ***ImiFlex*** (imazamox)
    - PRE/POST

- **DoubleTeam™**
  - S&W/Sorghum Partners/ADAMA
  - ***FirstAct*** (quizalofop)
    - POST

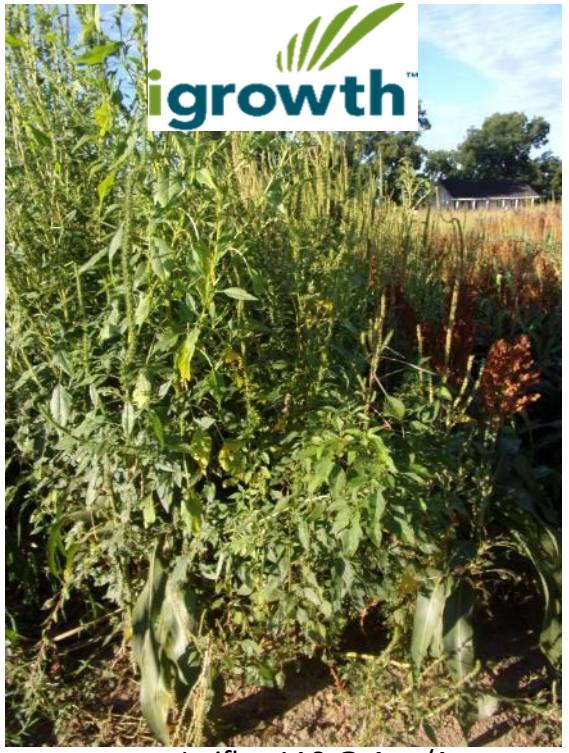
- **Inzen™**
  - Pioneer/Corteva
  - ***Zest*** (nicosulfuron)
    - POST

Grain Sorghum Weed Control – 2022
I-Growth

NTC



Mocassin II Plus 7.64EC @ 21 oz/A (PRE)
fb
Imiflex 1AS @ 6 oz/A
Agridex @ 1% v/v
POST (V7, 9-10” tall, 22 DAP)



Imiflex 1AS @ 4 oz/A
Agridex @ 1% v/v
EPOST (V3, 4” tall, 14 DAP)

GS-01-22
August 1
69 DAT (POST)/77 DAT (EPOST)

Igrowth Grain Sorghum Hybrids

Characteristics	ADV G2168IG	ADV G2193IG	ADV G1120IG
Technology	igrowth-Aphix	igrowth-Aphix	igrowth
Relative Maturity	Medium-Early	Medium	Medium-Early
Grain Color	Red	Red	Red
Plant Height	38-44	40-48	45-55
SCA tolerance	Yes	Yes	No
Head excersion	Good	Good	Good
Head type	Semi-compact	Semi-open	Semi-compact
Root Lodging	Good	Good	Good
Drought Tolerance	Good	Good	Very Good
Threshability	Very Good	Very Good	Very Good

Alta seeds by ADVANTA

DoubleTeam Sorghum - 2022

NTC

Parallel Plus 5.5F @ 72 oz/A
PRE
FirstAct 0.88EC @ 10 oz/A
Agridex @ 1% v/v
POST (22 DAP)

GS-01-22
August 1
69 DAT (POST)

DoubleTeam™ System – First Act Off-Types

GS-02-21
June 23
9 DAT

DoubleTeam Sorghum Hybrids

DOUBLE TEAM	Relative Maturity	Days to 50% Bloom	Height	Head Exertion	Head Type	Grain Color	Seeds Per Pound	Emergence	Yield for Maturity	Yield Stability	Standability	Drought Tolerance	Threshability	SCA Tolerance *
SP 30A30 DT®	Early	55-59	Medium	5-7"	Semi-Open	Bronze	13,200	1	1	2	3	3	3	9
SP 45A45 DT®	Medium Early	57-61	Medium	2-5"	Semi-Open	Bronze	12,500	1	1	2	2	3	3	9
SP 58M85 DT®	Medium	62-66	Medium	5-7"	Semi-Compact	Bronze	14,000	1	2	2	2	2	3	5
SP 65B21 DT®	Medium	65-67	Medium	4-6"	Semi-Open	Bronze	13,500	1	2	2	1	2	3	1

SORGHUM PARTNERS®
A BRAND OF S&W SEED COMPANY

Numeric
1 = excellent
5 = average
9 = poor

SCA
1 = high tolerance
5 = moderate tolerance
9 = susceptible

Inzen Grain Sorghum - 2022

NTC

Everprex 7.62EC @ 16 oz/A **(PRE)** fb
Zest 75DG @ 0.67 oz/A +
Aatrex 4L @ 48 oz/A + Agridex @ 1% v/v
(POST)

GS-01-22
August 1
69 DAT (POST)

Strongarm and Sorghum?

Strongarm 84WG Applied 1 DAP
0.90 oz/A (2X rate)

Specimen Label

CORTEVA agriscience

Strongarm®

HERBICIDE

™SM Trademarks of Corteva Agriscience and its affiliated companies

For broadleaf weed control in peanuts

Active Ingredient:
diclosulam: N-(2,6-dichlorophenyl)-5-ethoxy-7-fluoro[1,2,4]triazolo-[1,5-c]pyrimidine-2-sulfonamide 84%
Other Ingredients 16%
Total 100%

Contains 0.84 lb of active ingredient per pound of product

Keep Out of Reach of Children

CAUTION

First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Precautionary Statements

Hazards to Humans and Domestic Animals

EPA Reg. No. 62719-288

Causes Moderate Eye Irritation • Harmful If Absorbed Through Skin • Avoid contact with eyes, skin, or clothing.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:
- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:
- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change clothing.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water by cleaning of equipment or when disposing of equipment washwaters.

This chemical and its transformation products demonstrate the properties and characteristics associated with chemicals detected in ground water. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination.

This chemical can contaminate surface water through spray drift.

Under some conditions, this chemical, and/or its transformation products, may have a high potential for runoff into surface water (primarily via dissolution in runoff water), for several weeks post-application. Vulnerable conditions include poorly draining or wet soils with readily visible slopes toward adjacent surface waters, frequently flooded areas, areas over-laying extremely shallow ground water, areas with in-field canals or ditches that drain to surface water, areas not separated from adjacent surface waters with vegetated filter strips, and areas over-laying tile drainage systems that drain to surface water.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours. **Exception:** If the product is soil-injected or soil incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:
- Coveralls
- Waterproof gloves
- Shoes plus socks

Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal.
Pesticide Storage: Store in original container only. In case of leak or spill, contain material with absorbent materials and dispose as waste.
Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Nonrefillable rigid containers 5 gallons or less:
Container Handling: Nonrefillable container. Do not reuse or refill this container.
Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Nonrefillable nonrigid containers:
Container Handling: Nonrefillable container. Do not reuse or refill this container. Completely empty bag into application equipment. Then offer for recycling if available, or dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Crop Rotation Intervals

Numbers in parentheses (-) refer to Specific Crop Rotation Information.

Crop	Rotation Interval[1] (Months)
soybeans, peanuts	no restriction
wheat, barley	4
oats, rye	6
snap beans	9
Cotton[2,5]	10[5]
Corn[3], rice, tobacco, sorghum	18
sugar beets, sunflowers and other crops not listed	30[4]

Specific Crop Rotation Information:

[1]Minimum number of months that must pass before planting other crops after application of Strongarm at up to 0.45 oz per acre in peanuts.
[2]Strongarm applied at greater than 0.45 oz per acre, as may occur with boom overlap or at field ends where spray equipment has slowed, may cause injury to rotational cotton the following season. Soils with a shallow hardpan (less than 10 inches) and/or loam soils may be more prone to carryover. Additionally, cotton grown under early season stress resulting from conditions such as excessively cool, wet, dry or crusted soils, may be particularly susceptible to rotational injury.
[3]The crop rotation interval for corn hybrids identified as "IR" is 10 months.
[4]Rotation to sugar beets, sunflowers, and all other crops not listed requires a 30-month rotation interval and a successful field bioassay.
[5]In North Carolina, the crop rotation interval for cotton is 18 months in the counties of Camden, Currituck, Pasquotank and Perquimans. In all other counties in North Carolina, the crop rotation interval for cotton is 10 months.

Grain Sorghum Response to Strongarm 84WG Applied 1 DAP

NTC

0.90 oz/A

0.45 oz/A

0.225 oz/A

0.1125 oz/A

0.05625 oz/A

0.02813 oz/A

4 (1/2 lives)
~152 days
5 months

SG-02-25
October 22
65 DAP

1X = 0.45 oz/A

2026 Soybean Weed Control Update

Eric P. Prostko
Professor and Extension Weed Specialist
Dept. Crop & Soil Sciences

UNIVERSITY OF GEORGIA
College of Agricultural & Environmental Sciences

Dicamba Update (2024)

- ***02/06/24:*** District of Arizona Court vacated 3 dicamba labels (Engenia, Tavium, Xtendimax) for entire country
  - *Procedural errors [hearing (notice and comments) mandates for all stakeholders]*

- ***02/14/24:*** US EPA Existing Stocks Order
  - Existing stocks: stocks of previously registered pesticide products that are currently in the US and were packaged, labeled, and released for shipment prior to ***02/06/24***.
  - Soybean: sale & distribution until ***05/31/24***; use until ***06/30/24***.
  - Cotton: sale & distribution until ***06/30/24***; use until ***07/30/24.***

Dicamba Update (2025)

EPA Proposed Label Changes (07/23/25)

- A single use maximum application rate of 0.5 lb. acid equivalent (ae) dicamba/A.
- No more than two applications allowed with a maximum annual application of 1 lb. ae dicamba/A from all combined dicamba-containing products.
- Prohibition of aerial applications.
- Maintaining a 240-ft downwind buffer.
- The spray solution must include an approved drift reduction agent (DRA) and pH buffering volatility reduction (VRA) agent added to the tank in higher percentages as temperatures increase.

Dicamba Update (2025)

EPA Proposed Label Changes (07/23/25)

- Temperature-dependent application restrictions to manage volatility. Users have flexibility to implement temperature-dependent restrictions by reducing the percent of field treated, including by using precision agriculture techniques, or prohibiting certain tank mixes at higher temperatures.
- No applications at temperatures above 95^0F for day of application + 1 day.
- ***Three points*** of mitigation required based on the runoff/erosion mitigation menu.
- Users must access and follow any applicable endangered species bulletin from "Bulletins Live! Two" web-based system. ***Six points*** of runoff/erosion mitigation will be required in some pesticide use limitation areas where pesticide exposures are likely to impact the continued existence of a listed species, which may include a reduction in survival or recovery of the species.
- Applicators are required to wear baseline attire (i.e., long-sleeve shirt, long pants and shoes plus socks) along with personal protective equipment including chemical-resistant gloves when handling these products. A NIOSH-approved dust/mist filtering respirator with any R, P, or HE filter is also required for all handlers of the BAPMA-salt-formulated product (Engenia®). There is a restricted entry interval of 24 hours. Use is restricted to a limited number of approved states by certified applicators only. Applicators are required to complete additional dicamba-specific annual training and maintain records of all applications.

Proposed Dicamba/VRA/240’ buffer?

Table 8. Proposed options for application of OTT dicamba products at varying temperatures.

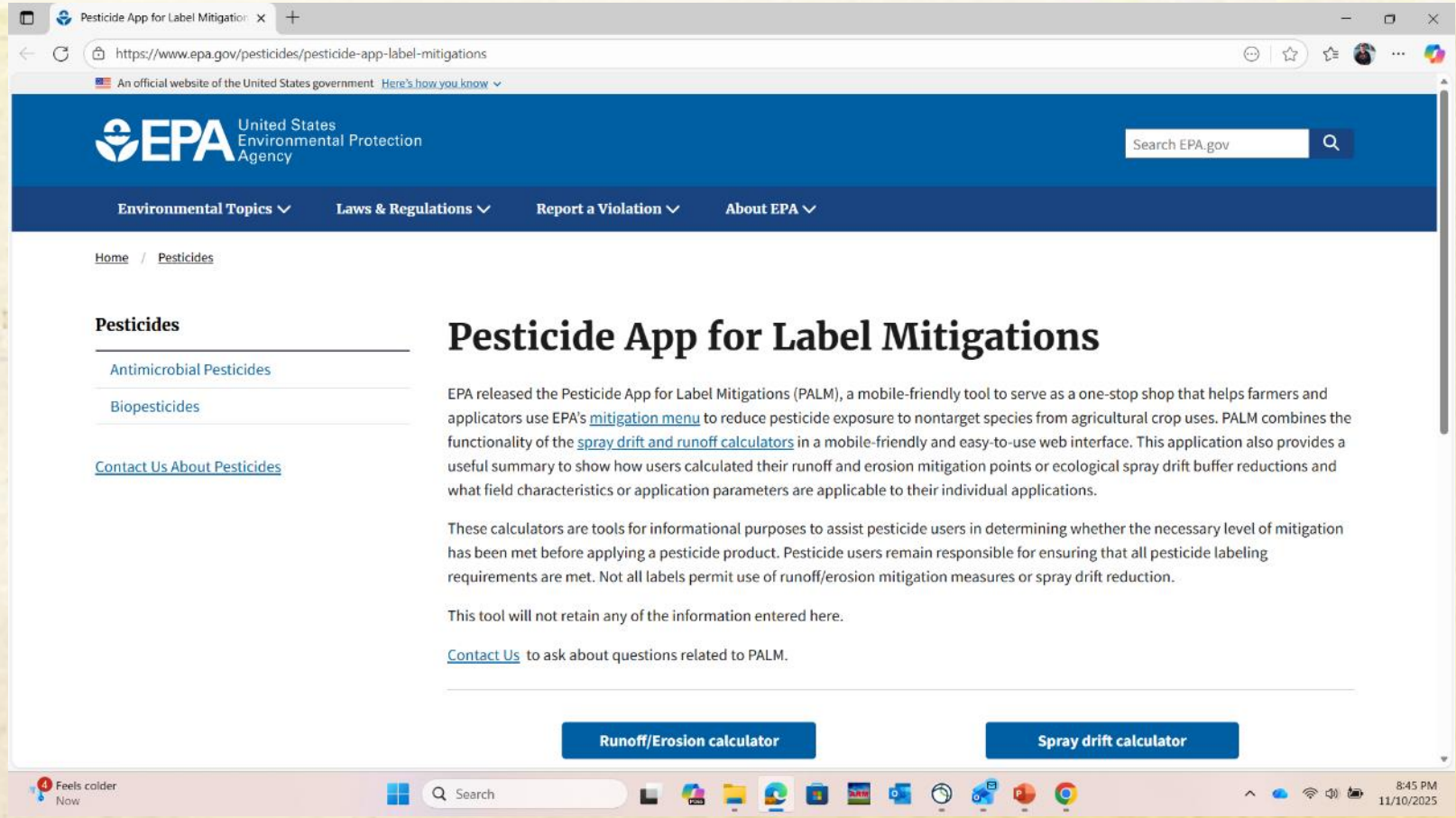
Air Temperature*	Rates of OTT dicamba product + Required VRA**
< 75˚F	0.5 lb dicamba + 20 fl oz VRA
≥ 75˚F - < 85˚F	0.5 lb dicamba + 40 fl oz VRA
≥ 85˚F - < 95˚F	0.5 lb dicamba + 40 fl oz VRA) **PLUS** 40% reduction in area treated*** **OR** No tank mix partners****
≥ 95˚F	No application allowed

* Maximum temperature must be forecasted by NOAA/National Weather Service not to exceed what’s noted for both the day of application and the day after application.
** VRAs approved for use include VaporGrip Xtra Agent, Sentris, and Suralta.
*** Remaining untreated 40% of field may be treated the third day after initial treatment. Do not apply these products to the untreated part of the field the day of or the day following initial treatment.
**** A DRA and VRA are always required to be in the tank with the proposed OTT dicamba products.

Table 9. Options for Reducing 240 ft Downwind Buffer Distance

Option	Qualifying Practice	Reduction in Buffer Distance
Reduce number of passes (applies to upwind part of the treated field)	Field border application/1 pass (or 1/10 acre to 1 acre) or < 1.5 acre	75%
	2-4 Passes (or >1 acre to 4 acres)	35%
	5-10 Passes (or 4 acres to 10 acres)	15%
Downwind Drift Barrier	Basic windbreak/hedgerow/artificial screen	50%
	Advanced windbreak/hedgerow/artificial screen	75%
Use of directed sprayer equipment	Over-the-top Hooded Sprayer	50%
	Row-middle Hooded Sprayer	75%
	Sprays below crop canopy using drop nozzles or layby applications (difference between the crop height and release height is ≥ 1 ft, and that there are more than 4 consecutive rows of crop on the field that meet this parameter)	50%

ESA Drift/Runoff Mitigation



- https://www.epa.gov/pesticides/pesticide-app-label-mitigations

More Court Troubles?

- Center for Food Safety vs. EPA
- Originally filed 06/06/23
- Motion for summary judgement filed 08/21/25
  - *Federal Court of District of Columbia*

- Plaintiffs argue that EPA's 2022 registration of Enlist One® and Enlist Duo® violate FIFRA because EPA failed to fully analyze the environmental and human health costs posed by use of Enlist products.
- Plaintiffs argue that EPA overstated the benefits of using Enlist One® and Enlist Duo®
- Plaintiffs argue that the drift buffer and runoff mitigations fail to mitigate the adverse effects of Enlist One® and Enlist Duo®

Enlist One®
COLEX-D® technology
HERBICIDE

Enlist Duo®
COLEX-D® technology
HERBICIDE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

CENTER FOR FOOD SAFETY
celebrating 25 years

Soybean Weed Control Simplified

- Start clean
- Narrow rows (< 30”)
- ***PRE***
  - Metribuzin + Group 15 or Prowl
    - tolerant variety
  - Irrigation or rainfall
- ***POST + Residual (weeds <3” tall)***
  - Post = Reflex or Prefix or Warrant Ultra or Liberty or Zalo or Enlist One (2,4-D choline) or Enlist Duo (glyphosate + 2,4-D choline)
  - Residual = Anthem Flexx/Max or Dual or Warrant or Outlook or Zidua
    - *Check tank-mix sites first*

Soybean Row Spacing

SCIENCE FOR SUCCESS

FUNDED BY THE SOYBEAN CHECKOFF

The best soybean management practices by Extension researchers from across the United States

HOW TO PICK THE RIGHT SOYBEAN ROW SPACING

Take Away Points

- Soybean producers across the US use row spacing from 7 to 40 inches; row spacing decisions are often largely controlled by equipment availability and rotational complexity.
- In research studies, narrow rows (7-15 inches) outyield wider rows (≥30 inches) **69%** of the time, due to earlier canopy closure that enables more light interception to drive photosynthesis.
- Beyond yield advantages, faster canopy development with narrow rows also enhances soybean competitiveness with weeds.

National Recommendations

- **Mechanism behind narrow row yield advantages:** The primary driver of the yield advantage from narrow rows is more light interception, with more sunlight driving more photosynthesis and growth. Narrow row yield advantages are typically greater with later planting dates, earlier maturing varieties, and high temperatures, all of which reduce the time from VE (emergence) to R3 (initial pod set).
- **Data:** Soybeans in 15-inch or narrower rows usually yield more than soybeans in 30-inch rows, and seldom yield less. Yield advantages for narrow rows typically range from about 1 to 4 bu/A (Figure 1). Yield advantages from narrow rows are typically more pronounced in the South when soybeans are planted later in double crop situations (Figure 2).
- **High-yield environments:** Recent analyses across the US indicate that in high yielding situations, there may be less benefit from narrow rows. This lack of response to narrow rows is more likely when soybeans are planted at the optimal time, weeds are effectively managed, and soil moisture is not limiting.

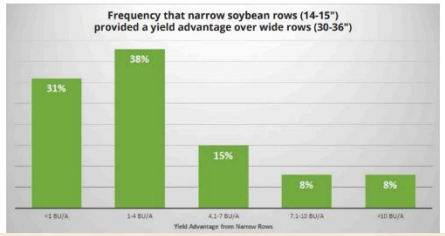


FIGURE 1. Frequency of soybean yield advantages from narrow rows (14-15 inch) versus wide rows (30-36 inch) across 84 US small-plot row spacing trials.

Soybean Row Spacing Research in Georgia

Table 9. Soybean yield change from reducing row spacing in Georgia.

Year	Location	Row Spacing Comparison	Yield Increase with Narrower Row (%)
1979	Athens	38" to 19"	11
1981	Tifton	36" to 18"	4
1982	Plains	36" to 20"	17
1989	Plains	30" to 20"	8
		30" to 10"	11
		20" to 10"	3
2007/2008	Camilla	36" to 24"	8
2015	Midville	22" to 15"	19
		22" to 7.5"	30
Average			**12**

Conventional Soybeans

FirstRate® HERBICIDE

Classic® HERBICIDE

STS®
herbicide tolerant trait

BOLT®

- ***PPO resistant weeds = SOL (really!)***
- Metribuzin – PRE
- Prowl or Group 15's
- Reflex, Cobra, Ultra Blazer, Prefix, Warrant Ultra
- Classic or FirstRate (sicklepod + MG)
  - *STS® (1993) - single gene (non-GMO)*
  - *Bolt™ (2015) - 2 genes (non-GMO)*

2025 Top Soybean Cultivars Planted in Georgia

[~$55-60/bag (140K); ~$30 for conventional]

- **Asgrow:** AG71XF2; AG69XF0; AG66XF2; AG57XF1
- **Dynagro:** DG72XT80
- **Integra:** XF7223; XF6772S; XF7062
- **Pioneer:** P56A71E; P68A41BE; P70A62E
- **Revere:** 6927XF;62-F24;53-F84; 5429E3
- **Conventional:** Hutcheson; AGS Woodruff; Virtue 4921; Musen; Pioneer P47A10; AGS V5422

Soybean Weed Control - 2025

NTC

Tricor 4F @ 8 oz/A
Prowl H_20 3.8SC @ 32 oz/A
(PRE)
Liberty Ultra 1.76SL @ 32 oz/A
Dual Magnum 7.62EC @ 16 oz/A
AMSOL @ 2.5% v/v
(POST - 36 DAP)

Tricor 4F @ 8 oz/A
Zidua 4.17SC @ 2.5 oz/A
(PRE)
Liberty Ultra 1.76SL @ 32 oz/A
Dual Magnum 7.62EC @ 16 oz/A
AMSOL @ 2.5% v/v
(POST - 36 DAP)

Tricor 4F @ 8 oz/A
Zidua 4.17SC @ 2.5 oz/A
(PRE)
Reflex 2SL @ 24 oz/A
Classic 25DG @ 0.5 oz/A
Induce @ 0.25% v/v
(POST - 36 DAP)

SB-05-25
June 30
55 DAP

2025 Soybean Preplant Burndowns

Gramoxone 3SL @ 32 oz/A
Tricor 4F @ 8 oz/A
Induce @ 0.25% v/v

SB-03-25
May 8
15 DAT

Rapidicil 0.46EC (epyrifenacil) Valent/Group 14 (PPO)

Rapidicil 0.46EC @ 5 oz/A
Valor EZ 4SC @ 2 oz/A
Ruoundup PowerMax3 5.88SL @ 32 oz/A
2,4-D Amine 3.8SL @ 32 oz/A
Agridex @1% v/v
AMSOL @ 5% v/v

SB-03-25
May 8
15 DAT

Dicamba Preplant Injury
(Non-Tolerant Soybean Variety)

No Dicamba

Clarifier (dicamba) 4SL @ 8 oz/A
Applied 3 days before planting

SB-06-25
May 5
12 DAT

INTRODUCING ZALO™ HERBICIDE — DELIVERED BY PROLEASE™ TECHNOLOGY

Zalo HERBICIDE

Delivered By ProLease™ Technology

POSTEMERGENCE CONTROL WITH MULTIPLE MODES OF ACTION FOR TRAIT-ENABLED CROPS IN A CROP-SAFE FORMULATION

ACTIVE INGREDIENTS

- Glufosinate
- Quizalofop

POSTEMERGENCE TIMING

- Early-Post
- Mid-Post — *Without Cutoff Dates*

Expected FIFRA Section 3 Registration
FALL 2023

Formulation	Soluble liquid — 2.57 lb/gal 2.34 lb glufosinate 0.23 lb quizalofop
Use Rate	**Soybean/Cotton:** 32-43 fl oz/A; up to 72 fl oz/A per year **Canola:** 22-29 fl oz/A; up to 72 fl oz/A per year
Restricted Entry Interval (REI)	12 hours *(under EPA review)*
Rainfast	Rainfall or overhead irrigation within 4 hours after application may result in reduced weed control
Expected Pack Sizes	2x2.5 gallon jugs & 250 gallon totes

AMVAC An American Vanguard Company

ZALO™ Herbicide has not yet received regulatory approval. EPA registration is pending.

Zalo Tank-Mixes – 2025

Zalo 2.52SL @ 32 oz/A + Induce @ 0.25% v/v

NTC

Zalo

+ Dual Magnum 7.62EC
@ 16 oz/A

+ Outlook 6EC
@ 16oz/A

+ Warrant 3ME
@ 48 oz/A

+ Zidua 4.17SC
@ 2.5 oz/A

+ Anthem Maxx 4.3SC
@ 2.5 oz/A

+ Reflex 2SL
@ 24 oz/A

SB-01-25
May 24
4 DAT

Volunteer Peanut in Soybeans

- Generally, peanut is tolerant of all soybean herbicides except for dicamba, glyphosate, glufosinate, and metribuzin.
- Control Options:
  - Metribuzin – PRE
    - 8 oz/A of 4L = ~45% stand reduction
  - Liberty – POST
    - May need 2 apps

R. Ethredge
May 2025

Soybean Green Stem - 2025

1) Seasonal environment stresses (water, temperature, hailstorms, animal damage, excessive soil nitrogen availability at R6-R7); 2) certain viruses (bean pod mottle virus, tobacco ringspot virus and alfalfa mosaic virus): 3) insects (stinkbugs, common brown leafhopper, bean leaf beetle): 4) soybean genetics (cultivars); and 5) fungicides (especially strobilurims) are considered to be causal agents and risk factors associated with green stem.

UGA Ponder Farm
October 2025

UGA/OVT Green Stem Ratings - 2025

Plains, Georgia: MG V
2025 Soybean Variety Performance, Irrigated, May-planted

Company or Brand Name	Variety	Maturity	Yield	Maturity[1]	Plant Height	Lodging[2]	Green Stem[3]
			bu/acre	date	in	rating	rating
Dyna-Gro	S58XF24	5.8	**59.1**	10/10	25.6	1.0	1.5
Integra	XF5834S	5.8	**56.3**	10/16	25.6	1.0	2.8
Progeny	P 5751XFS	5.7	**54.3**	10/12	26.8	1.3	2.2
Asgrow	AG55XF5	5.5	46.1	10/8	26.4	1.3	2.2
UniSouth	USG 7543XF	5.4	43.4	10/20	37.4	2.0	4.7
Armor	59-F21	5.9	40.8	10/19	32.7	1.7	3.1
Innvictis	A5445XF	5.4	38.2	10/13	26.0	1.0	4.0
Mixon Seed	DM 59E01S	5.9	36.5	10/25	40.2	1.7	3.6
Revere	X55-F92	5.5	32.7	10/12	29.5	1.3	3.0
Asgrow	AG50XF5	5.0	24.2	10/21	31.9	1.3	5.1
Armor	51-F29	5.1	23.3	10/29	32.9	1.0	4.6
Progeny	P 5056XFS	5.0	20.1	10/15	34.0	1.7	5.3
Average			39.6	10/17	30	1.4	3.5
LSD at 10% Level			8.8	5	2	NS	0.9
Model R-square			0.88	0.72	0.92	0.44	0.77
C.V.			20.6	0.0	6.0	33.6	23.4

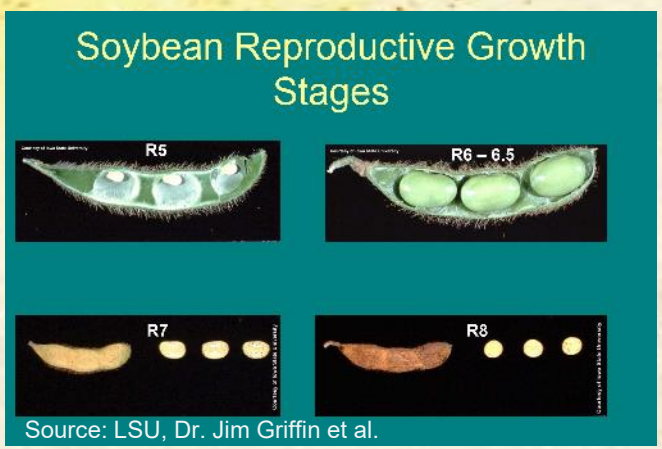
1. Maturity date indicates when 95% of pods are dried.
2. Lodging rating: 1 (all plants erect) to 5 (over 80% of plants down).
3. Green stem rating: 1 (very good) to 5 (very green).

Tifton, Georgia: MG VI, VII and VIII
2025 Soybean Variety Performance, Irrigated, May-planted

Company or Brand Name	Variety	Maturity	Yield	Maturity[1]	Plant Height	Lodging[2]	Green Stem[3]
			bu/acre	date	in	rating	rating
UGA	G18-8335LL	7.0	**95.9**	10/15	40	1.7	5.1
Asgrow	AG69XF0	6.9	88.1	10/13	38	1.3	2.7
Pioneer	P69Z71E	6.9	87.7	10/7	33	1.0	4.4
Asgrow	AG66XF2	6.6	86.6	10/16	31	1.0	0.9
UGA	G23PR-1034BE3	7.0	85.3	10/22	42	2.7	2.3
GSDC	Cook (Public)	8.0	85.2	10/18	43	3.0	2.1
Revere	6927XF	6.9	84.9	10/18	32	1.3	1.0
Armor	71-F12	7.1	84.7	10/18	32	1.0	0.9
Pioneer	P60Z06E	6.0	84.7	10/14	53	2.0	3.1
UGA	G21-2534	6.0	84.2	10/16	33	1.0	2.0
Asgrow	AG69XF5	6.9	84.0	10/10	33	1.3	2.0
Dyna-Gro	S68XF16S	6.8	81.8	10/11	35	1.3	1.3
Asgrow	AG71XF2	7.1	81.5	10/16	33	1.0	1.0
Armor	59-F21	5.9	80.4	10/4	39	1.7	2.4
Revere	62-F24	6.2	79.9	10/9	32	1.0	1.0
UniSouth	USG 7633XF	6.3	78.6	10/9	35	1.0	3.0
UGA	G19-13438	7.0	78.5	10/17	34	1.7	3.7
UGA	G24-10152BXF	7.0	78.3	10/11	32	1.7	2.6
UGA	G23PR-1001BXF	7.0	77.6	10/16	33	2.0	2.0
UGA	G24-10220BXF	7.0	76.7	10/10	34	1.3	1.9
UGA	G21-2407	6.0	75.8	10/22	39	1.7	1.3
Mixon Seed	DM 69E83	6.9	73.8	10/16	36	1.7	3.8
Progeny	P 6685XFS	6.6	72.3	10/5	33	1.3	0.9
Revere	X62F52	6.2	65.3	10/3	33	1.0	2.3
Average			81.3	10/13	36	1.5	2.2
LSD at 10% Level			3.3	-	2	0.5	0.4
Model R-square			0.92	-	0.92	0.70	0.95
C.V.			3.8	-	5.0	28.6	18.3

1. Maturity date indicates when 95% of pods are dried.
2. Lodging rating: 1 (all plants erect) to 5 (over 80% of plants down).
3. Green stem rating: 1 (very good) to 5 (very green).
4. Seed quality rating: 1 (very good) to 5 (very poor).

Soybean Harvest Aids



Source: LSU, Dr. Jim Griffin et al.

R7 = beginning maturity, 1 pod on mainstem has reached mature pod color

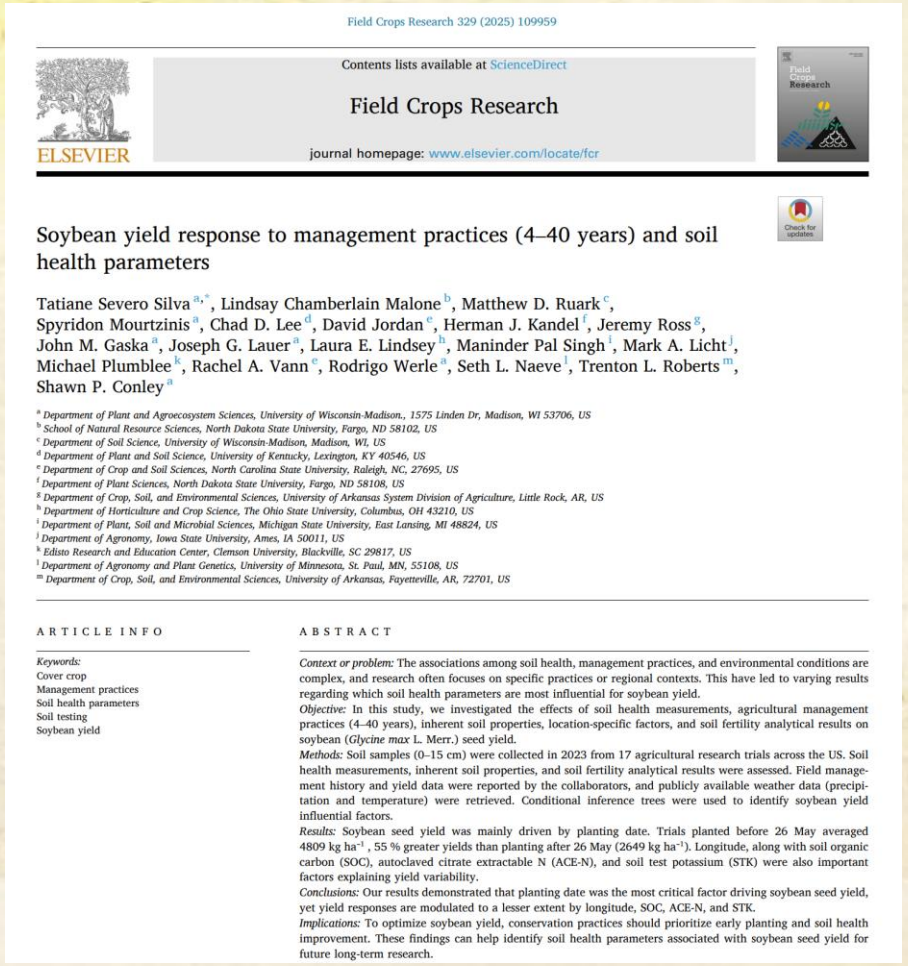
- Roundup (glyphosate)
  - *7 d PHI*
- Gramoxone (paraquat)
  - *15 d PHI*
- Aim (carfentrazone)
  - *3 d PHI*
- Sharpen (saflufenacil)
  - *3 d PHI*
- Defol (sodium chlorate)
  - *10 d PHI*

Harvest Weed Seed Information*

(https://growiwm.org/how-harvest-weed-seed-control/)

*soybean, sorghum, wheat

Soybean Yield and Planting Date



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Soybean yield response to management practices (4–40 years) and soil health parameters

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ABSTRACT

Context or problem: The associations among soil health, management practices, and environmental conditions are complex, and research often focuses on specific practices or regional contexts. This have led to varying results regarding which soil health parameters are most influential for soybean yield.
Objective: In this study, we investigated the effects of soil health measurements, agricultural management practices (4–40 years), inherent soil properties, location-specific factors, and soil fertility analytical results on soybean (*Glycine max* L. Merr.) seed yield.
Methods: Soil samples (0–15 cm) were collected in 2023 from 17 agricultural research trials across the US. Soil health measurements, inherent soil properties, and soil fertility analytical results were assessed. Field management history and yield data were reported by the collaborators, and publicly available weather data (precipitation and temperature) were retrieved. Conditional inference trees were used to identify soybean yield influential factors.
Results: Soybean seed yield was mainly driven by planting date. Trials planted before 26 May averaged 4809 kg ha^{-1} , 55 % greater yields than planting after 26 May (2649 kg ha^{-1}). Longitude, along with soil organic carbon (SOC), autoclaved citrate extractable N (ACE-N), and soil test potassium (STK) were also important factors explaining yield variability.
Conclusions: Our results demonstrated that planting date was the most critical factor driving soybean seed yield, yet yield responses are modulated to a lesser extent by longitude, SOC, ACE-N, and STK.
Implications: To optimize soybean yield, conservation practices should prioritize early planting and soil health improvement. These findings can help identify soil health parameters associated with soybean seed yield for future long-term research.

- In 2023 (***17 trials in 7 states***),the effects of agricultural management practices (4–40 years), soil health metrics, inherent soil properties, location-specific factors, and soil fertility analytical results were investigated on soybean seed yield.
- ***Planting date was the most influential factor impacting soybean seed yield, with planting before May 26 consistently resulting in greater yields.***

Soybean Yield and Micronutrients

SCIENCE FOR SUCCESS

FUNDED BY THE SOYBEAN CHECKOFF

The best soybean management practices by Extension researchers from across the United States

Foliar Fertilizers Rarely Increase Yield in U.S. Soybean

Foliar Fertilizer Overview

There is interest among farmers and agronomists to test different fertilizer products to improve soybean yield. With increasing soybean yields across the U.S., there are concerns that fields with higher yields may need supplemental fertilizer. Soybean farmers are interested in foliar products that apply a mixture of micronutrients and macronutrients and can be tank-mixed with insecticides and fungicides and applied during early reproductive growth (R1-R4). This timeline corresponds with a period of high nutrient uptake for soybean (Gaspar et al., 2017).

Foliar fertilizers enter the plant through the leaves, first passing through the waxy cuticle, then the cell wall, and finally the cell membrane. Foliar fertilizers enter leaves more quickly when stomata are open, since stomata aid passage past the waxy cuticle (Fageria et al., 2009). Macronutrients are more mobile than micronutrients in plant tissues, with the exceptions of Ca and S (Fageria et al., 2009). For immobile nutrients, foliar fertilization may help distribute essential nutrients to deficient plant parts.

Take Home Messages

- This coordinated study was conducted in 16 states at 46 sites.
- The tested prophylactic foliar fertilizers did not increase soybean yield.
- Foliar fertilizers did not change grain protein and oil concentration.
- Some tested prophylactic foliar fertilizers decreased profitability, and no tested products increased profitability.

This paper is Open Access! More details about the trial, including individual site results, are available in the full publication at: https://doi.org/10.1002/agj2.20889

Past Foliar-applied Macronutrient Trials

Past foliar fertilizer research has shown inconsistent impacts on soybean yield, with soybean yield increases associated with N-P-K-S application of up to 8 bu/A observed in Iowa in the 1970s (Garcia L. & Hanway, 1976) despite a contemporaneous study in Wisconsin showing much smaller yield increases associated only with N application (Syverud et al., 1980). In a Minnesota study, the yield benefit to N-P-K-S foliar fertilization was only observed in one out of 16 trial site-years, and no yield benefit to micronutrient application (Poole et al., 1983).

Larger studies in the 1990s in Iowa showed small, inconsistent increases in yield with early-season prophylactic foliar fertilizer application, including yield increases in plots treated with N-P-K of less than 1 bu/A at 10 out of 48 site-years (Haq & Mallarino, 1998). In a subsequent on-farm strip trial testing N-P-K fertilization, there was a 0.5 bu/A increase in soybean yield at one out of eight sites (Mallarino et al., 2001). The associated small-plot trial tested a wider range of nutrient rates and had two responsive locations out of 18 with a 1.4 to 5.3 bu/A increase in soybean yield when N, P, and K were applied (Mallarino et al., 2001).

Agronomists in Michigan have performed extensive foliar fertilizer trials in soybean since 2000. Out of the 51 location N-P-K product trials, four locations had increased yield in fertilized plots. Three of 18 locations in Michigan had higher yield in N-treated plots than control plots (Staton, 2019).

- 2019/2020
- 46 sites/16 states
- 1 application of micronutrients applied at R3
  - *Brandt Smart B-Mo, Harvest More Urea Mate, Brandt Smart Quatro Plus, FertiRain, Sure-K, Maximum N-Pact K*
- Based on the results of this study and the current body of published agronomic research, there is ***no scientific evidence*** to support the use of foliar fertilizer products on soybeans in the absence of visual symptoms of nutrient deficiency.

Soybean Yield and Biological Seed Treatments

Biological Seed Treatments on Soybeans

SCIENCE FOR SUCCESS

Science for Success evaluated biostimulant seed treatments in over 100 different growing environments across 22 states. **Across 100 growing environments in 22 states, there was no product that consistently improved soybean yield compared to the non-treated control.**

What is a biostimulant?

In 2018, United States legislators introduced the first legal definition for the term *plant biosimulant*, defining it as "a substance or microorganism [*biological*] that, when applied to seeds, plants, or the rhizosphere, stimulates natural processes to enhance or benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress, or crop quality and yield."[1] Biostimulant seed treatment products may include one or multiple types of microbes (living microscopic organisms). Some commonly used microbes include *Azospirillum*, *Bacillus*, *Pseudomonas*, *Bradyrhizobium*, and *Trichoderma*, which have proposed benefits of enhancing early growth, vigor, and root mass, improved plant nutrient uptake and nitrogen fixation, and increased yield.

Table 1. Commercially available biostimulant seed treatment products evaluated in 2022 and 2023.

Product Number	Year Tested	Active Ingredient	Marketed Benefits According to Company
1	Both	***Azospirillum brasilense, Bacillus licheniformis, Bacillus amyloliquefaciens, Bacillus subtilis, Pseudomonas fluorescens, Rhizobium***	Enhance early growth, vigor, and root mass
2	2022	***Trichoderma virens***	No information provided
2	2023	***Kosakonia cowaii***	Suppress seedling diseases
3	Both	***Bradyrhizobium japonicum***	Enhance nitrogen fixation and improve grain yield
4	2022	***Bacillus subtilis, Bacillus amyloliquefaciens, Bradyrhizobium japonicum***	Protection against fungal root diseases, enhance nitrogen fixation, and improve grain yield
4	2023	***Bacillus subtilis, Bradyrhizobium japonicum***	Improve plant nutrient uptake, plant growth and resilience, and grain yield
5	2023	***Bacillus amyloliquefaciens***	Protection against plant parasitic nematodes
6	2023	***Methylobacterium hispanicum***	Enhance root area, root depth, and root tips, increase nutrient uptake and plant efficiency, and increase yield
7	Both	***Bradyrhizobium elkanii, Delftia acidovorans, Bacillus velezensis***	Increase crop establishment, improve root vigor and plant growth, solubilize phosphorus from organic and inorganic reservoirs, and increase grain yield
8	Both	***Bacillus velezensis***	Increase crop establishment, improve root vigor and plant growth, solubilize phosphorus from organic and inorganic reservoirs, and increase grain yield
9	Both	***Glomus intraradices, Glomus mosseae, Glomus aggregatum, Glomus etunicatum***	Improve plant vigor, enhance water and nutrient absorption, enhance phosphorus uptake

[1] *Agricultural Improvement Act, Sec. 10111 (2018). https://www.congress.gov/115/bills/hr2/BILLS-115hr2enr.pdf*

- 2022/2023
- 100 different sites in 22 states
- 9 "biostimulants" tested
- Among the tested biostimulant seed treatments, ***none*** of the products consistently improved soybean yield compared to the nontreated control.
- Published February 2025

Questions/Comments?

229-392-1034 (cell)