2,4-D-Based Weed Management Programs for 2017 Enlist Cotton
(A. S. Culpepper, A. C. York, and J.C. Smith)

Mitigating off-target movement of 2,4-D is the greatest challenge for a 2,4-D-based weed management system. Georgia has many areas where this herbicide should not be applied in-season; for areas where it can be applied safely, review labels closely. Mitigating off-target movement of 2,4-D and implementing sound programs are addressed. The Georgia Cotton Commission, Cotton Incorporated, and Industry are primary funding sources!!

Enlist Duo, a premix of glyphosate and 2,4-D choline, is the only formulation labeled for use at planting or in-season for Enlist cotton.

Enlist Duo can only be tank mixed with products approved at www.EnlistTankmix.com. As of Jan 16, no herbicides are approved for tank mixing. See discussion on back.

CRITICAL STEPS FOR ON-TARGET 2,4-D CHOLINE APPLICATIONS (yes, it is complex)

1. Person responsible for an in-crop application of Enlist Duo must have attended the Using Pesticides Wisely Training.

2. At least 15 factors should be understood for success; only having the right nozzle or only applying in low winds will not end well (Fig 1).

3. Most broadleaf vegetables, fruits, and nuts are very sensitive to 2,4-D; avoid applications near these sensitive crops (Fig 2).

4. Apply in winds between 3 to 10 mph; drift distances can still be large. Land terrain and direction of wind have huge impacts on drift.

5. Sprayer ground speed influences drift greatly. Suggest staying under 10 mph. Absolutely no aerial applications!

6. Enlist Duo label currently allows numerous spray nozzle options; see back page for more details.

7. Boom height should be minimized based upon the nozzle selected; 24” above the target is ideal when feasible.

8. Drift distances can be cut nearly in half with a 24” boom height compared to one at 50”.

9. Downwind in-field buffers for 1X rate is 30 ft. Label clearly restricts any application being made with winds toward susceptible plants.

10. Labels are written to protect the manufacturer from drift. No matter the distance, if you have spray drift, you are solely responsible.

11. Strongly encourage applying 2,4-D through hoods or layby rigs. DO NOT make more than 2 applications/year in a field for resistance mgmt.

12. Water volume 10-15 GPA with applications from burndown through cotton in full flower; UGA suggest direct sprays only after 8-lf.

Fig 1. UGA’s 15 Factors Influencing Success

- Spray Tip
- Spray Pressure
- Sprayer Speed
- Boom Height
- Tank Cleanout
- Drift Control Agent
- Proper Formulation
- Wind
- Size of Crop
- Land Terrain
- Buffers
- Sensitivity of Surrounding crops
- Volatility
- Residue Tolerance

Fig 2. 2,4-D Visual Sensitivity Scale for 2017

- Lower
  - Broccoli
  - Cabbage
  - Kale
  - Mustard
  - Onions
  - Turnip

- Moderate
  - Cantaloupe
  - Canola
  - Cucumber
  - Peaches
  - Peanut
  - Squash

- Severe
  - Pepper
  - Tomato
  - Watermelon

- Extreme
  - Cotton
  - Grapes*
  - Sweet potato*
  - Tobacco*

Herbicide Rate of Visually Detectable Injury

For relative comparison, tomato, squash, and watermelon response to Roundup would be in the “lower” category.

* Asterisk denotes data from literature; all other data generated in 64 UGA field experiments.

Herbicide resistance is threatening the sustainability of ALL FAMILY FARMS. The use of cover crops and/or tillage with a diversified herbicide program will reduce herbicide dependency and improve weed control. HAND WEED ESCAPES!
POTENTIAL ENLIST DUO (2,4-D CHOLINE) PROGRAMS

STEP 1: Burndown: no Palmer emerged at planting.
2,4-D is not that effective controlling pigweed over 3”. Standard programs using Valor (before Palmer emergence), Direx, and Gramoxone are better. Dickamba or 2,4-D should be considered for primrose, horseweed, and radish. No plant back interval exists for Enlist Duo in Enlist cotton; however, weeds should be killed ≥ 10 d before planting. Plantback interval for Enlist cotton following dicamba is similar to standard cultivars.

STEP 2: Preemergence (PRE) herbicide application.
Two herbicide active ingredients should be applied PRE together, even in a 2,4-D system. Higher rates of a single active ingredient are less effective than two ingredients at lower rates (Fig 3). Research suggests Reflex + Warrant or Direx, Direx + Warrant, or Brake F16 are great options. Select rates per acre that have minimal injury potential on your soil such as: Reflex (10-12 oz), Direx (12-16 oz), Warrant (2-2.5 pt), and Brake F16 (1 pt). Enlist Duo is not an effective residual alternative.

STEP 3: Sequential POST’s are needed for most fields.
The Enlist Duo label restricts tank mixtures with other herbicides to date; check web site for updates. Enlist Duo programs currently labeled are in Table 1. Make all topical applications prior to the 8-leaf of cotton development.

Table 1. Labeled Enlist Duo systems as of Jan 16, 2017.

<table>
<thead>
<tr>
<th>POST 1 ~17 d after PRE</th>
<th>POST 2 ~ 13-17 d after POST 1</th>
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<tbody>
<tr>
<td>Biggest pigweed in field 3”:</td>
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<tr>
<td>Enlist Duo 3.5 to 4.75 pt/A</td>
<td>Engenia 12.8 oz/A or XtendiMax 22 oz/A followed in 4 to 24 hr later by Liberty or Roundup + Dual Mag. or Warrant</td>
</tr>
<tr>
<td>or Liberty + Dual Mag., Warrant, or Staple</td>
<td>Engenia 12.8 oz/A or XtendiMax 22 oz/A followed in 4 to 24 hr later by Liberty or Roundup + Dual Mag. or Warrant</td>
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1 Day interval assumes PRE’s were activated. 2 Need ≥ 12 d between applications. 3 Use higher rate on difficult to control weeds such as Palmer.

Enlist Duo tank mixtures with herbicides ARE NOT APPROVED AND SHOULD NOT be applied until approved by the EPA; for latest details visit www.EnlistTankMix.com. If approved, Dual Magnum or Warrant mixed with Enlist Duo at POST 1 will likely improve weed control; mixtures will increase injury, occasionally exceeding 20%, as compared to Enlist Duo alone. For POST 2, apply Enlist Duo alone or apply a Liberty mixture and follow with a sound directed layby application 12-17 d later.

STEP 4: Layby NEEDS TO BE DIRECTED and not overtop.
A directed or hooded application is needed for auxin systems as it will improve farm sustainability through improved weed control and resistance management while reducing injury potential. Figures 4 and 5 stress the importance of not damaging cotton after the 8 leaf stage with topical applications; thus, one should direct the layby. Direx + MSMA (best for pigweed) or Roundup + Direx are great options; adding Envoke improves morningglory control. For grasses, make sure to utilize Roundup.

Nozzle selection and pressures approved for use on the Enlist Duo label as of Jan 16, 2017.