

Big Cotton Project: Where are the (Physiology) gaps?

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Introduction

- Plant development is temperature-dependent
- Thermal time (GDD_{60}) indicates season length
- Questions:
 - Is development consistent within cultivar
 - Is development consistent among cultivars with differing maturities
 - Are GDD recommendations consistent with current cultivars

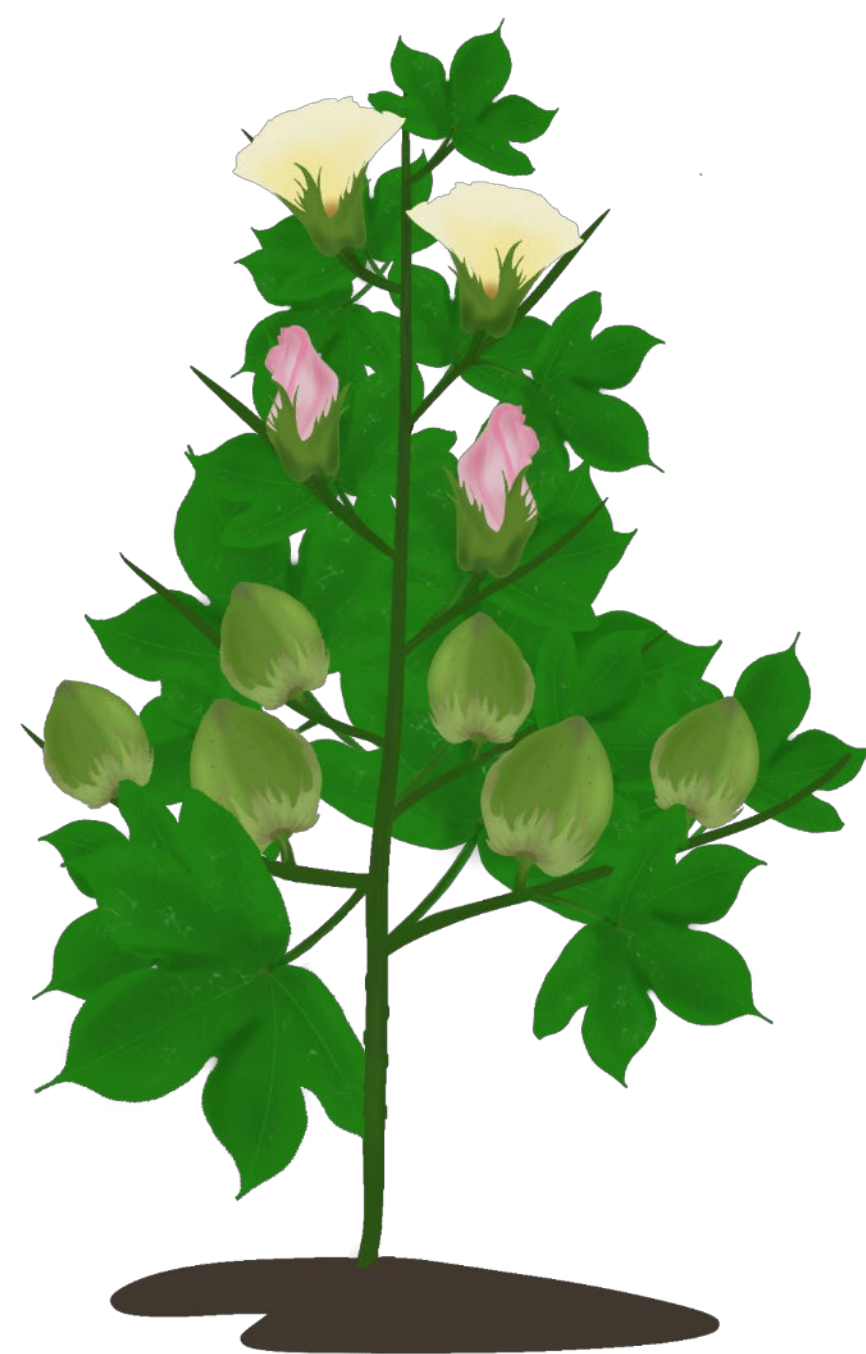


Illustration credit: Irish Pabuayon

First: What was done in 2023?

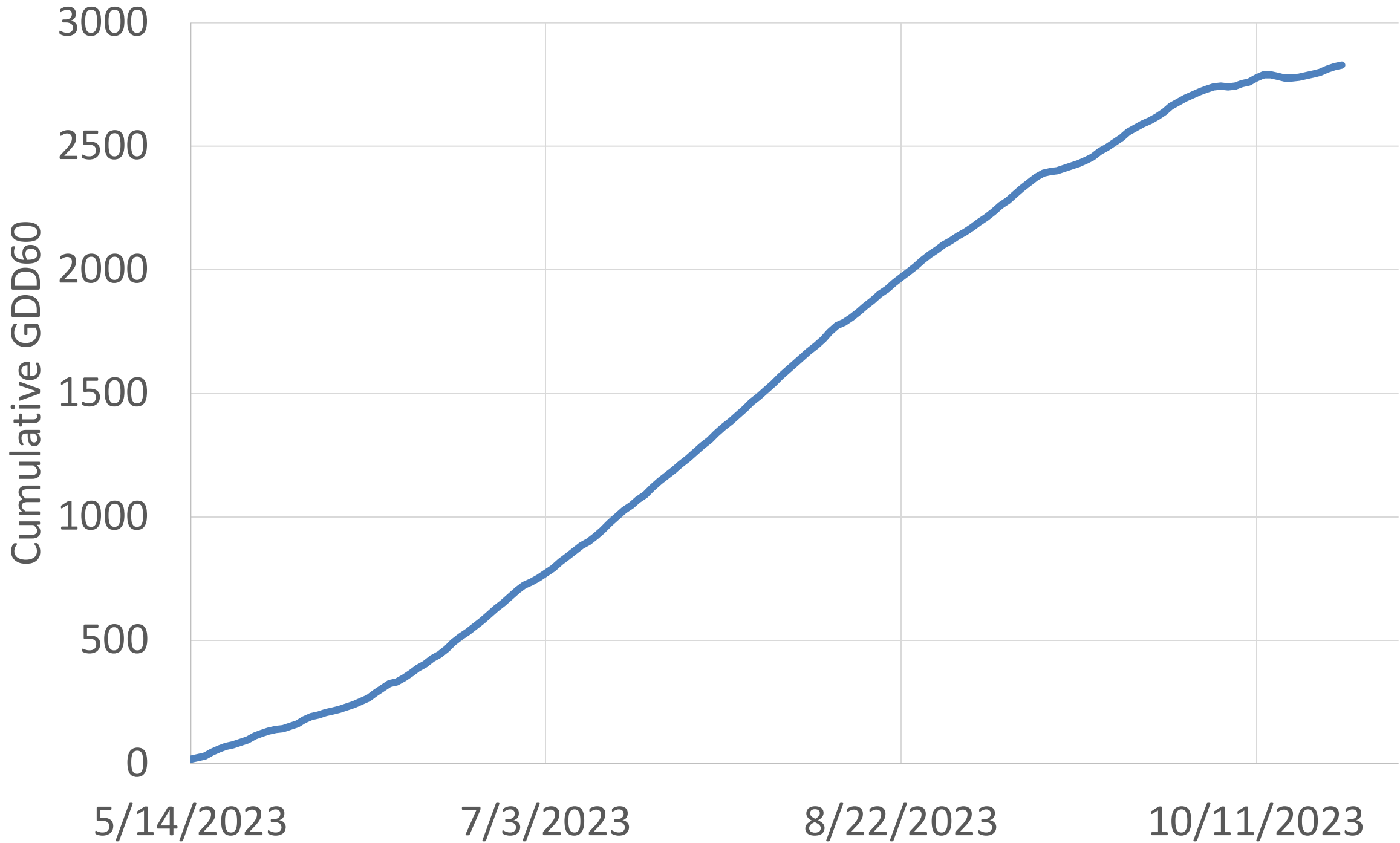
- Quaker Research Farm (Lubbock):
Amarillo-Acuff sandy clay loam soil
- 192 plots
 - 12 cotton cultivars (including PHY 205 and PHY 332)
 - 4 irrigation treatments (subsurface drip)
 - 4 replicates within each irrigation treatment ('dry', 40, 50, and 60% ET)
- Planting date May 12

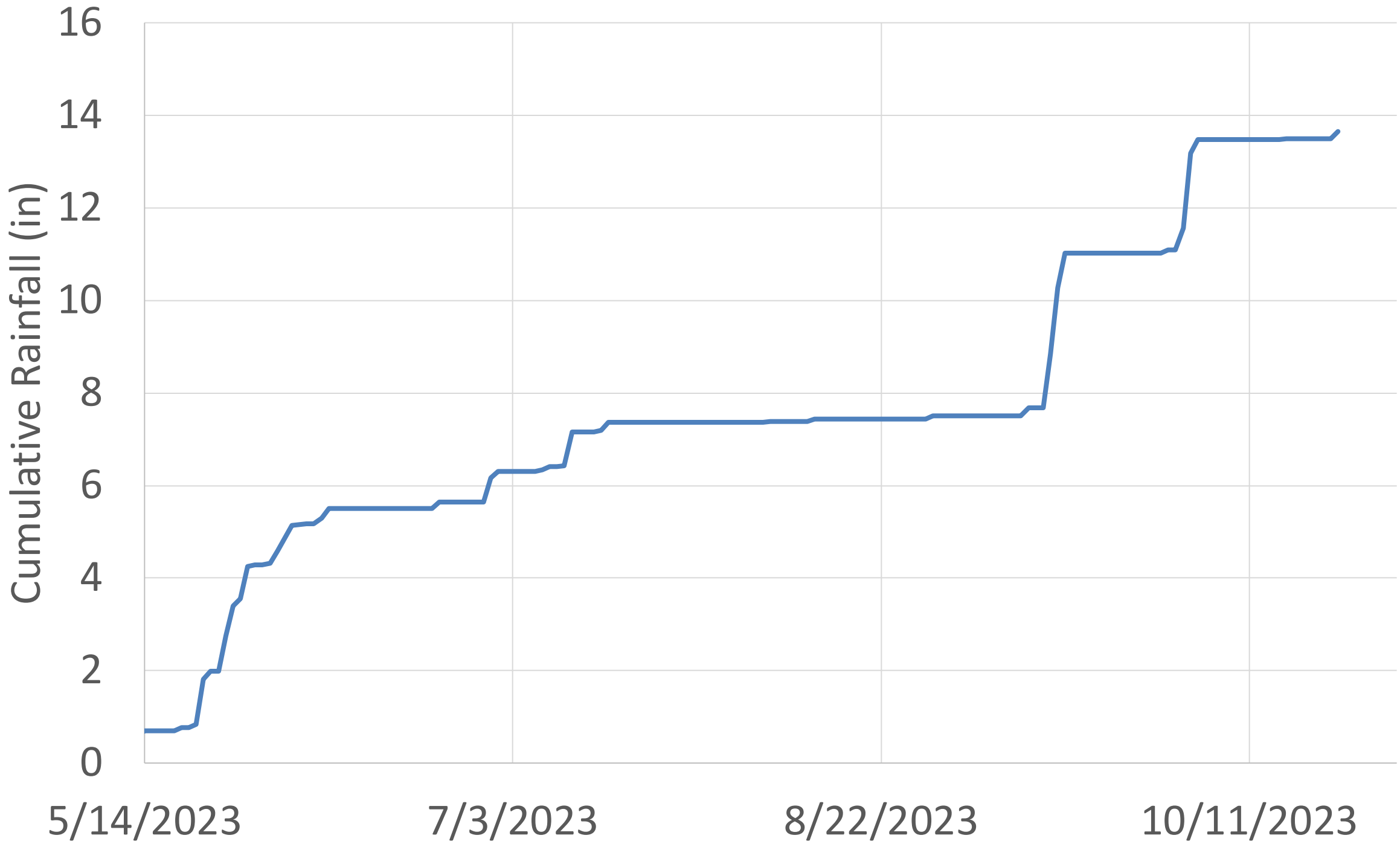


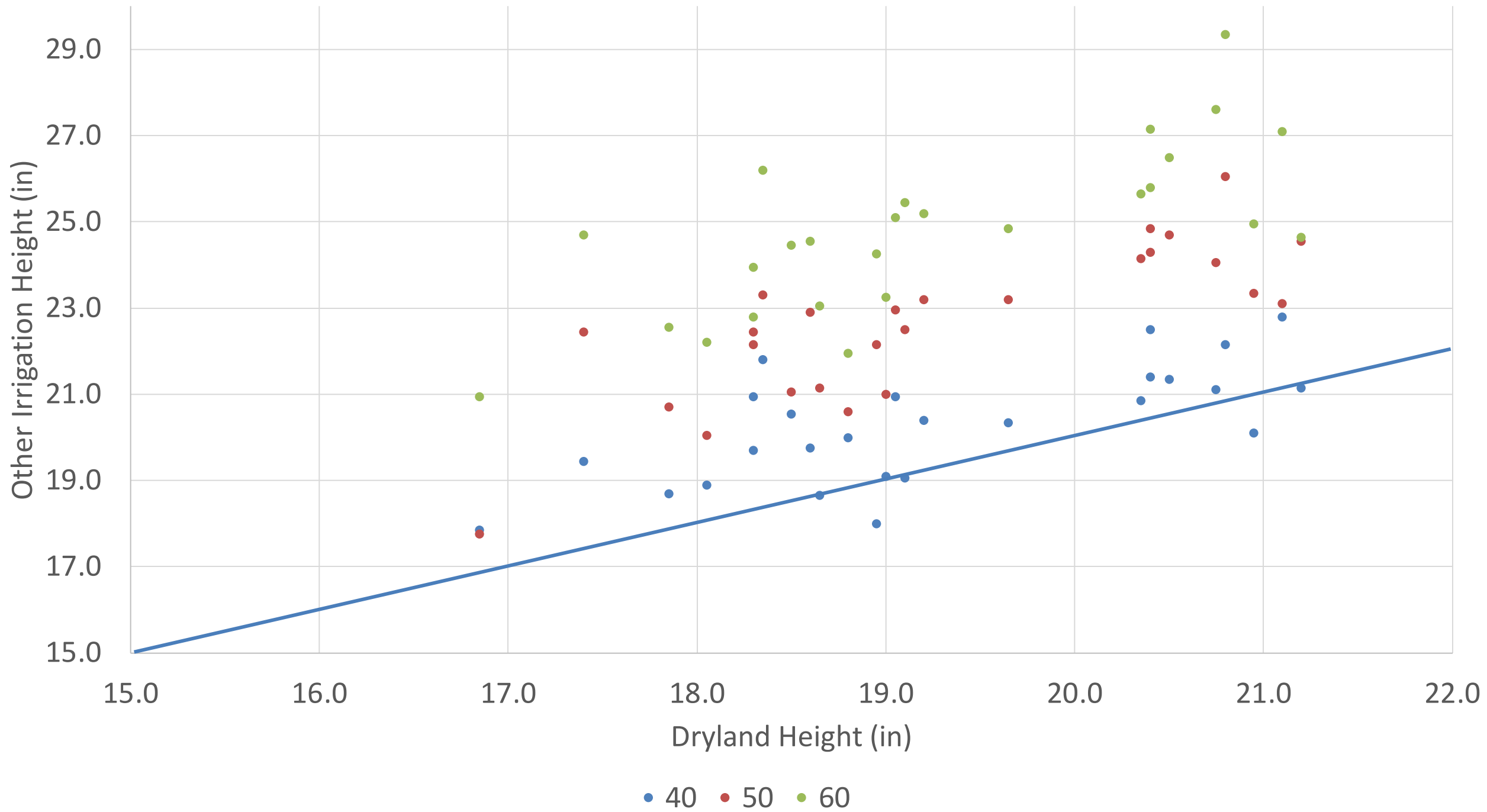
- Two Enlist (2,4-D tolerant) varieties evaluated
 - Phytogen 205 W3FE: a broadly adapted early, more determinate variety
 - Phytogen 332 W3FE: early-med maturing less determinate variety

Measurements

- Weather
- Stand counts
- Nodes
- Node of first square and white flower
- Nodes above first square white flower
- Nodes above cracked boll
- Plant mapping (limited plots)

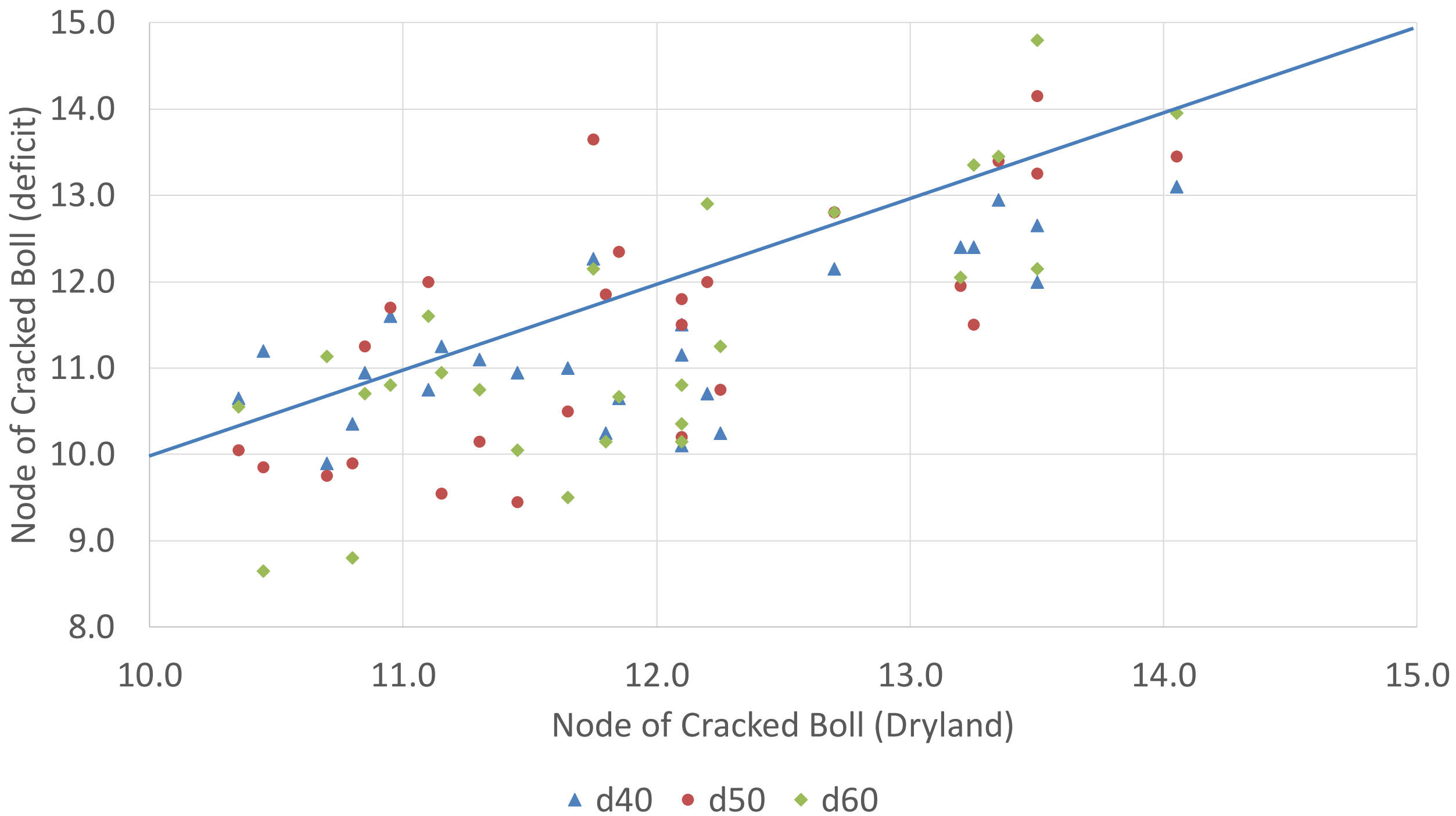






Take-Home

- Vegetative growth with irrigation is consistent over cultivars
 - At least within our range to measure



Take-Home

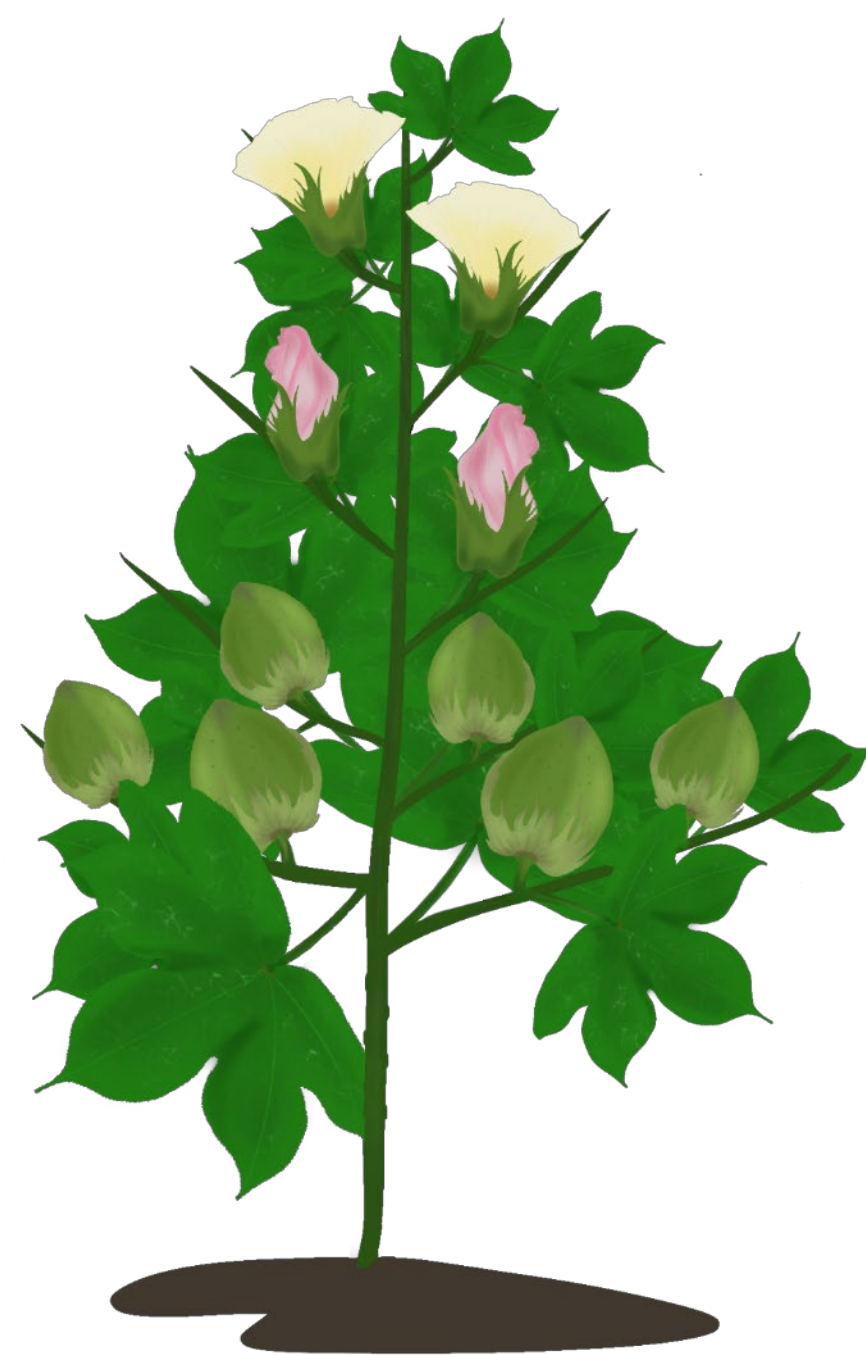
- Progression of cracked bolls with irrigation is consistent over cultivars
 - At least within our range to measure

Summary

- Consistency: early cultivars were early cultivars among irrigation levels
- Developmental consistency among cultivars: not so much
- Mid-season temperatures
 - Increased heat units to pinhead square and flowering
 - Similar heat units flowering to open boll as reported

Gaps

- Has the rate of node production and fruit development in current cultivars changed (Bednarz)?
 - Cultivar selection
 - Limitations of heat unit-based calculations
- Does prior exposure to cold change developmental rate?

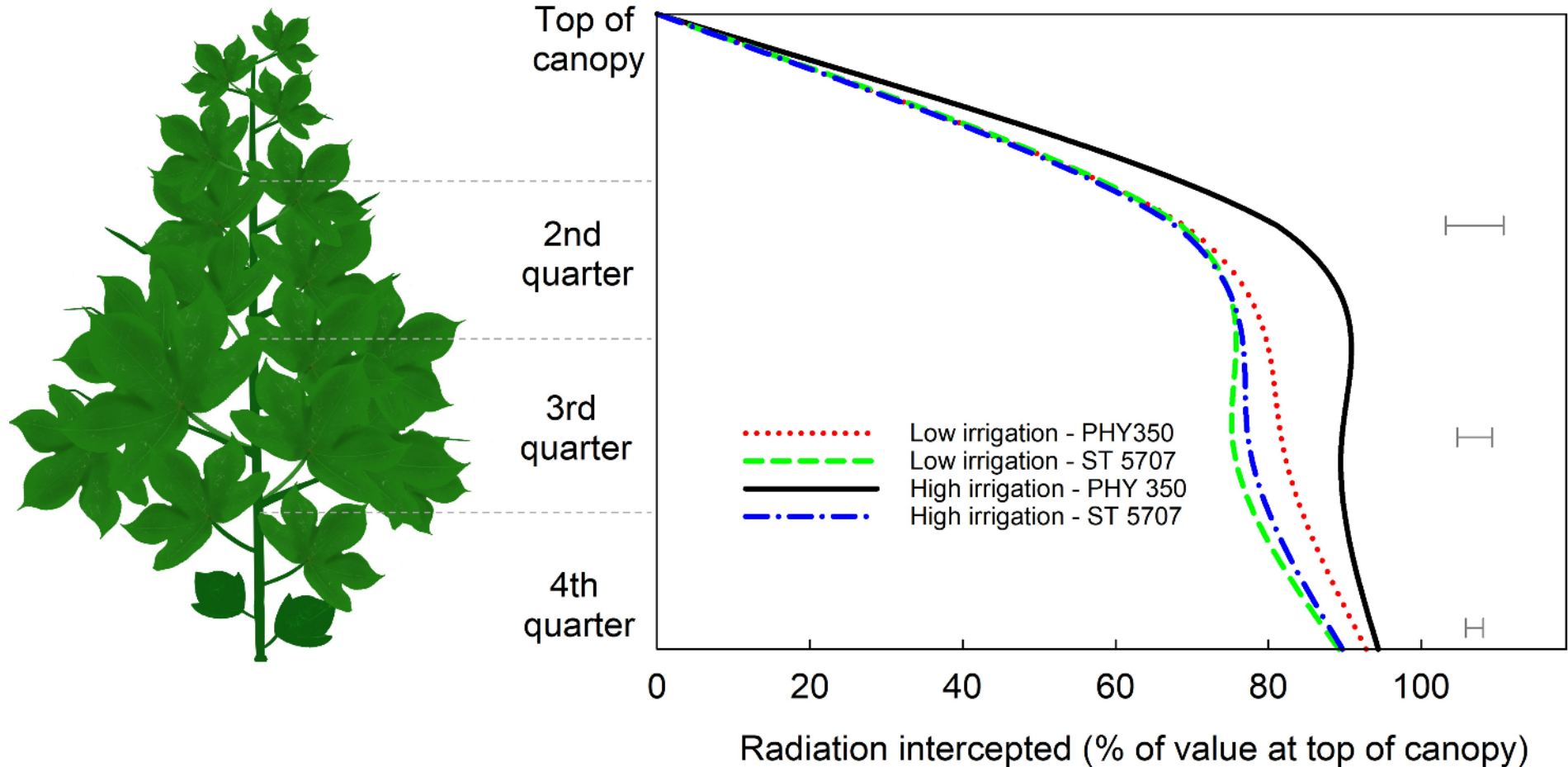


Gap Testing

- Multiple planting dates
- Node and fruit mapping by date
- Comparison of development by heat units by cultivar by plant

Gaps

- Are vegetative development and reproductive development closely, loosely, or not linked?



Thank You and Questions