

COTMAN OVERVIEW

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COTMAN Development

UofA DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System



Cotton Incorporated®



COTMAN Development

- Major contributions from scientists in research and Extension, growers and private crop advisors across the Mid-South and Texas.

Nothing magic about COTMAN

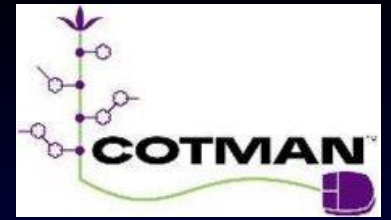
- ↗ Does not predict yield
- ↗ Does not give “Cookbook” recipes for production
- ↗ Is not a cure all for cotton production problems





COTMAN provides an standardized in-season monitoring system to describe the pace and progress of crop development.





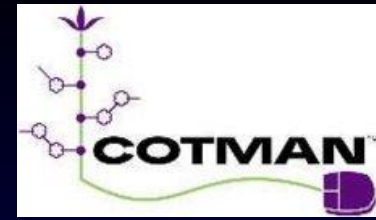
COTMAN Components

↗ SQUAREMAN

Monitors crop from 1st squares to 1st flowers

↗ BOLLMAN (NAWF)

Monitors crop from 1st flowers to cutout



COTMAN Components

SQUAREMAN

Before 1st Flowers

- Fruit retention
- Pace of crop growth
 - Pre-flower Stress

BOLLMAN

After 1st flowers

- Boll Loading Stress
- Crop termination
 - Insecticides
 - Irrigation
 - Defoliation

Plant Development

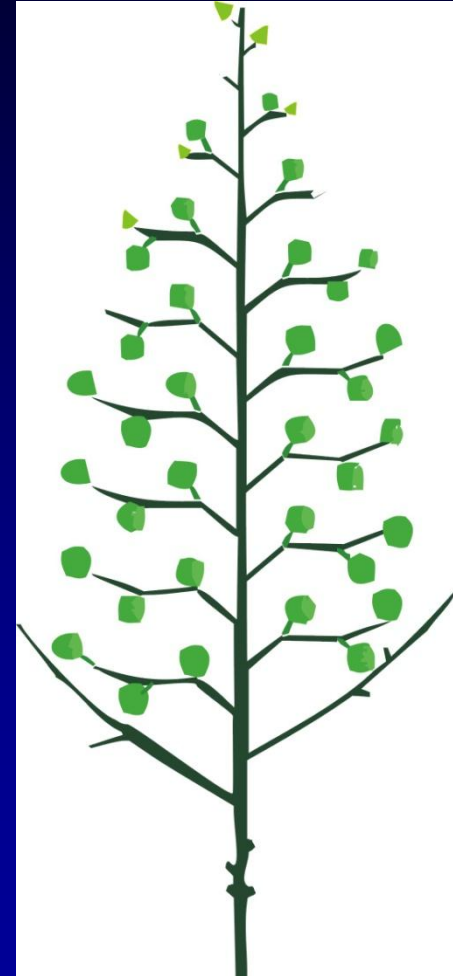
COTMAN is based on the following assumptions:



➤ Planting to 1st squares in 35 days

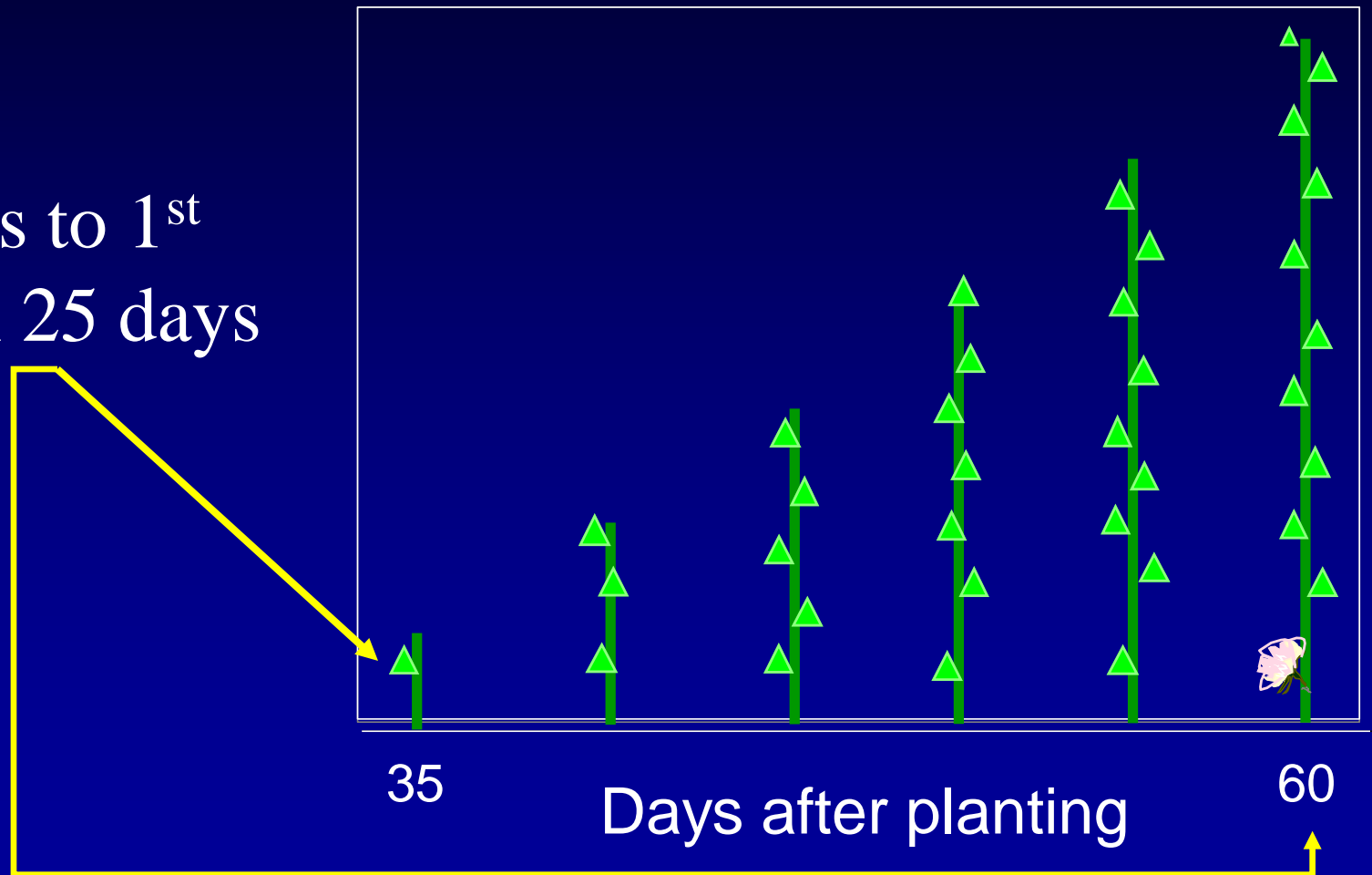
Squaring Node Development

↗ Every 2.7 days a new sympodial node on the main-stem.



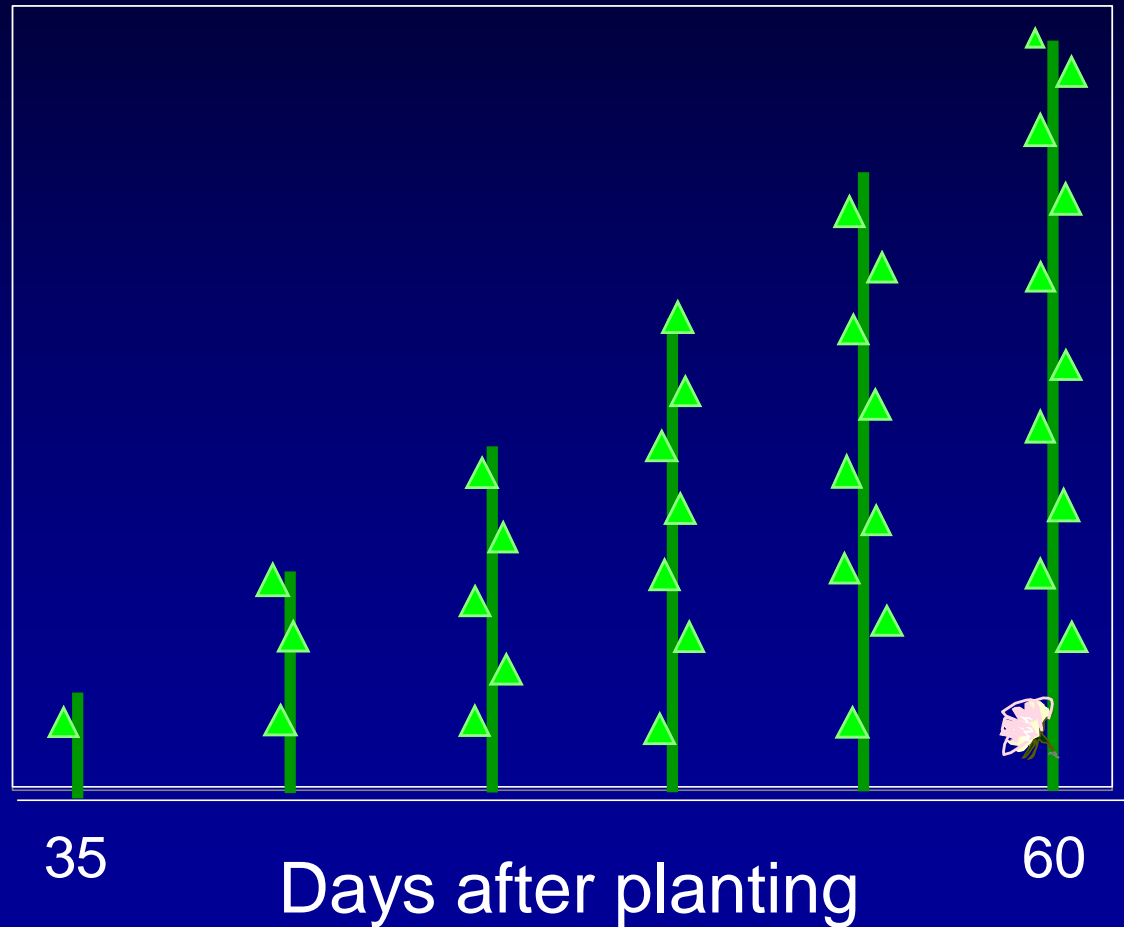
Flowers at 60 days after planting

↗ 1st Squares to 1st flowers in 25 days



From 1st Squares to 1st Flowers

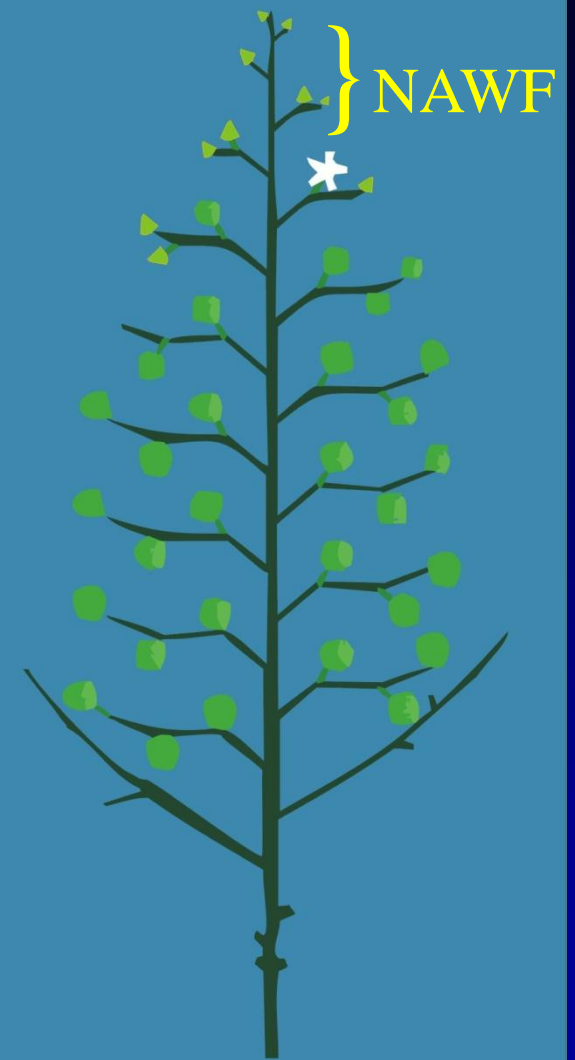
- ↗ Squaring node every 2.7 days
- ↗ 9.25 squaring nodes at the time of the first flowers



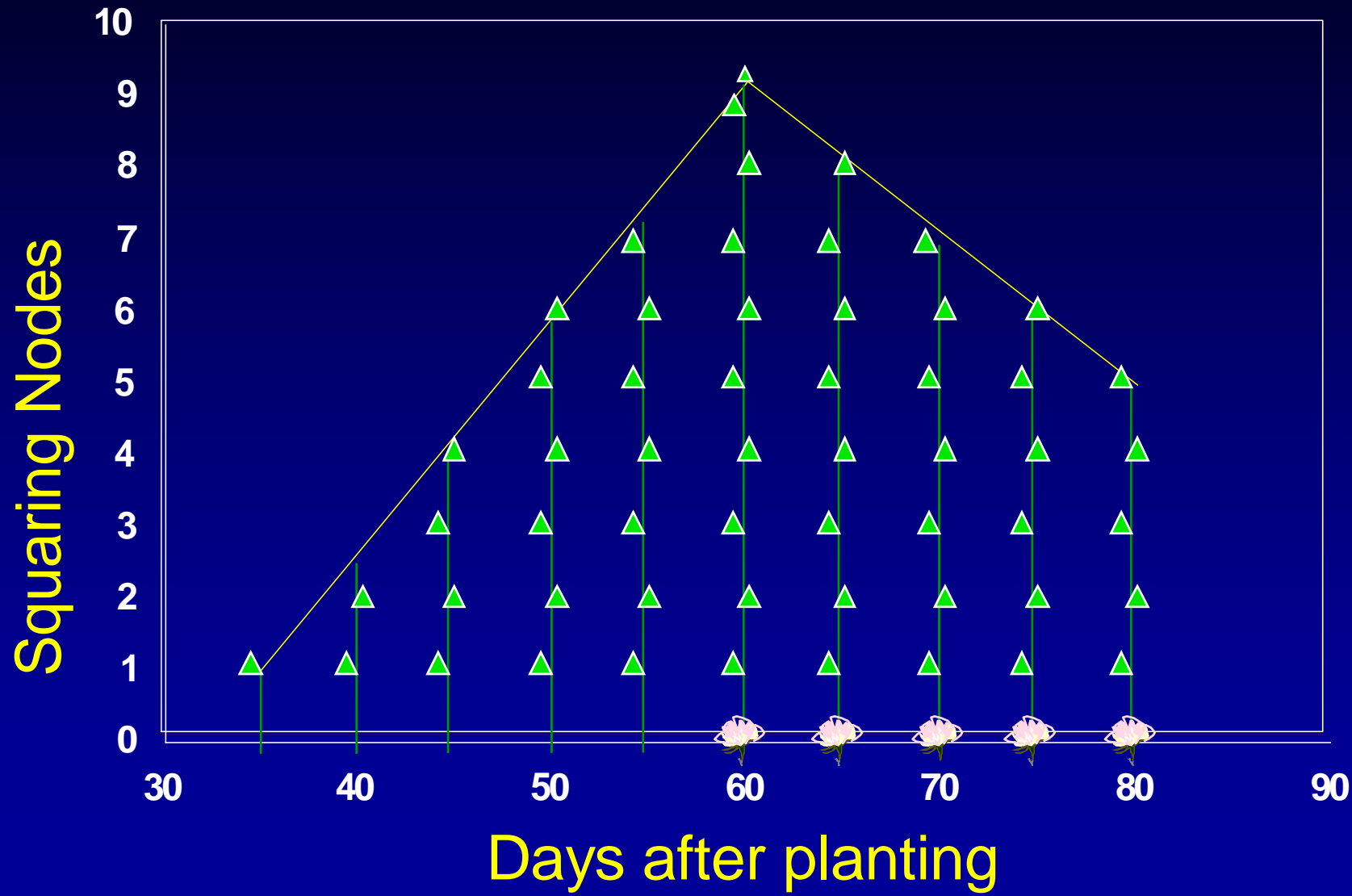
1st Flowers to Cutout

↗ Physiological Cutout at 80 DAP

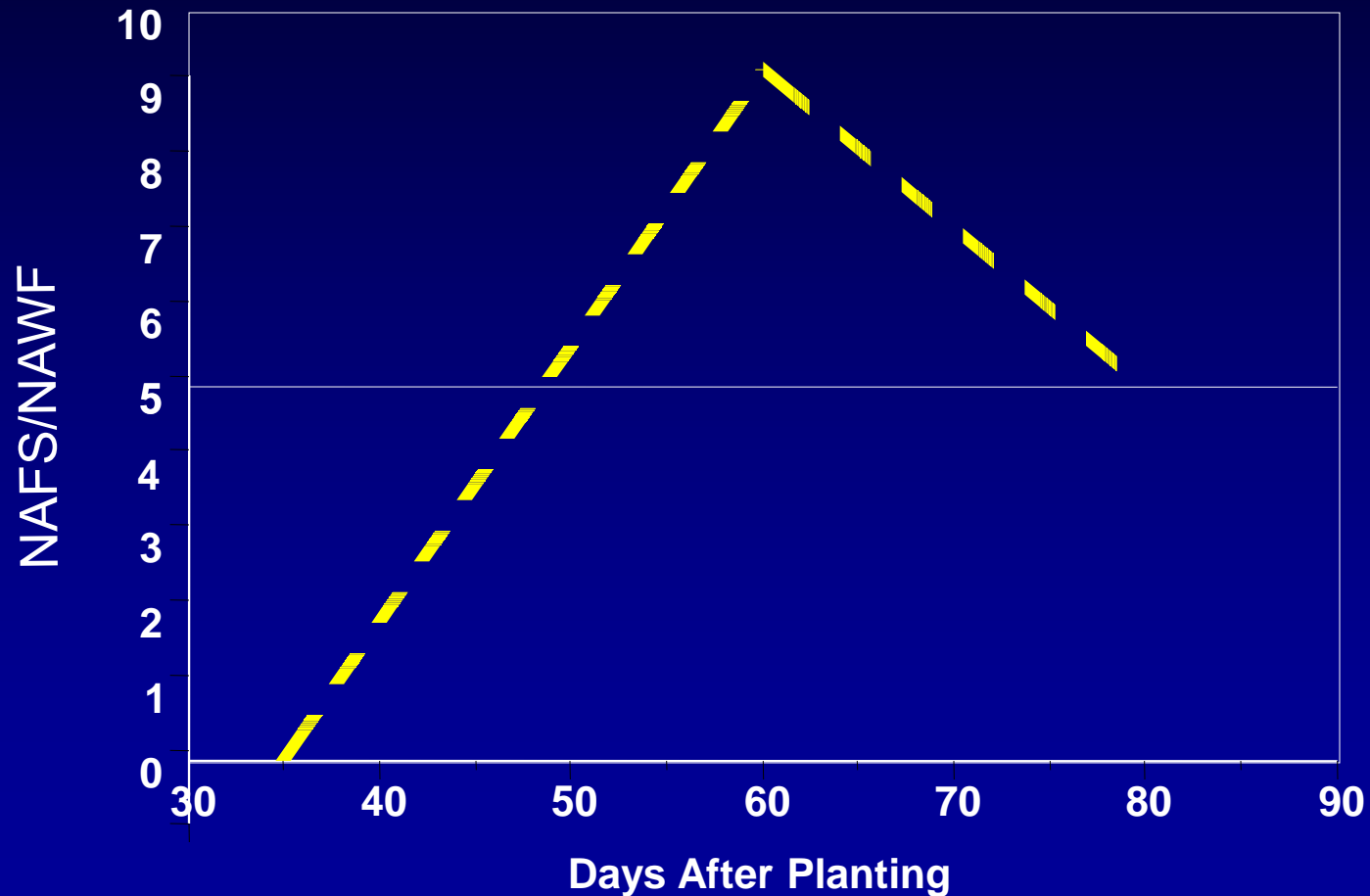
↗ 5 squaring nodes above the first position
white flowers (NAWF = 5)



Target Development Curve

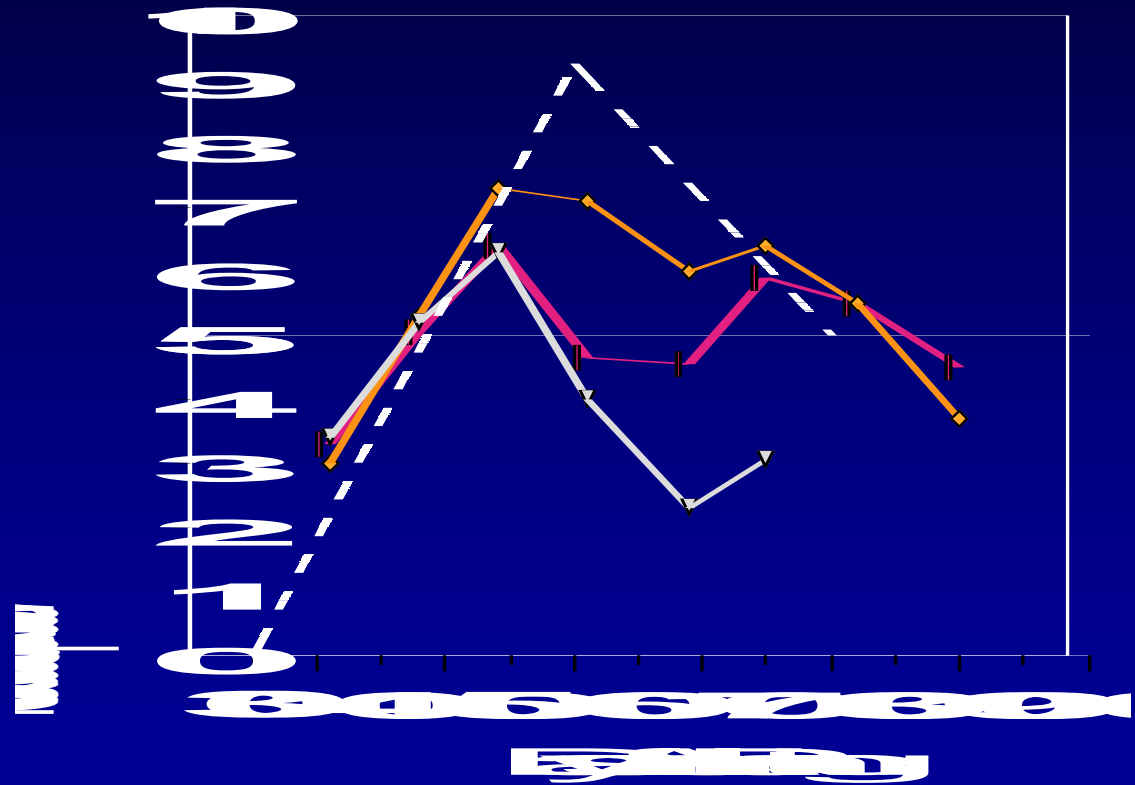


Target Development Curve



Crop growth VS. TDC

- Shows growth status of your crop compared to a *STANDARD*
- Identify stress
- Use crop monitoring to improve decision-making



Field Setup (1 time per season)

FIELD SETUP

- ↗ Field Name
- ↗ Acreage
- ↗ Planting Date
- ↗ Cultivar
- ↗ Row Spacing
- ↗ Re-plant (Y/N)
- ↗ FN
- ↗ Stand count

Stand Counts

- Use a T-stick to determine # of plants in 3 row feet from 24 consecutive rows.
- Repeat at 4 locations/Field.
- Used to calculate fruit/A.



Finding First Fruiting Node (FN)

- ↗ Count UP from cotyledons (“0”).
- ↗ Count to the first fruiting branch (sympodial).



SQUAREMAN Data

➤ Start at PHS
(Usually node 5-6).

➤ Collect weekly.

➤ 4 areas/field.

Plant Height

SQUAREMAP



SQUAREMAP Data

- At each location or area in the field, ten plants will be square mapped.
- Five consecutive plants on row 1. Turn around.
- Five consecutive plants on the adjacent row or row 2.
- Start at the top of each plant.
1st unfurled true leaf.



SQUAREMAP Data

- Look for the presence or absence of 1st position squares.
- Record a “1” if square is there.
- Record a “0” if square is missing.



(1) Plant Height

- Choose a plant that represents average height in row.
- Measure height (in inches) from soil to terminal.



~~SOIL NUTRIENT~~ Growth



BOLLMAN Data (NAWF)

- Collected once per week
- Start at first flower
- Count # of nodes above white flower.
- Get 5 counts from 1 row and 5 from adjacent row.
- Repeat at 4 locations in the field.



BOLLMAN Data (NAWF)

- Stop counting at the last unfurled leaf in the plant terminal. (BE CONSISTENT)
- Collect NAWF data until cutout (NAWF = 5).



CUTOUT

Use COTMAN to identify **cutout**:

↗ Physiological (Crop)

↗ Seasonal (Weather)

Cutout

Physiological cutout



➤ Cutout based on crop development (carrying capacity) - No end-of-season weather restraints

➤ **NAWF = 5** prior to latest possible cutout date.
(Bourland et al. 1992)

➤ Cutout at 80 DAP.

Cutout Con't.



Seasonal cutout:

- ↗ Natural cutout restricted due to weather
- ↗ Crop development limited by end-of-season weather constraints (Zhang et al. 1994).
- ↗ NAWF = 5 **AFTER** the latest possible cutout date



Cutout

- **From NAWF=5**
 - **Heat unit calculations begin**
 - **Historical weather file**
 - **Actual or current**

When Are Bolls Safe from Insect Attack?



+ **250** DD60s
Lygus lineolaris



+ **350** DD60s
Boll weevil
Bollworm, Tobacco Budworm



When Are Bolls Safe from Insect Attack?



+ **450** DD60s
Stink Bugs

+ **500-550** DD60s
Fall Armyworm

+ **650** DD60s
Defoliating insects



(work from Roger Leonard's lab at LSU no preference Cage tests)

End of Season Management

Irrigation

Identify flowering date of last effective boll population and track heat units....

+ **350** DD60s

Final Furrow Irrigation in Mid-South

Vories, E. D., J. K. Greene, T. G. Teague, J. H. Stewart, B. J. Phipps, H. C. Pringle, E. L. Clawson, R. J. Hogan, P. F. O'Leary, T. W. Griffin. 2011. Determining the optimum timing for the final furrow irrigation on mid-south cotton. *Applied Engineering in Agriculture*. 27(5): 737-745.

End of Season Management

Defoliation

Identify flowering date of last effective boll population and track heat units....

+ **850** DD60s

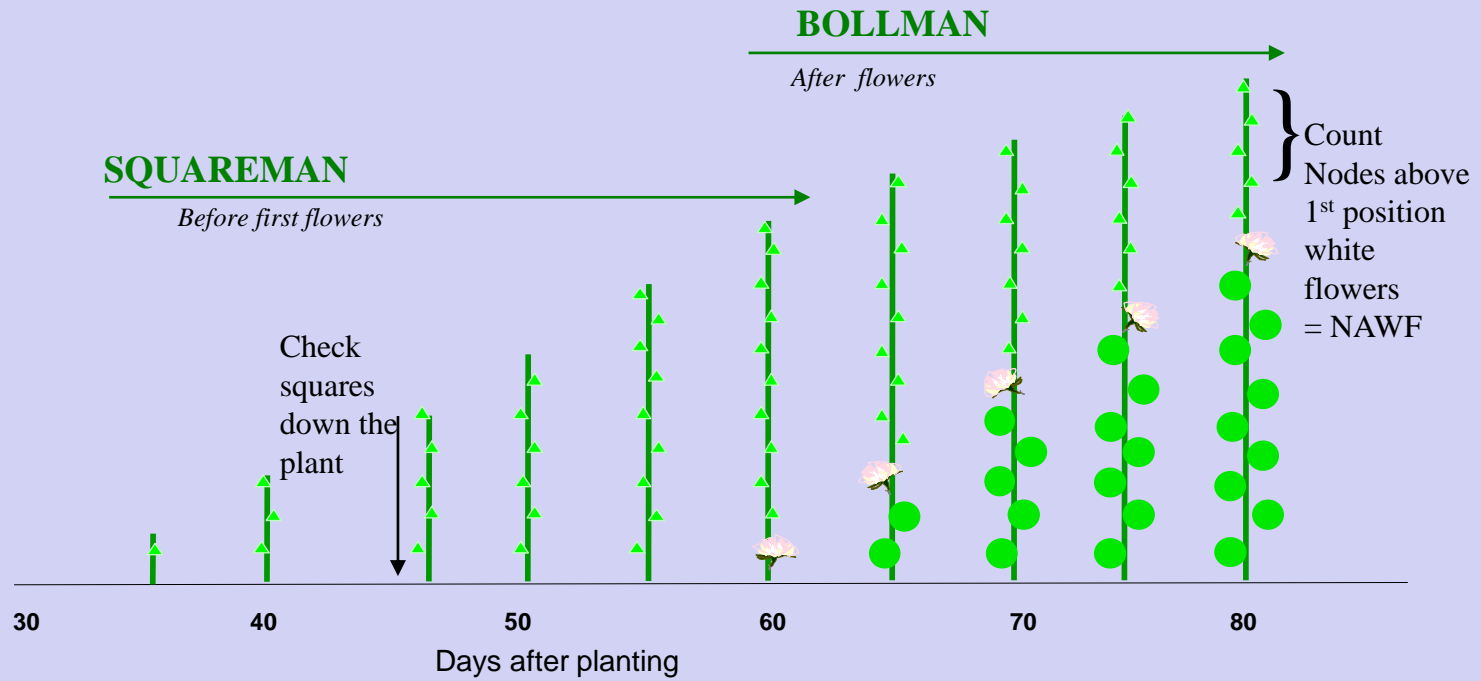
Evaluate for Defoliation



Overall Average – Insecticide Reduction Effects

COTMAN	Full-Season	Difference	Cost
837.7	839.6	1.90	19.32





Time Requirements

- **Approximately 20 minutes per field**
- **Reduce time for insect scouts**
- **Two different crews**

Squaremap Time Requirements

3 to 10 minutes per site

**Except in instances where there is excessive
plant to plant variability
(e.g. insect injury)**

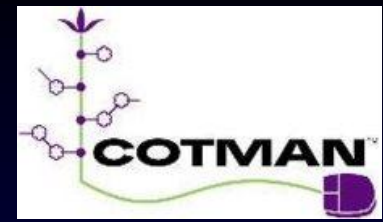
NAWF Time Requirements

< 2 minutes per site

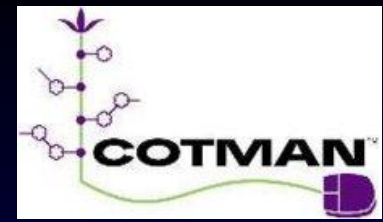


Why Use COTMAN as a Management Tool?

- Better information means better decision-making
- COTMAN is easy to use
- COTMAN provides timely information
- COTMAN is profitable
- COTMAN has been tested from Texas to Virginia
- COTMAN has a strong research base



COTMAN.ORG



Thank You



**COTTON INCORPORATED
FOR AMERICA'S COTTON GROWERS**

