When is Cotton Most Sensitive to 2,4-D

J. C. Banks
Oklahoma State University
Common Perceptions

- A Light Rate of 2,4-D can actually increase cotton yield
- All hormone herbicides are the same
- Cotton can be killed by 2,4-D
- Cotton can “grow out” of 2,4-D injury
- 2,4-D can be cleaned from spray tanks and boom hoses
How a Cotton Plant Grows

- **Seedling stage**
  - Cotyledon
  - 2 to 4 true leaves

- **Pre-Squaring**
  - Prior to the sixth true leaf

- **Squaring**
  - Sixth to 12\textsuperscript{th} leaf

- **Blooming**
  - 12\textsuperscript{th} leaf until cutout
COTTON GROWTH & DEVELOPMENT

Growing point (terminal)

16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1

Cotyledonary node scars

Main stem node of white flower = 9

Vegetative branch

Dr. Randy Boman
TAEX, Lubbock
How a Cotton Plant Grows

Seedling Stage

Cotyledon Stage

First True Leaf

Fourth True Leaf
Seedling Stage

A cotton plant is developing its basic structure during the seedling stage

- Vegetative branches form on the first four to five nodes of the plant

Application of drift rates of 2,4-D during this stage often results in death of the terminal of the plant

- Vegetative branches are forced to develop, causing candelabra growth pattern

  - Fruiting is delayed, but if given enough season length, yield could be the same or possibly enhanced
Loss of Plant Terminal
How a Cotton Plant Grows

Pre Squaring Stage
- At this stage, the cotton plant changes from totally vegetative to initiation of fruiting
  - Vegetative branches help support the terminal and a rapidly developing plant will initiate squaring early

- Drift rates of 2,4-D at this time delay squaring, the amount of delay is dependant on rate of herbicide
6-Leaf Stage

Terminal

3rd Node (true leaf)

1st Node (true leaf)

Cotyledons

2nd Node (true leaf)

5th

6th

4th
How a Cotton Plant Grows

**Squaring Stage of Growth**
- The cotton plant has initiated the fruiting cycle
- Yield and earliness will be dependant on an uninterrupted period of fruiting

**Injury from 2,4-D drift is normally most severe at this stage of growth**
- The amount of injury is rate dependant, but any injury can cause a severe delay in fruiting, resulting in a plant that may not recover, and at the best, fruiting will be delayed enough to have a significant impact on yield.
First Position Square (fruit)
Square Development

Pinhead  7 Days  14 Days  21 Days
How a Cotton Plant Grows

**Blooming Stage of Growth**
- Any type of stress during blooming results in fruit shed
  - Once a boll reaches 10-14 days from blooming, it is almost resistant to fruit shed

2,4-D injury during early bloom will cause an absence of bolls in the middle of the plant, size of the non fruiting area is dependent upon rate of injury
- 2,4-D injury during late bloom may not result in as much fruit shed, but fiber quality could be reduced

Maturity will be delayed, bolls may not mature prior to cool weather
First Bloom

55-60 Days

Open Boll
Dr. Wayne Keeling

Texas A&M Research and Extension Center
Lubbock, Texas
Sprayer Contamination

- Hormone herbicides are readily absorbed into rubber hoses and spray tanks
  - They can be released when another herbicide/surfactant mixture is sprayed through the system
  - Many times injury will be located at the beginning of the first pass in the field, and will last until fresh spray is in the boom
  - Fiberglass and plastic tanks are more likely to have herbicides adsorbed than stainless steel tanks
Sprayer Contamination
Summary

- Drift rates of 2,4-D on cotton will always cause visible damage and a delay in maturity
  - Normally this results in a loss of yield primarily due to a delay in fruiting caused by loss of fruit due to exposure, and inadequate time to mature later set bolls
- The most significant yield loss results from injury at the 6 leaf or early squaring stage of cotton (approximately 30 days following planting)
- Cotton yield is more sensitive to injury from 2,4-D than other hormone herbicides
- The only way to remove 2,4-D from a sprayer is to use a stainless steel tank, and to replace all rubber and plastic components of the sprayer