COTMAN OVERVIEW

Dan Fromme

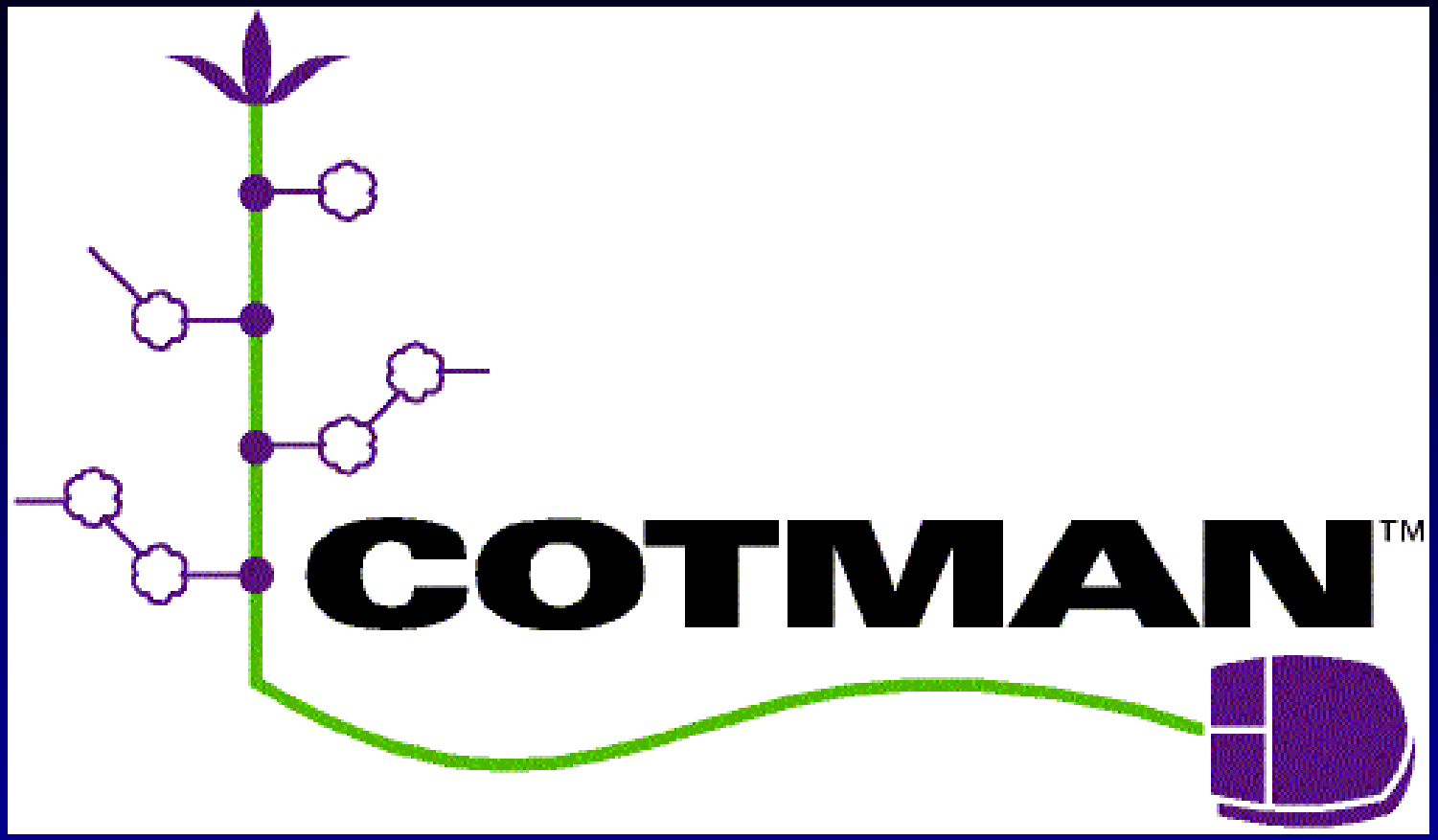
Assistant Professor & Extension Agronomist

Department of Soil and Crop Sciences

Texas AgriLife Extension Service

Texas A&M University System

AgriLIFE EXTENSION
Texas A&M System


COTMAN™

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 Components

- **SQUAREMAN**

  Monitors crop from 1st squares to 1st flowerss

- **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

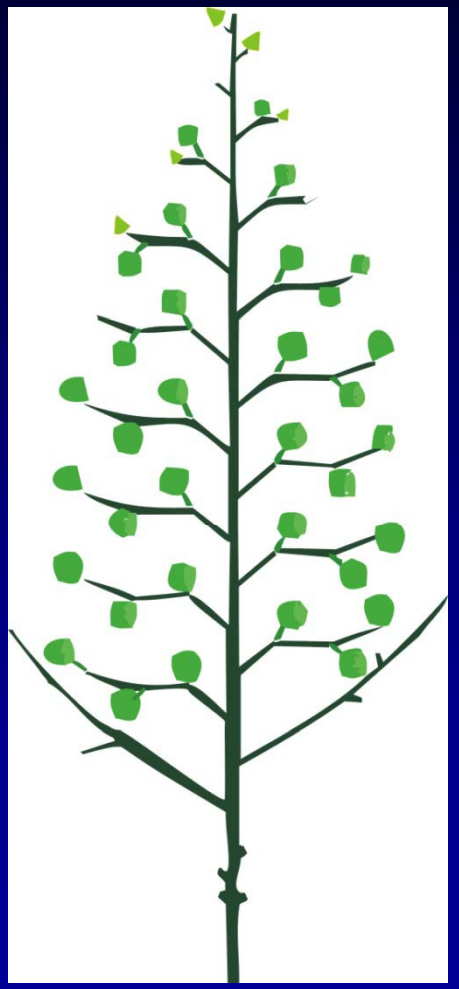
Plant Development

COTMAN is based on the following assumptions:

↗ Planting to 1st squares in 35 days

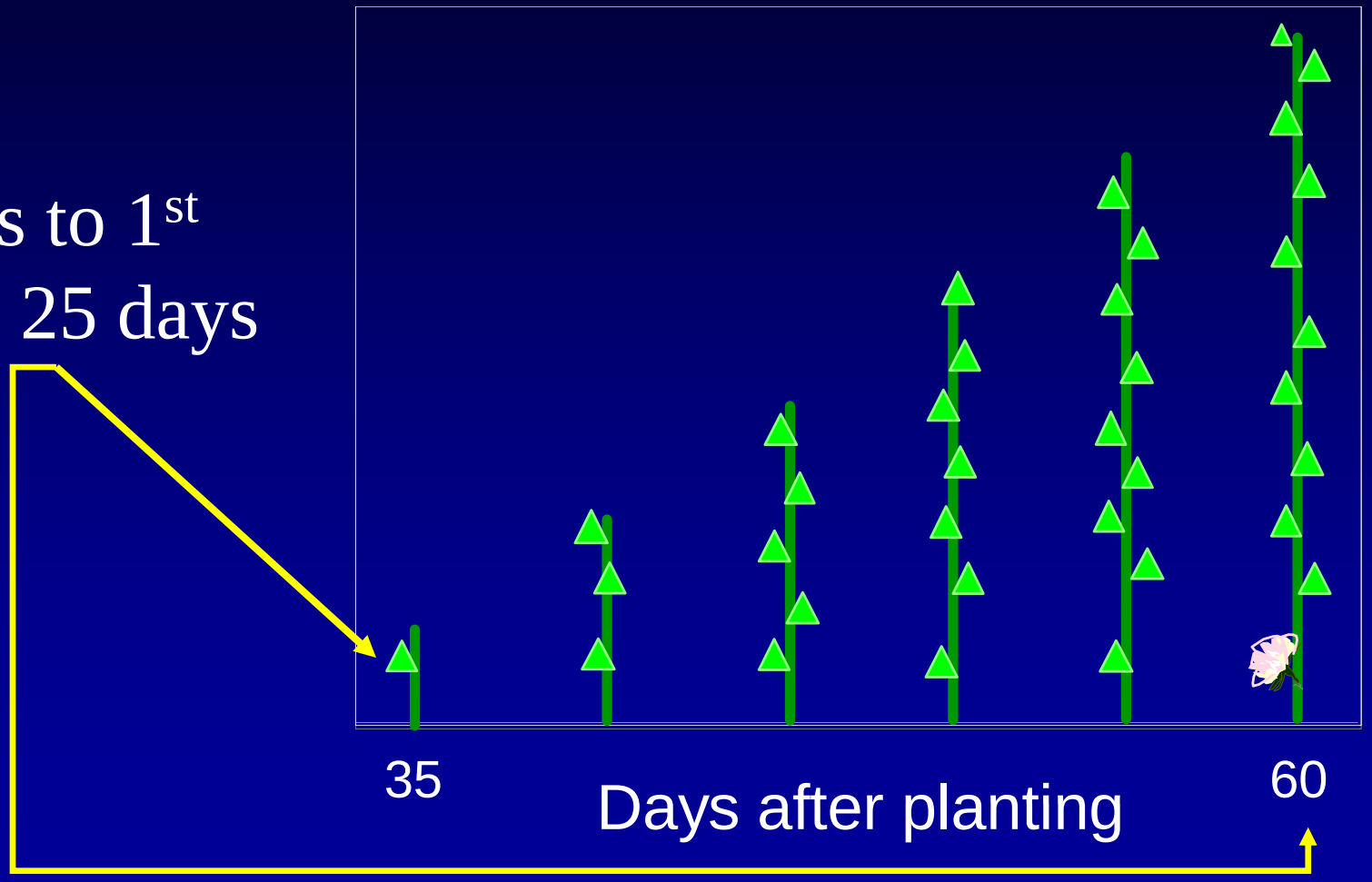
Squaring Node Development

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



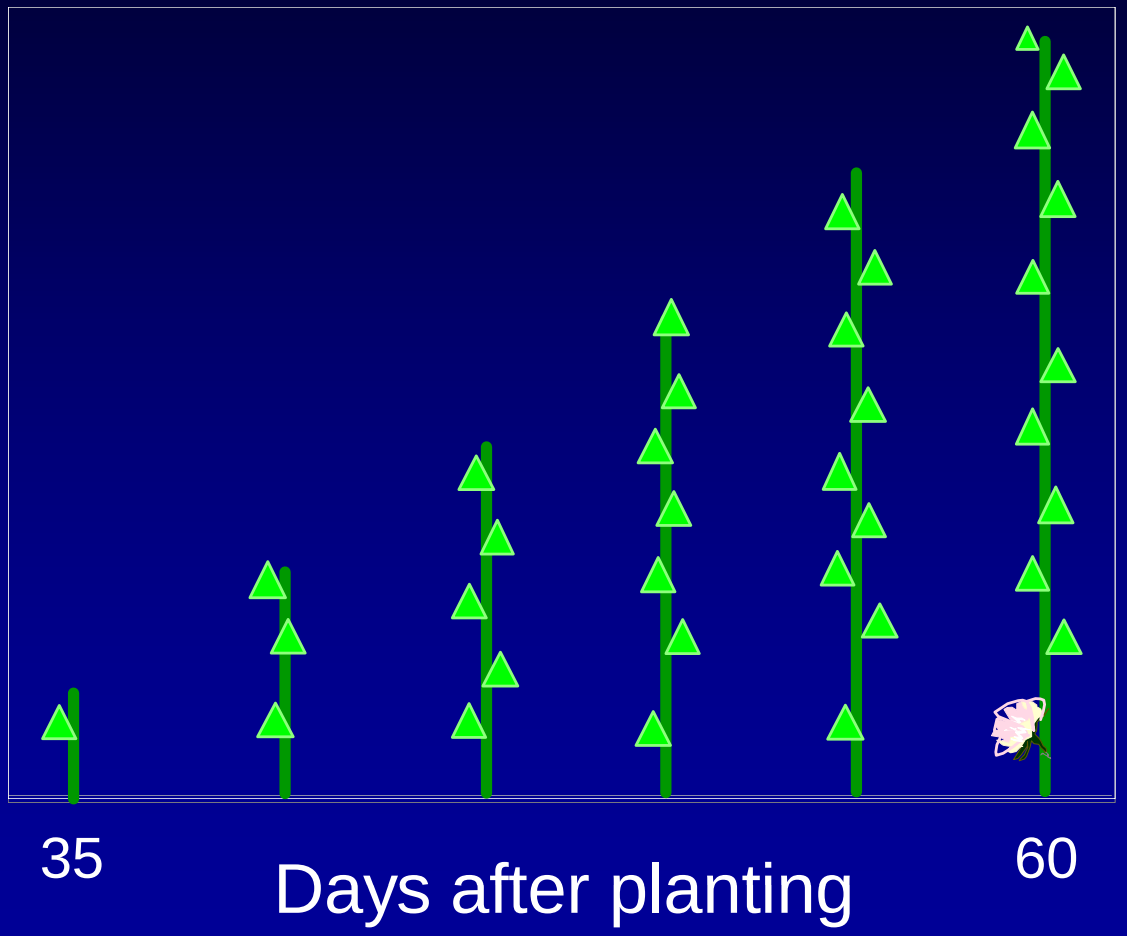
Flowers at 60 days after planting

↗ 1st Squares to 1st flowers in 25 days



From 1st Squares to 1st Flowers

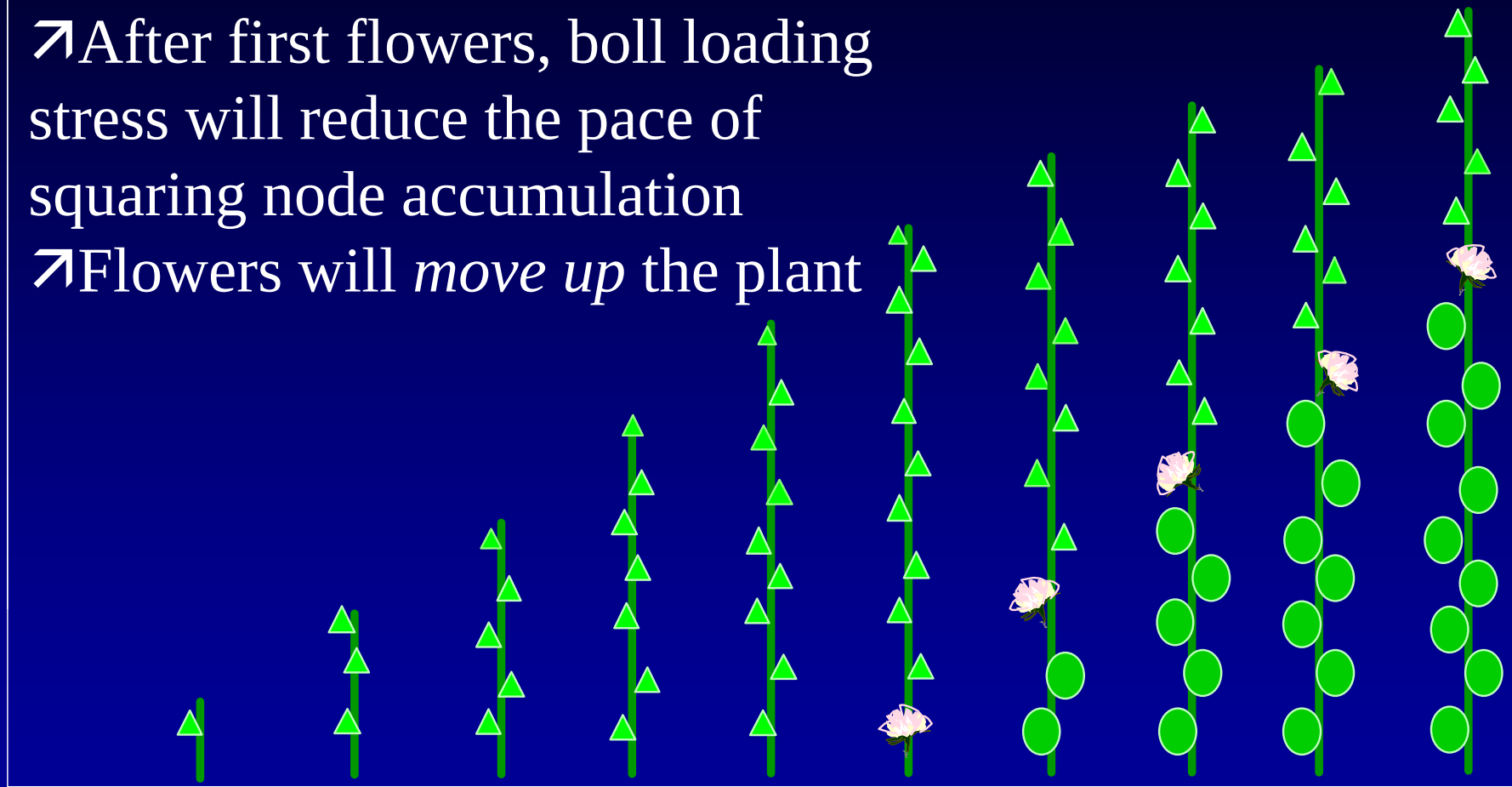
- Squaring node every 2.7 days
- 9.25 squaring nodes at the time of the first flowers



Pace of Crop Development

↗After first flowers, boll loading stress will reduce the pace of squaring node accumulation

↗Flowers will *move up* the plant

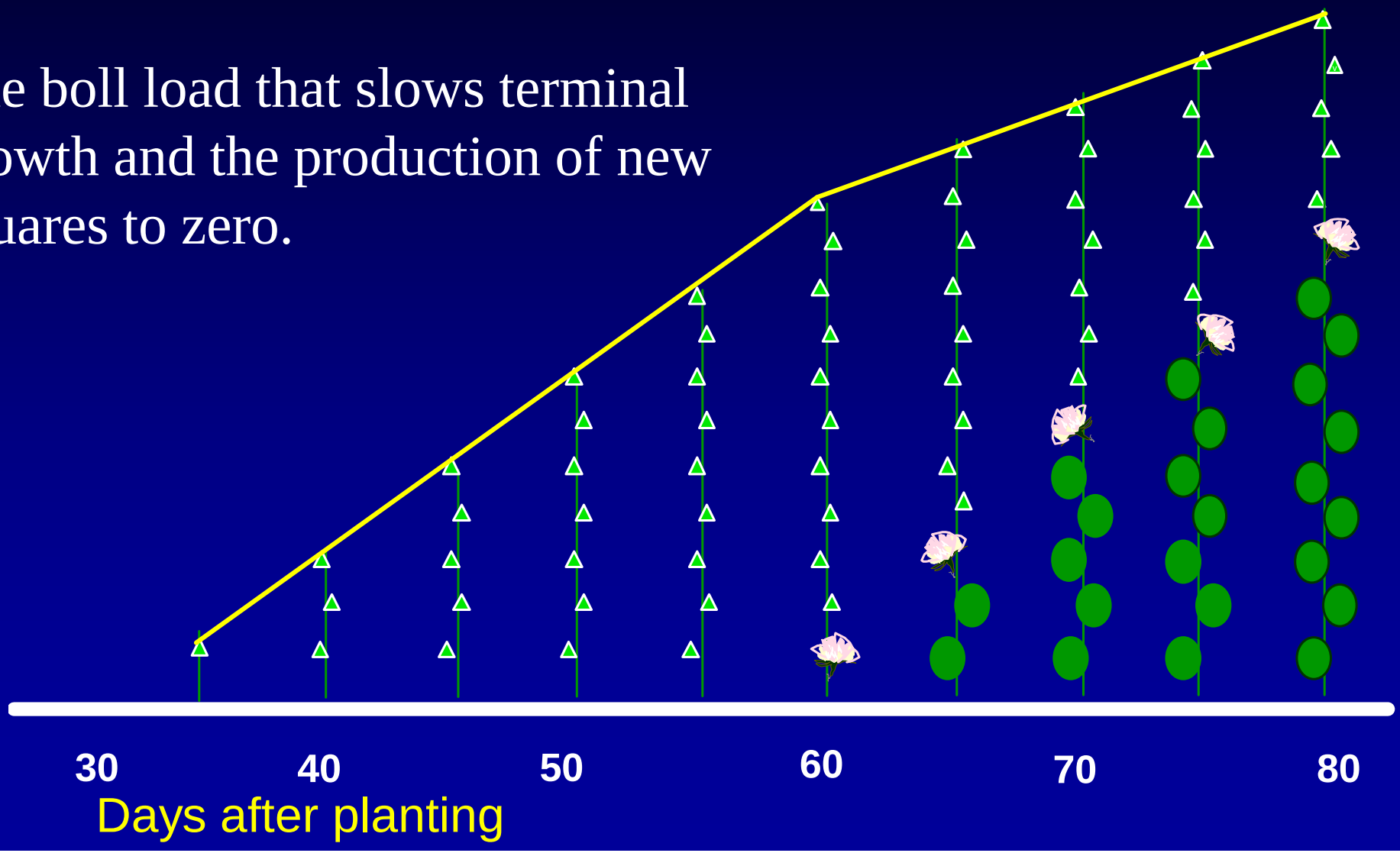


30 40 50 60 70 80 9

Days after planting

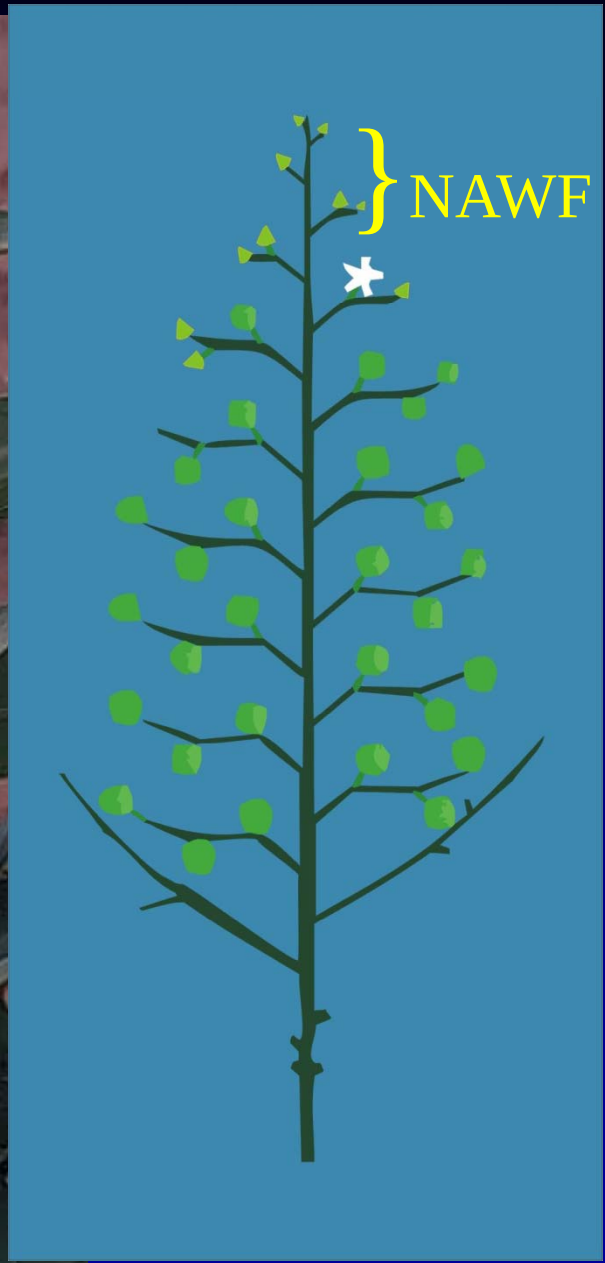
Crop Carrying Capacity

The boll load that slows terminal growth and the production of new squares to zero.

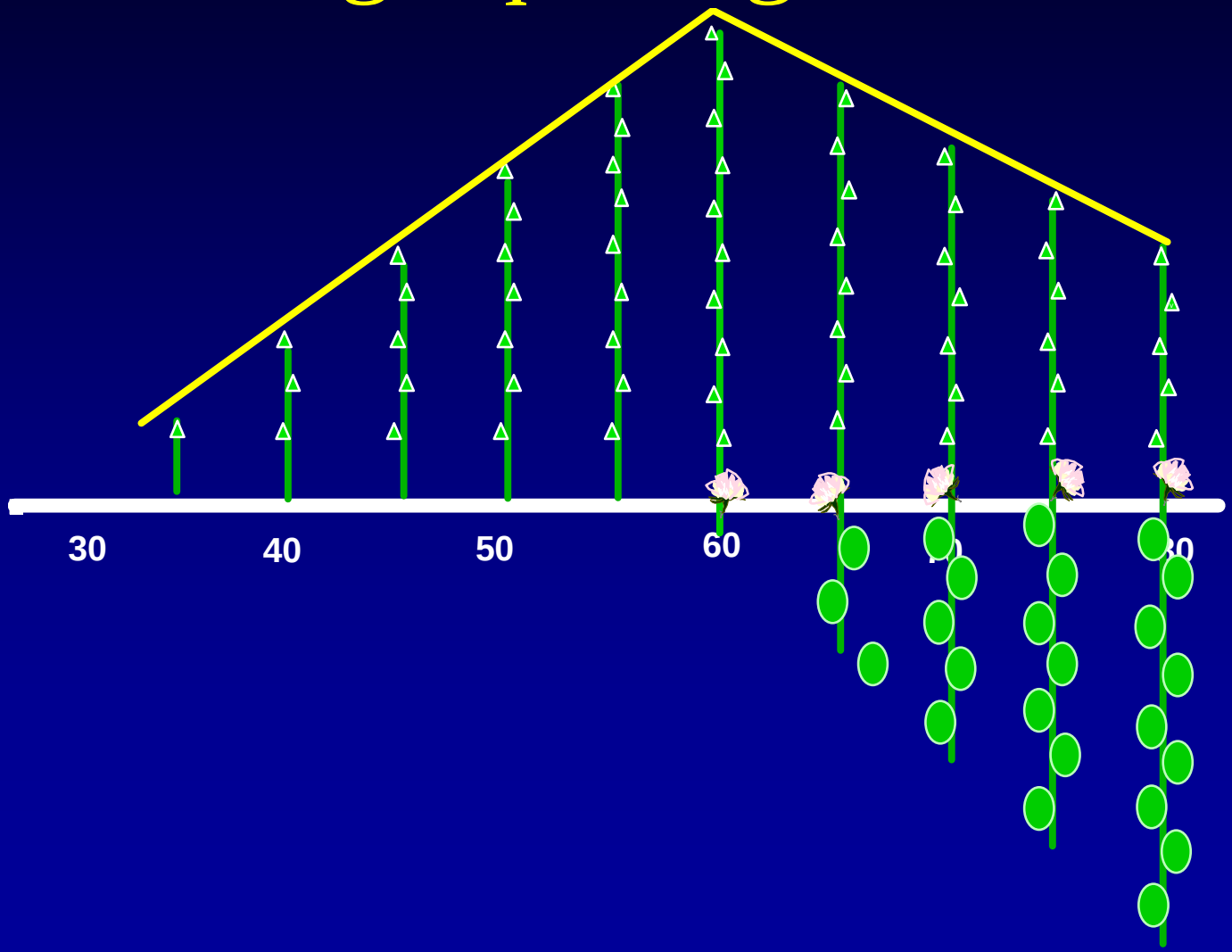


1st Flowers to Cutout

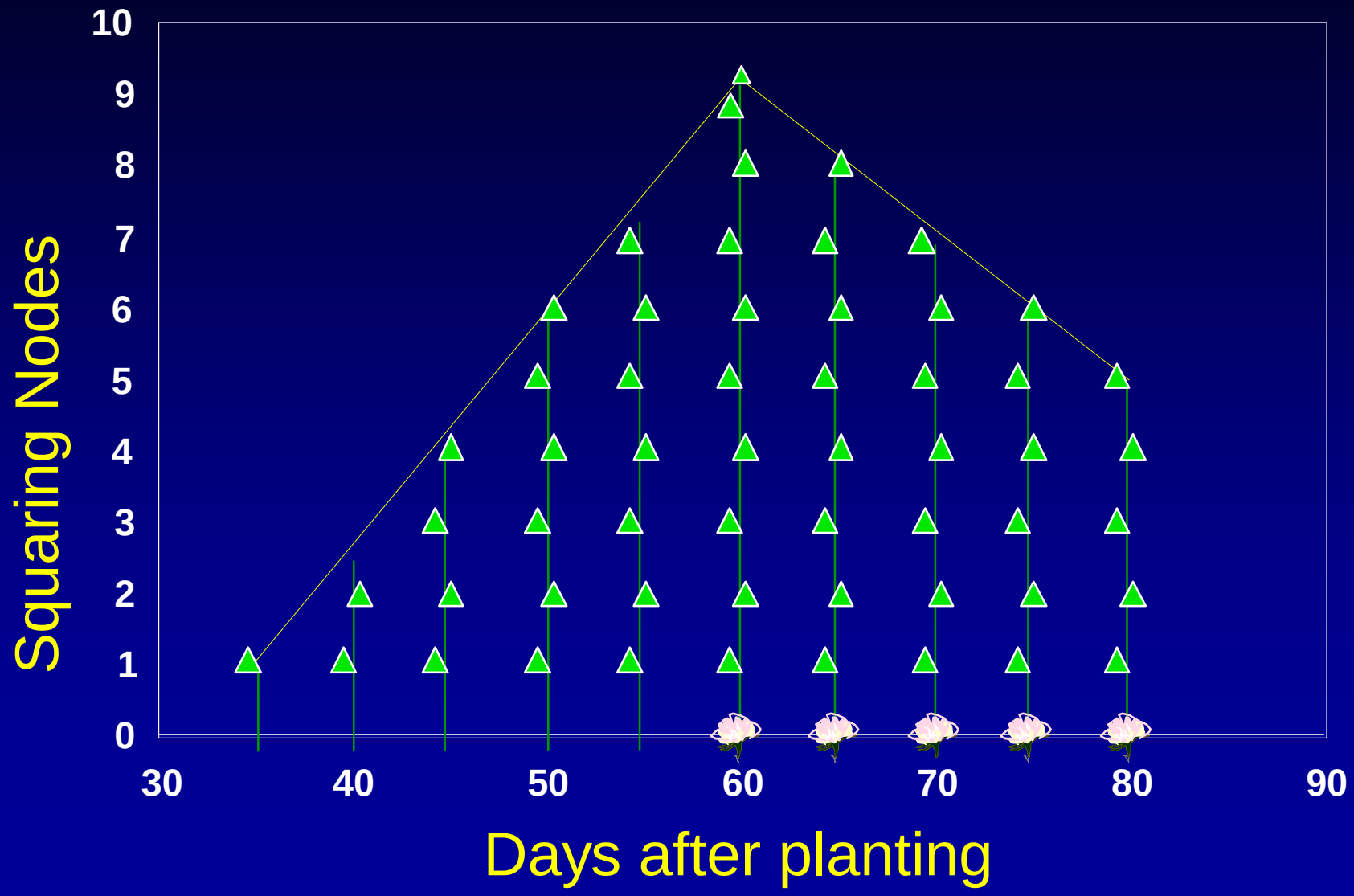
- Physiological Cutout at 80 DAP
  - 5 squaring nodes above the first position white flowers (NAWF = 5)



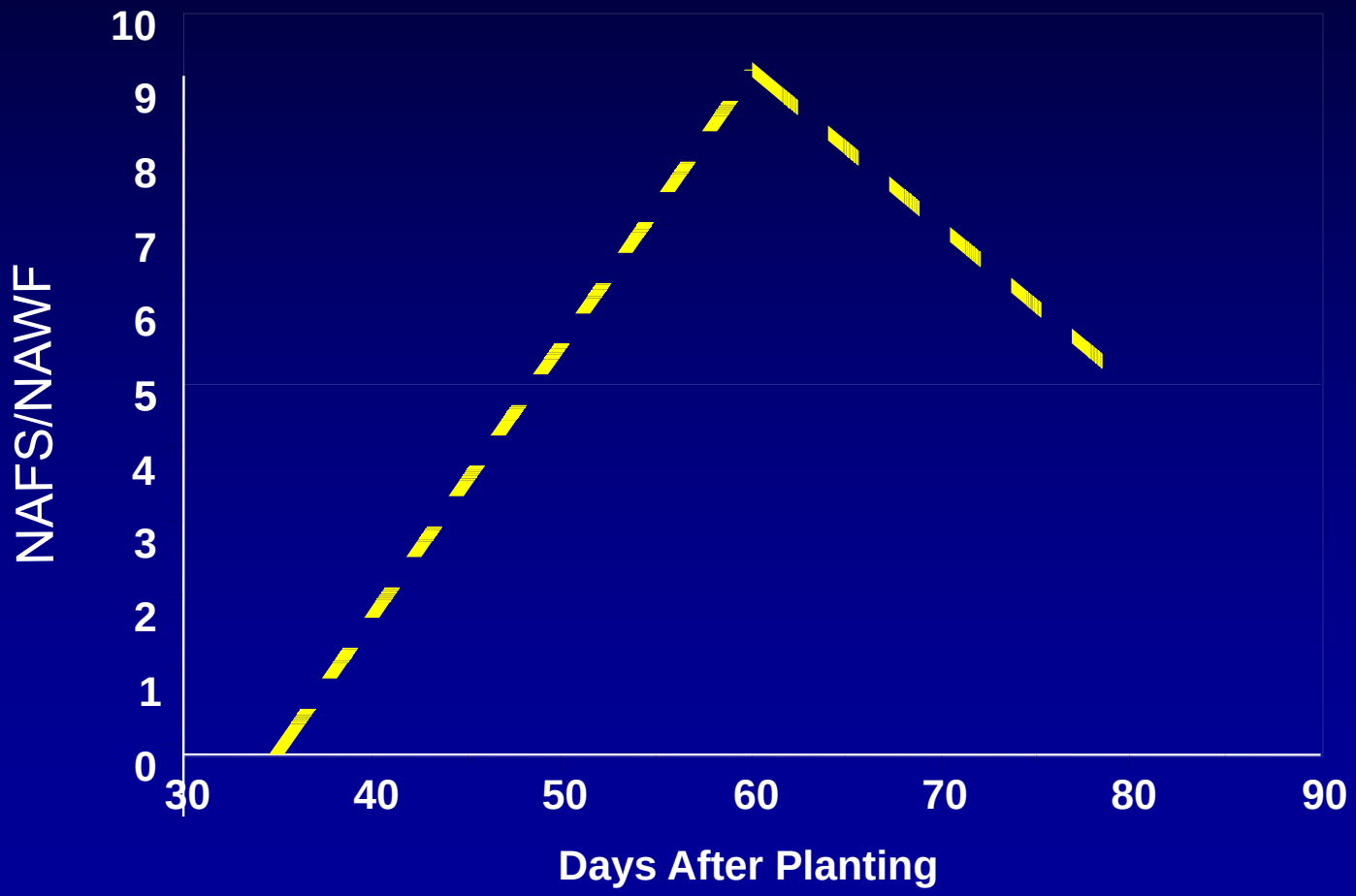
Plotting Squaring Nodes



Target Development Curve

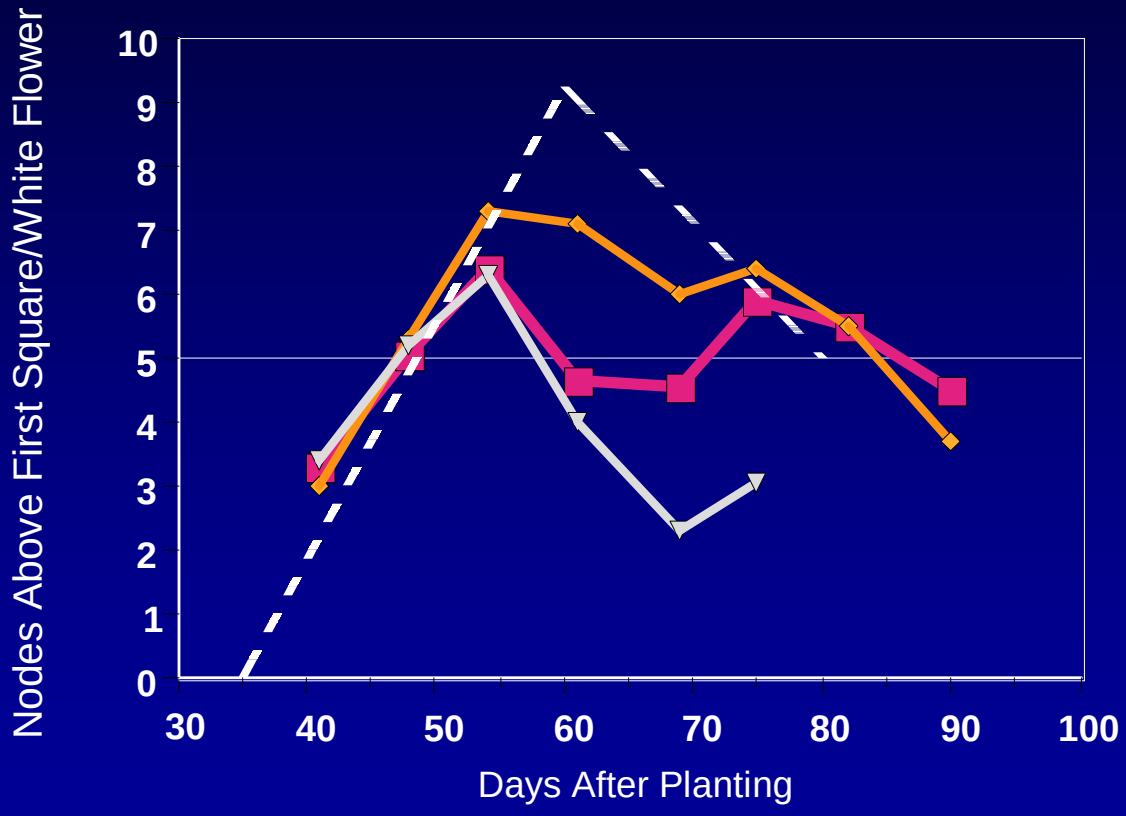


Target Development Curve



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

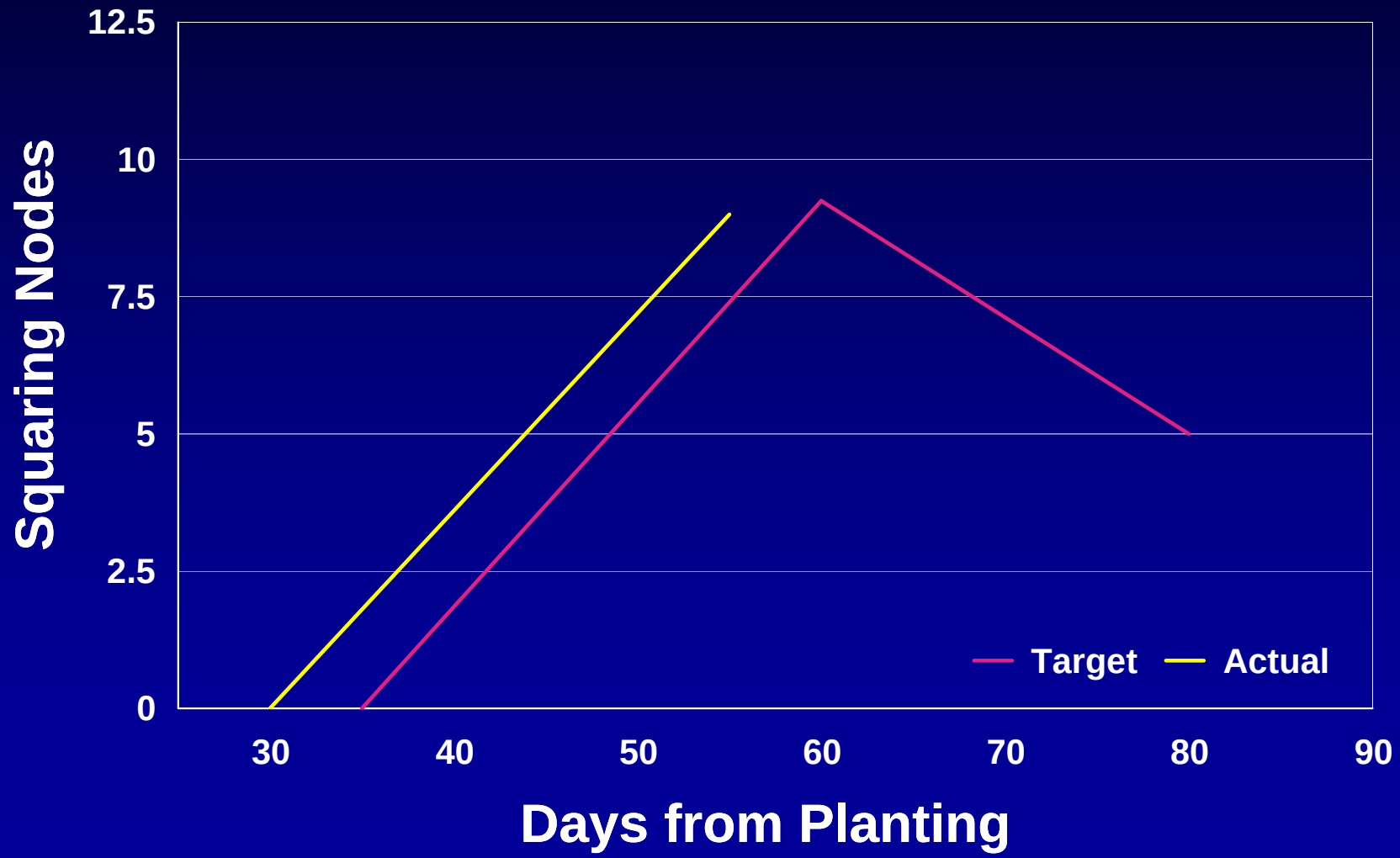
SQUAREMAN Data

- Start at PHS
  (Usually node 5-6).
- Collect weekly.
- 4 areas/field.

  Plant Height

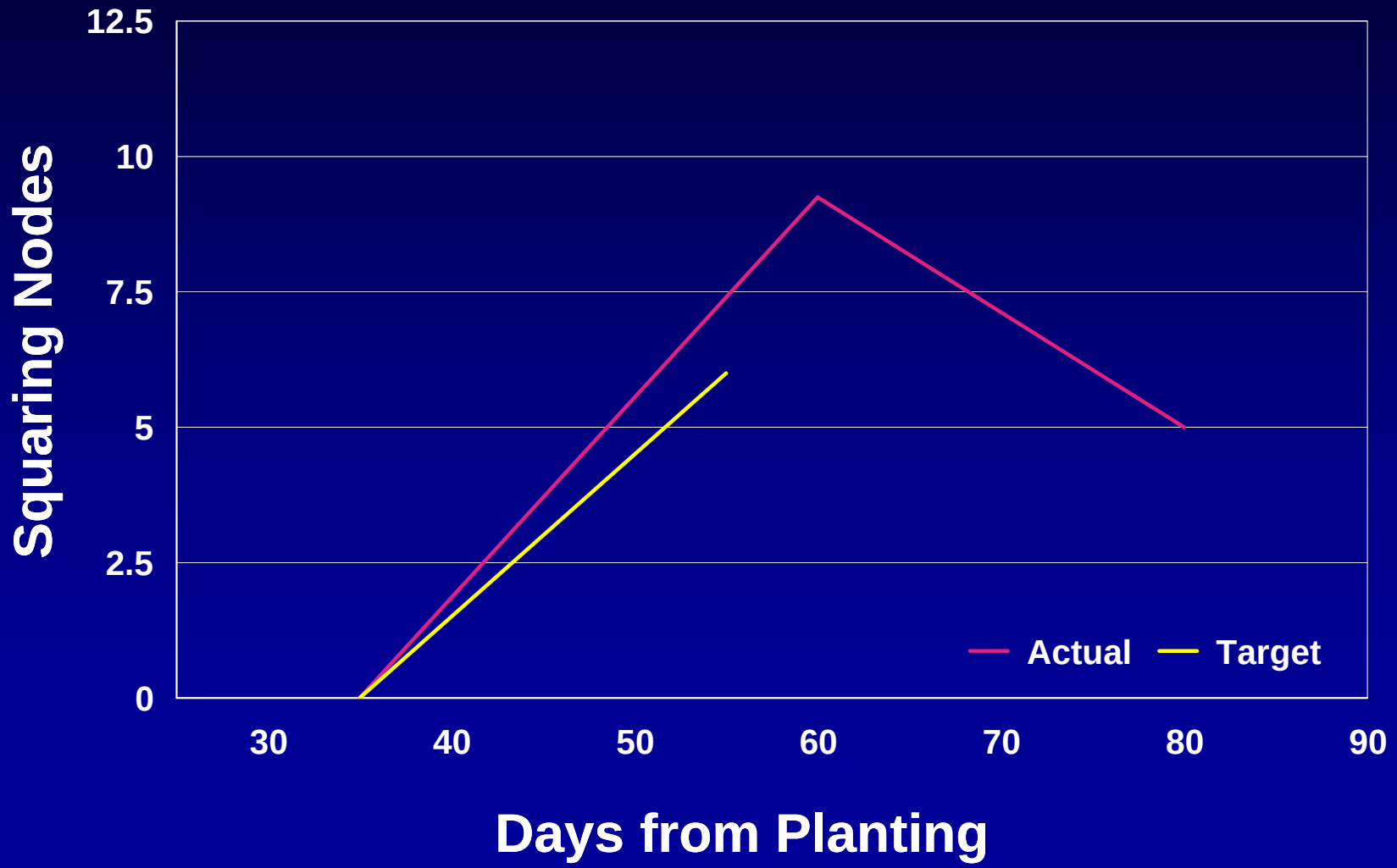
  SQUAREMAP

SQUAREMAN Crop Growth Curve: Early Development

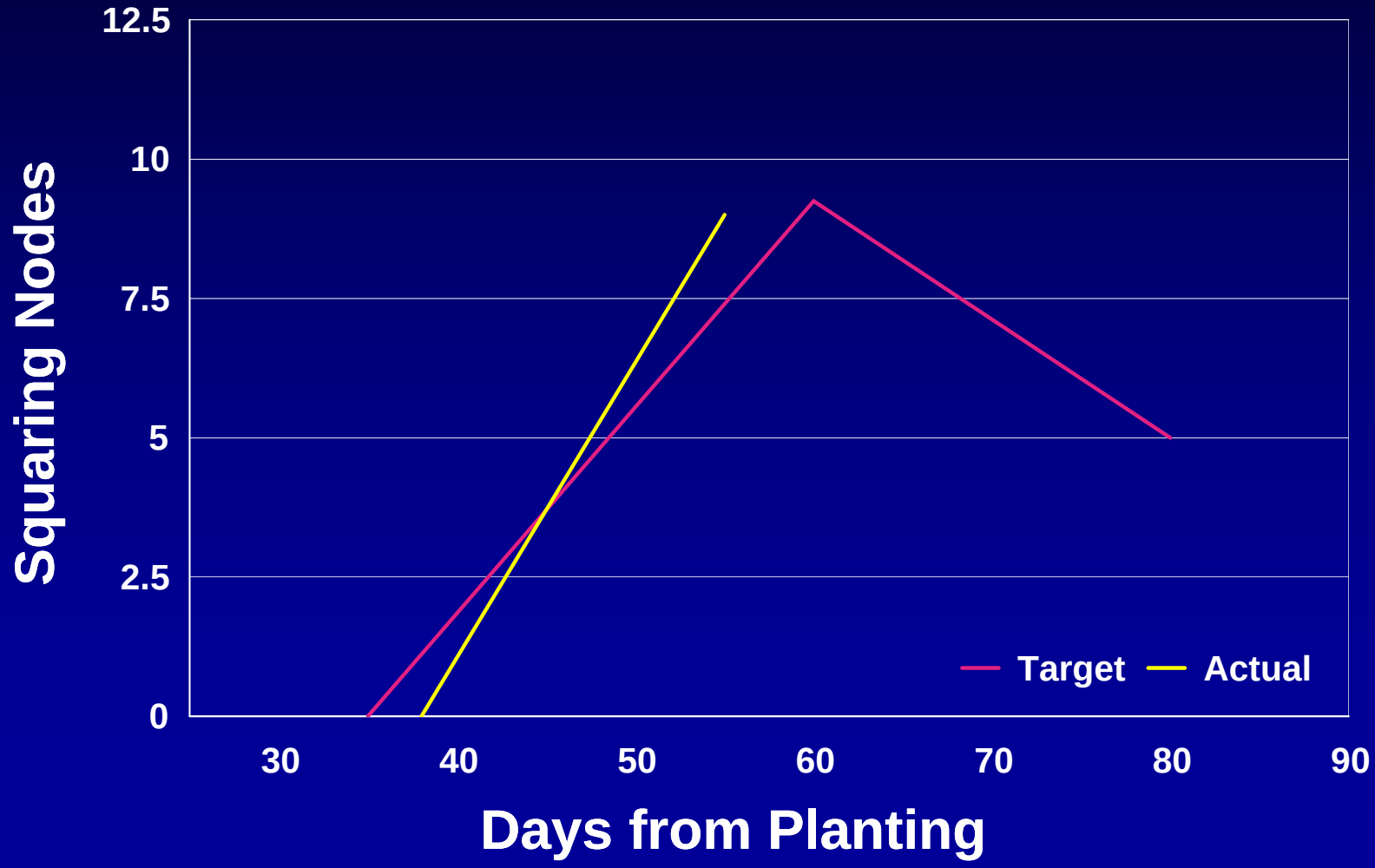


TDC 1

SQUAREMAN Crop Growth Curve: Flat Slope



SQUAREMAN Crop Growth Curve: Steep Slope after Slow Start



TDC 4

Maturity

Key to better end-of-season management is an accurate in-season measure of maturity.



Standard measures of maturity

↗% open bolls

↗NACB

Require us to “guess” about which boll population is the last one we can pick

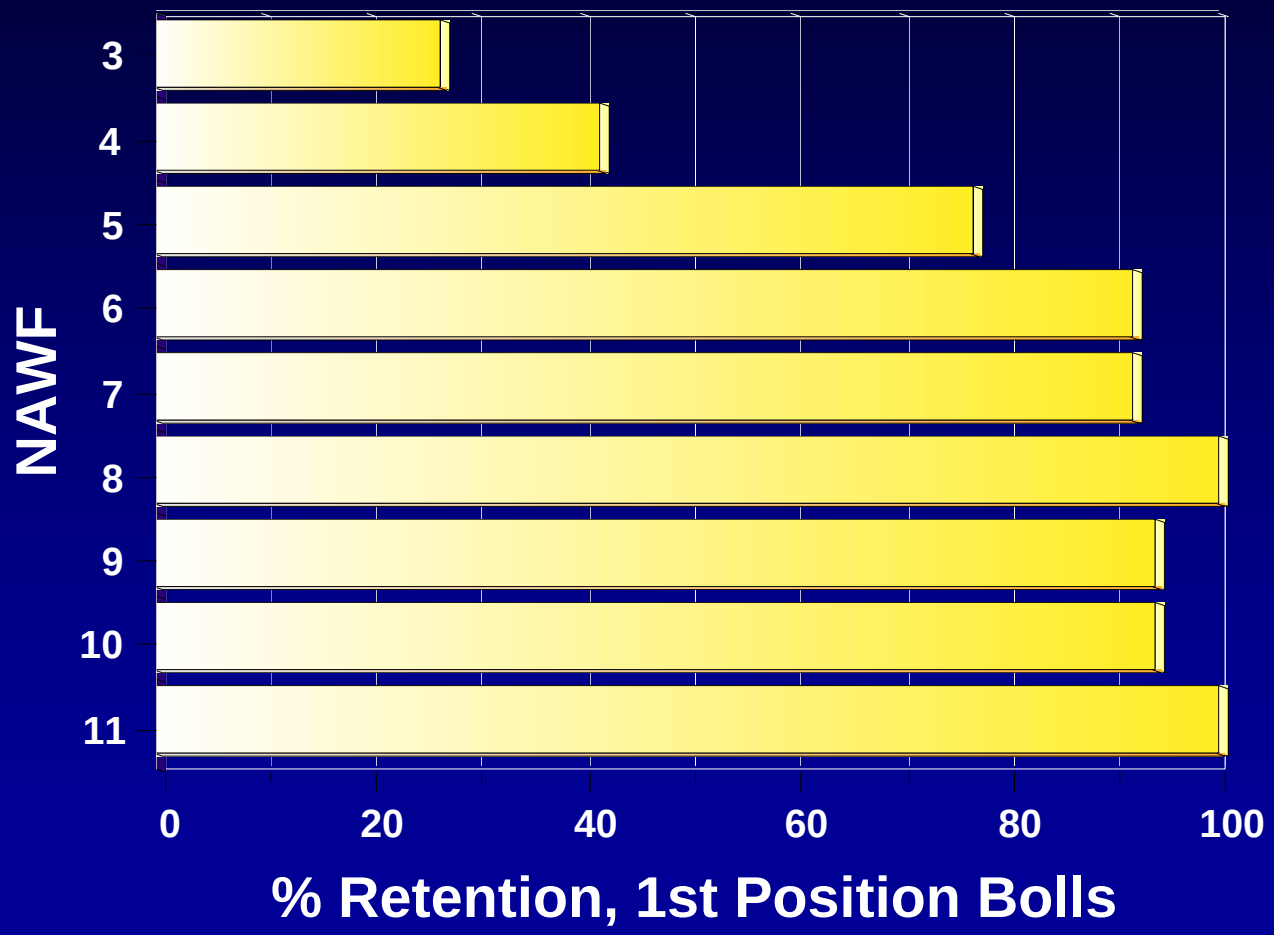
COTMAN removes "GUESSING" from end-of-season management

Defines the **Last Effective** boll population:

- ↗ % boll retention
- ↗ Contribution to yield
- ↗ Plant development
- ↗ Weather data

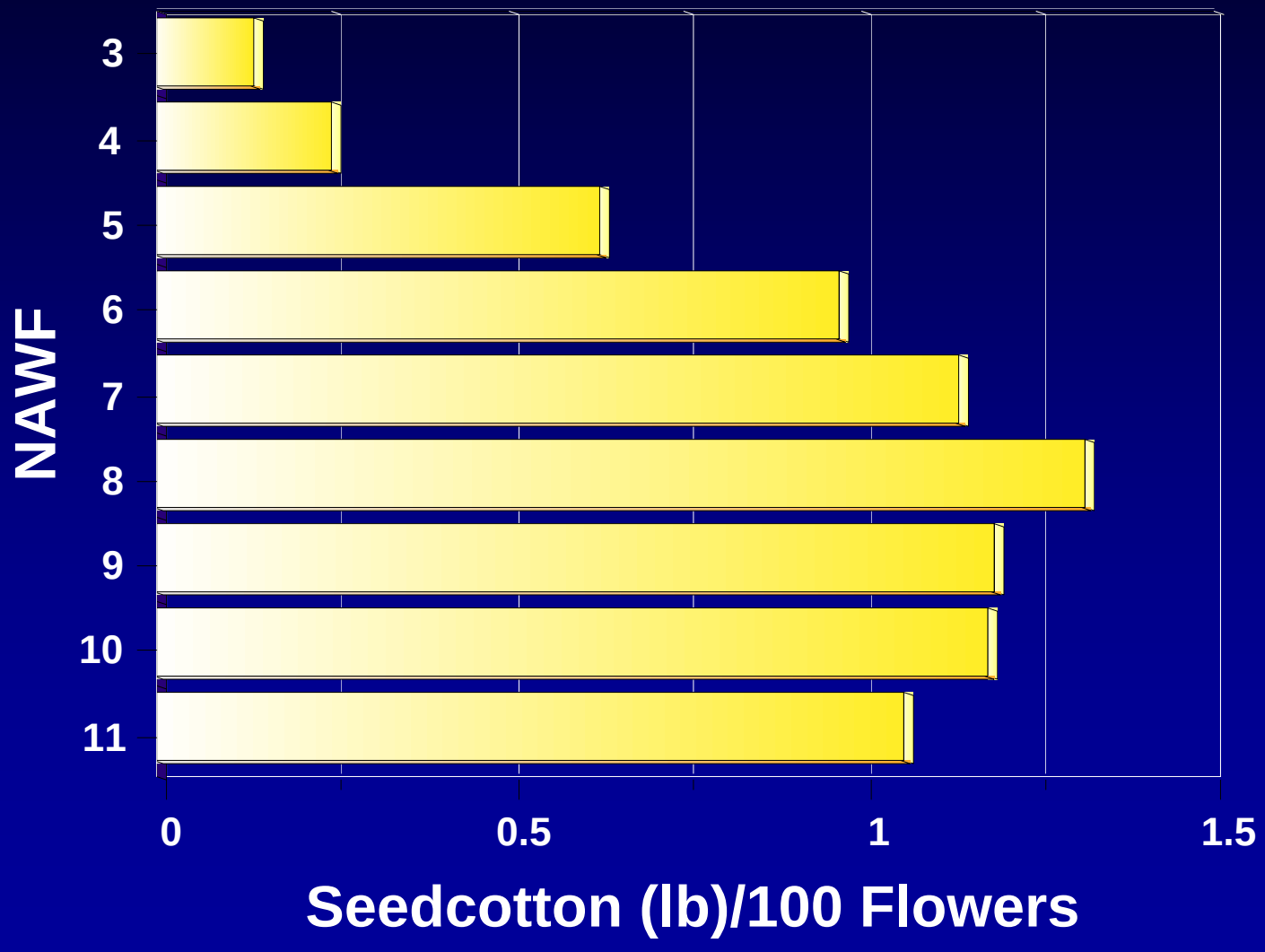
Boll Retention

NAWF = 5

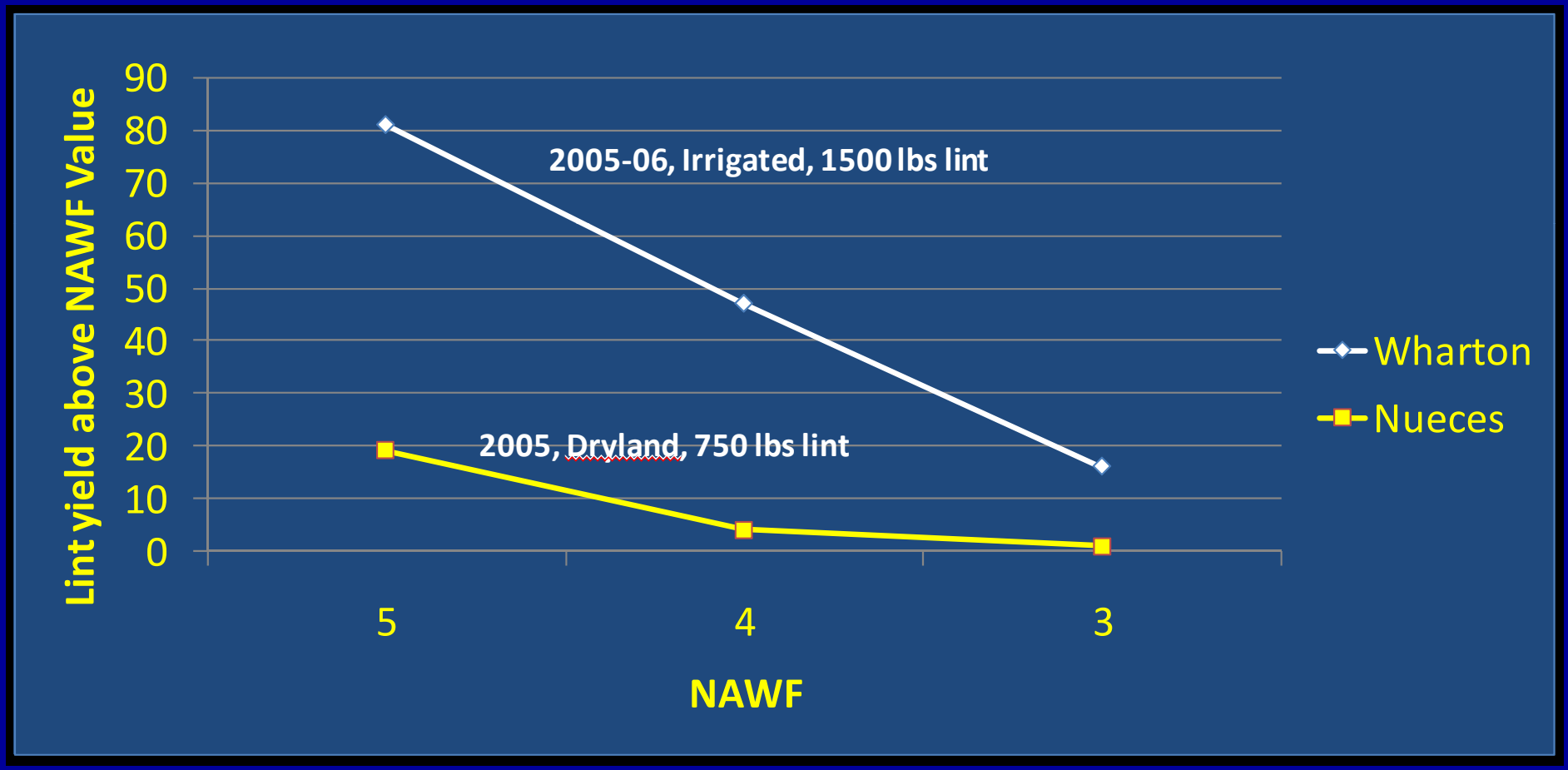


Flower Power

NAWF = 5



Contribution of Lint Yield Above NAWF= 5, 4, and 3
Texas Upper Gulf Coast



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

Are Bolls Safe from Insect Attack?

350 HU's after flower:

- Bollworm
- Tobacco Budworm
- Boll weevil
- Lygus species

450 HU's for:

- Stink Bugs

Bagwell & Tugwell, 1992, 1994, Harris 1998, Teague & Tugwell 2001

Are Bolls Safe from Insect Attack?

500-550 HU's after flower:

- Fall Armyworm

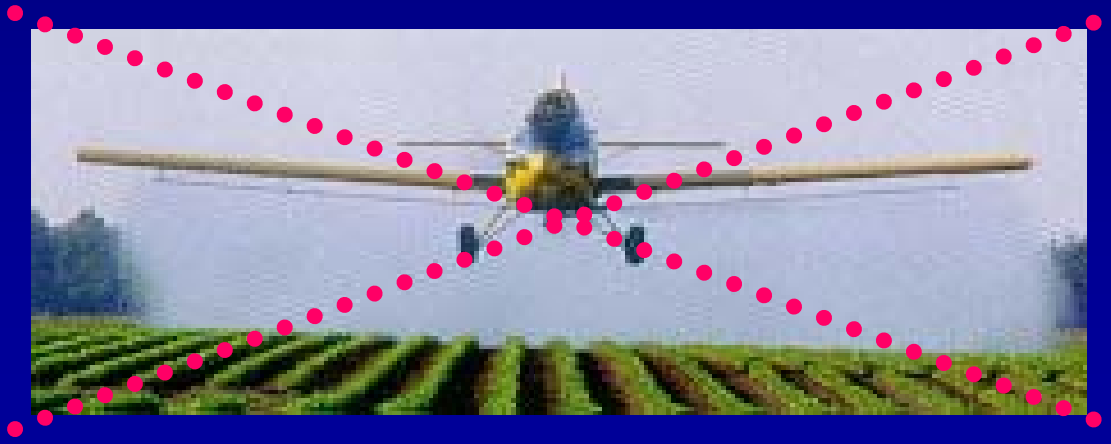
650 HU's for:

- Defoliating insects

Bagwell & Tugwell, 1992, 1994, Harris 1998, Teague & Tugwell 2001

COTMAN (End-of-Season)

- NAWF = 5 is the last effective boll population (Weather considerations)
- 350 HU's and bolls resist insect penetration
- Cutout + 350 HU's = no more spraying



End of Season Management

(Crop Susceptibility to fruit feeding insects)

- Identify last effective boll population. (NAWF)
- Track heat unit accumulation.
- Stop spraying for:
  - Bollworm
  - Tobacco Budworm
  - Boll weevil
  - Plant Bugs

End of Season Management
(Irrigation)

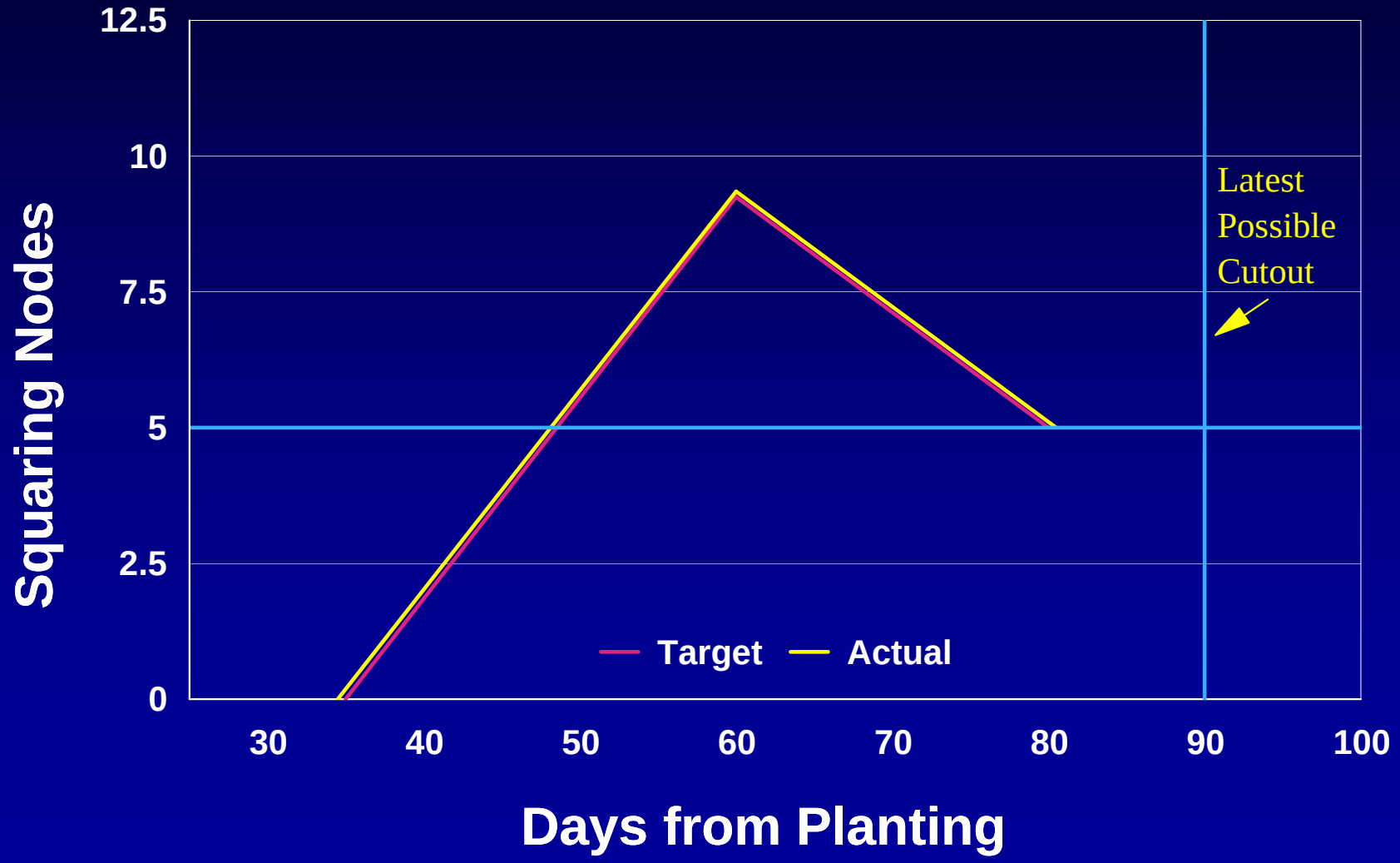
- Identify last effective boll population. (NAWF)
- Track heat unit accumulation.

- Terminate irrigation.
  - 350-400 DD60's for North Arkansas
  - 400-450 DD60's for Central Arkansas
  - 450-500 DD60's for South Arkansas

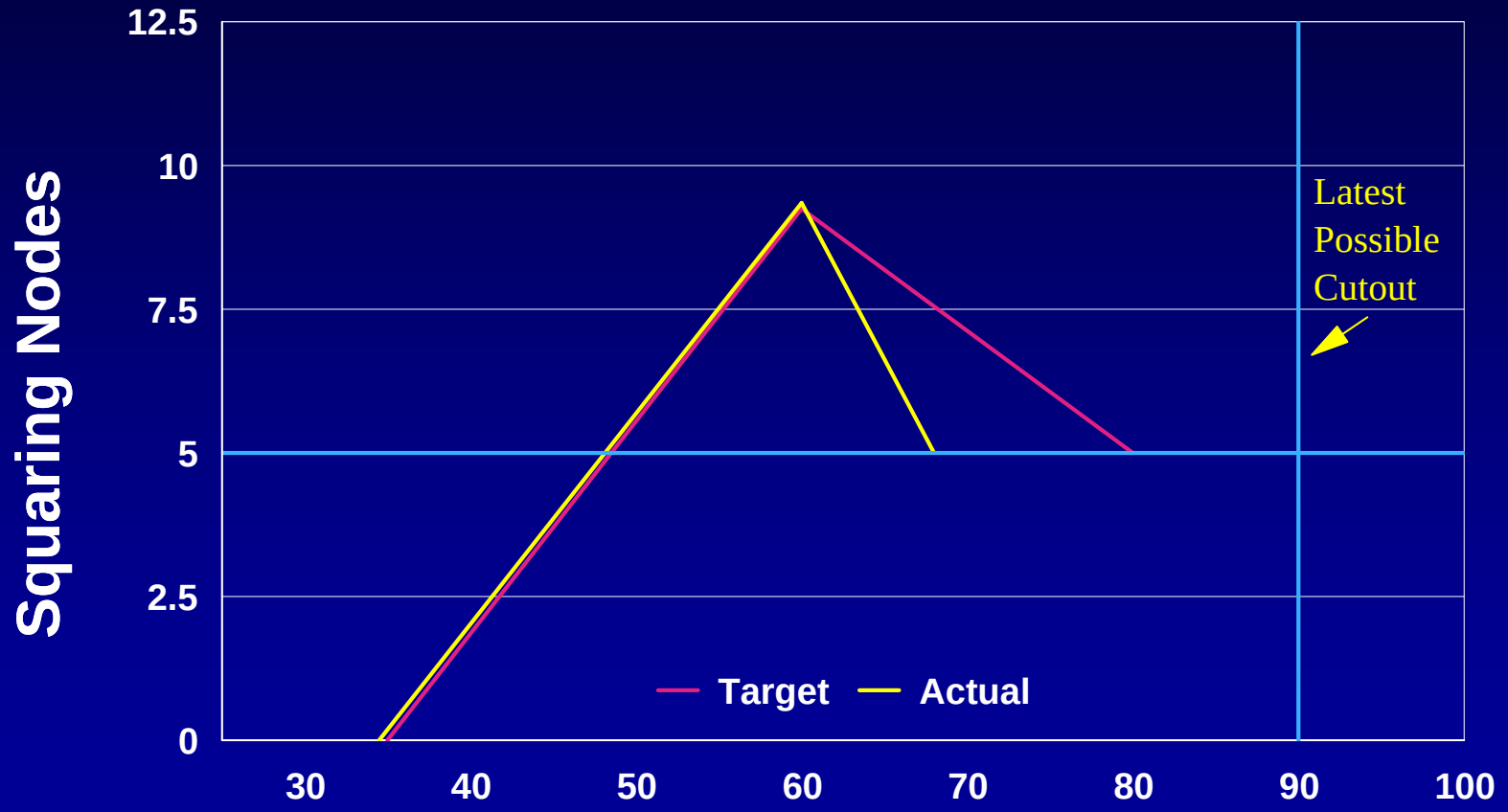
End of Season Management
(Defoliation)

- Identify last effective boll population. (NAWF)
- Track heat unit accumulation.
- 850 DD60's start evaluating defoliation.

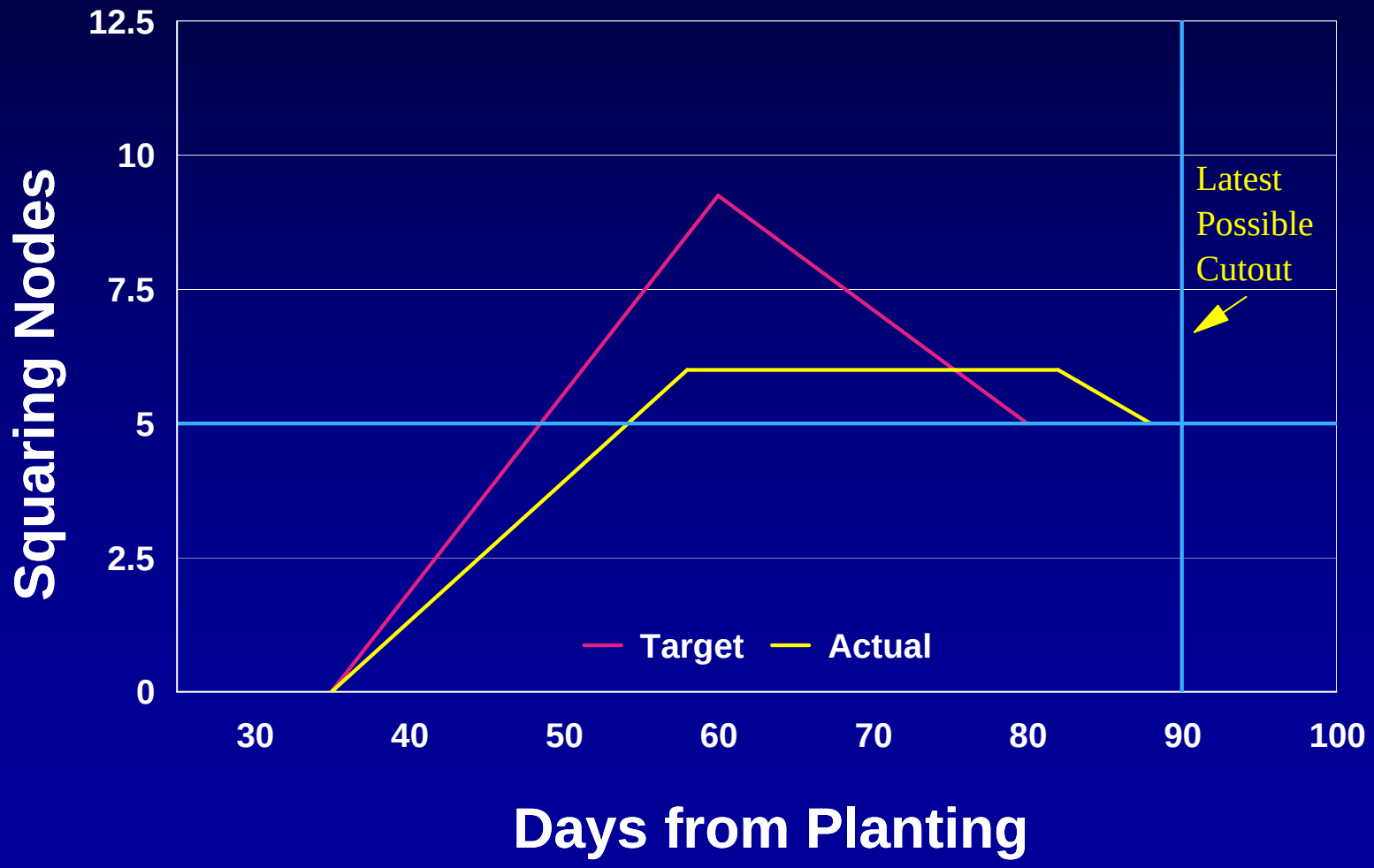
On-Target Fruit Development Rate, Physiological Cutout



SQUAREMAN on Target, Rapid Decline in Nodes-Above-White-Flower



Slow Square Development, Low Nodes at First Flower, Delayed Cutout



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

COTMAN.TAMU.EDU

AgriLIFE EXTENSION
Texas A&M System

Thank You


cotton
®
COTTON INCORPORATED
FOR AMERICA'S COTTON GROWERS