

UF/IFAS Nutrient Management Renaissance

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2024 Citrus Growers' Institute

Topics

- Overview of statewide nutrient management project.
- Review slow and controlled release fertilizer work with citrus.

Renaissance A revival or rebirth, especially of culture and learning.



Why now?

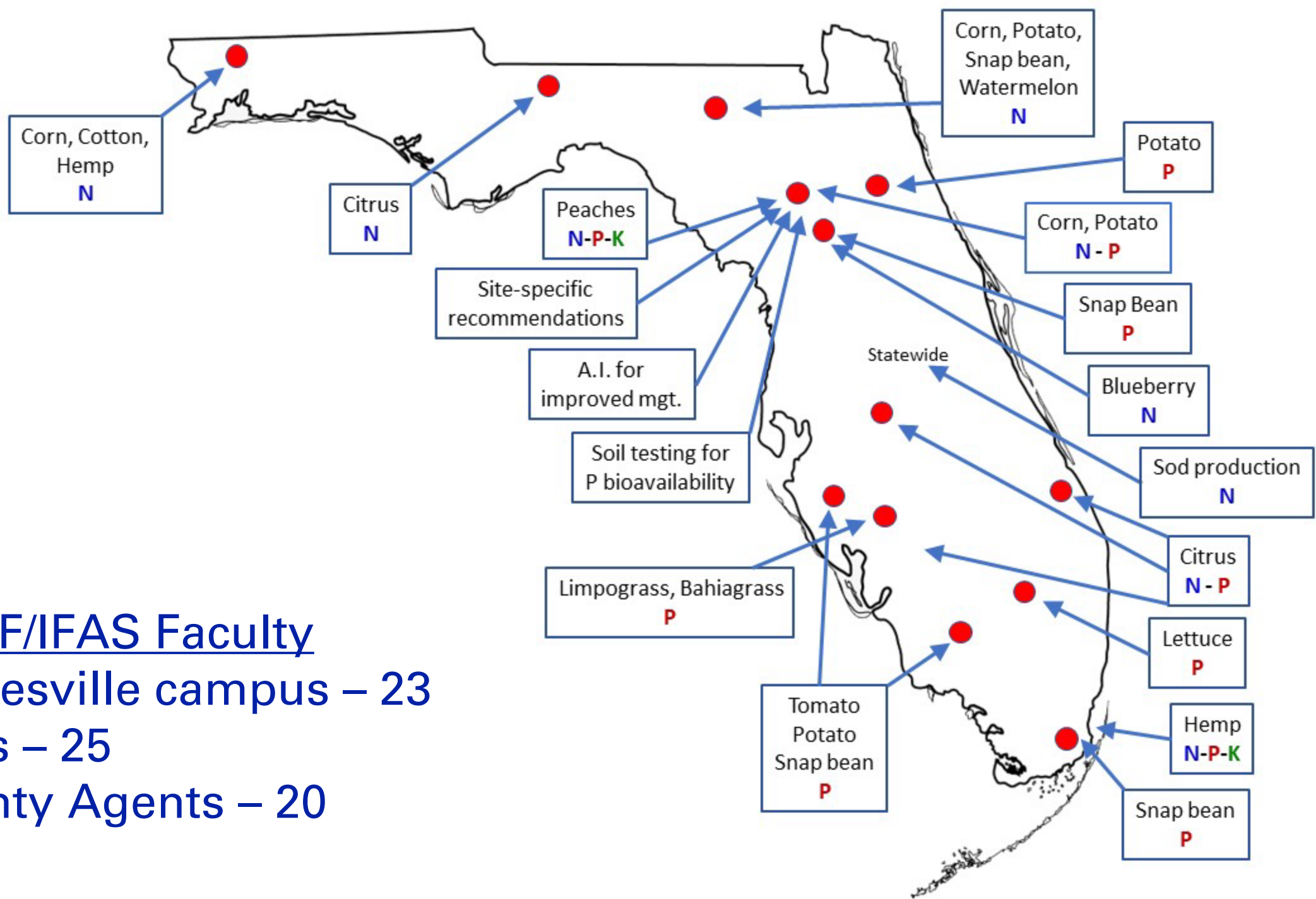
1. Producer concerns to IFAS.
2. Update the research base:
 - Commercial production practices.
 - Modern crop varieties.
 - Site-specific recommendations.
3. Recommendations becoming regulations???(SB 712)
4. Common support from producers, legislators, and IFAS leadership.

Nutrient management funding

- Legislative allocations to UF/IFAS:
 - 2021: \$1.6 million
 - 2022: \$8.76 million
 - 2023: \$6.2 million
 - 2024: \$4 million
- Goal: New generation of IFAS recommendations

Legislative intent

- HB 5001
 - Fertilizer rates: tomato, potato, citrus, corn, snap beans... plus “any other crop.”
 - Normal and economical crop production.
 - Maximize crop yield and quality.
 - Minimize nutrient inefficiencies.
- SB 1000
 - Develop recommendations for sitespecific nutrient management.



68 UF/IFAS Faculty
 Gainesville campus – 23
 RECs – 25
 County Agents – 20

Plans of work

- Focus on N, P, and fertilizer 4Rs “plus one”
 - Rates
 - Sources
 - Timing
 - Placement
 - Water
- Advanced concepts
 - Soil testing, site specific recs, artificial intelligence

A few observations

- Grain corn yield increase above max. IFAS N rate.
- Vegetable response to P fertilizer where soil test P is “high.”
- Row distance from ditch affected fertilizer response.
- Banding = better fertilizer efficiency.
- CRF + proper irrigation = greater watermelon yield, less N/K leaching, lower N rates.

November 1, 2022 (70 days after planting – first harvest)

P₂O₅ application rate

0 lb/acre

50 lb/acre

100 lb/acre

150 lb/acre

200 lb/acre



Watermelon at 150 lbs N/acre



All CRF
683 cwt/acre

Soluble dry + liquid
724 cwt/acre







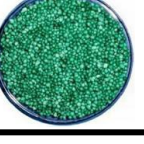
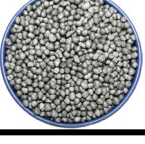


All liquid
739 cwt/acre

CRF + liquid
725 cwt/acre

Slow and Controlled-Release Fertilizers for Citrus

CRF/SRF has come a long way

<1960s	Manure and other "natural" materials		
1960s	Sulfur-coated urea (SCU) Urea formaldehyde (UF)		
1970s	Isobutylidene diurea (IBDU) Methylene urea (MU)		
1980s	Plastic-coated urea (PCU)		
1990s	Polymer-coated, S-coated urea (PCSCU) Resin-coated N-P-K		
2000s	Polymer-coating technologies		

SRF/CRF: Interests vs. concerns

Interests	Concerns
Lower application frequency	Will it work?
New plantings and resetting	Correct release pattern?
Increased nutrient use efficiency	Can I trust it?
Less leaching	Can I afford it?
Alternative to fertigation	

Progression of SRF/CRF use on citrus since 1980s

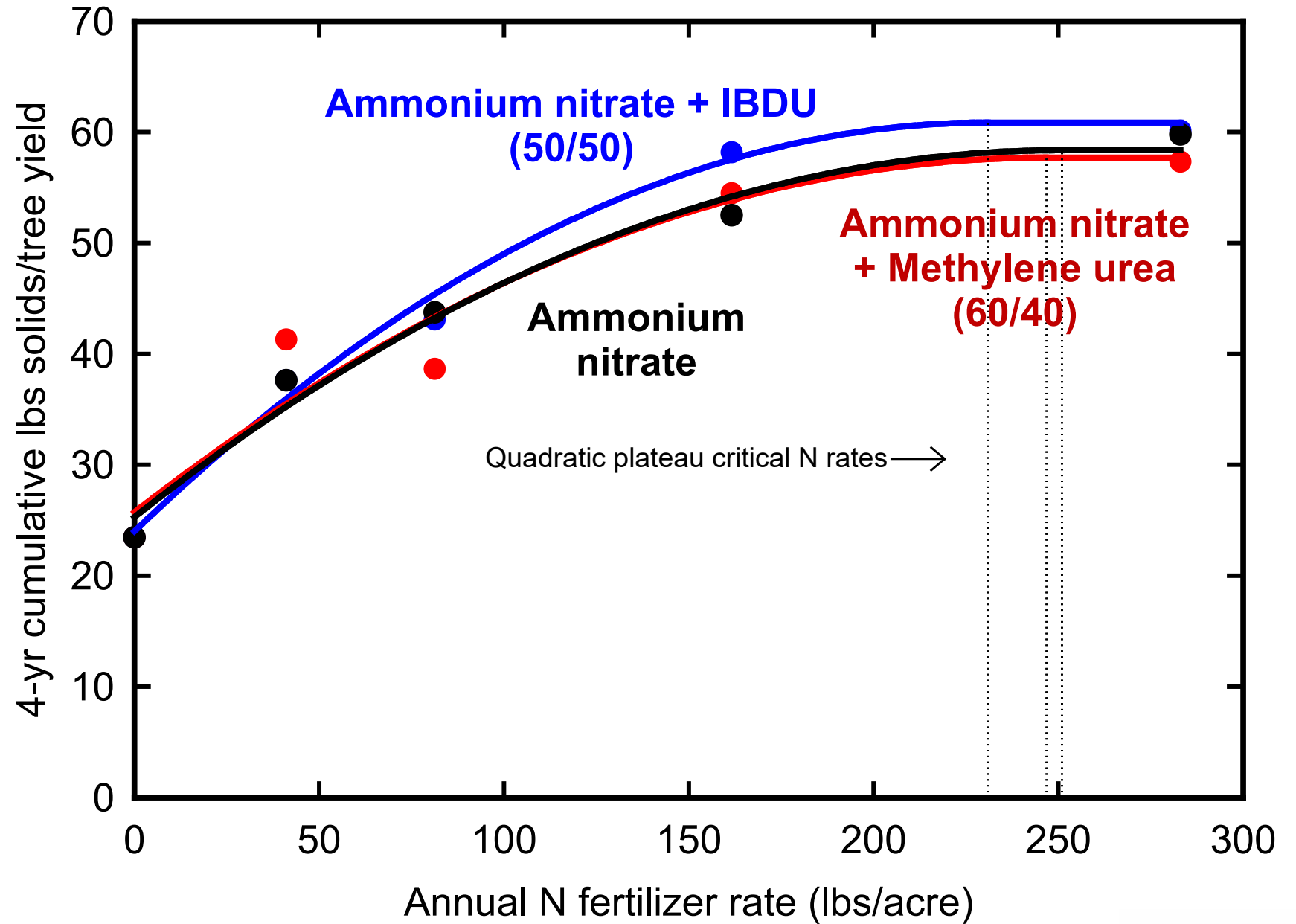
- Young-tree fertilizers: Water-soluble N + IBDU or MU.
- Bearing tree fertilizers: Blend in SCU to extend N availability.
- New plantings: Put coated CRF in planting hole.
- Some dabbling with CRF applied to mature groves.
- Advent of HLB. Continuous supply of nutrition from CRF?

Soluble/SRF mixtures, Hamlin/Carrizo



No. of applications
in 7 years

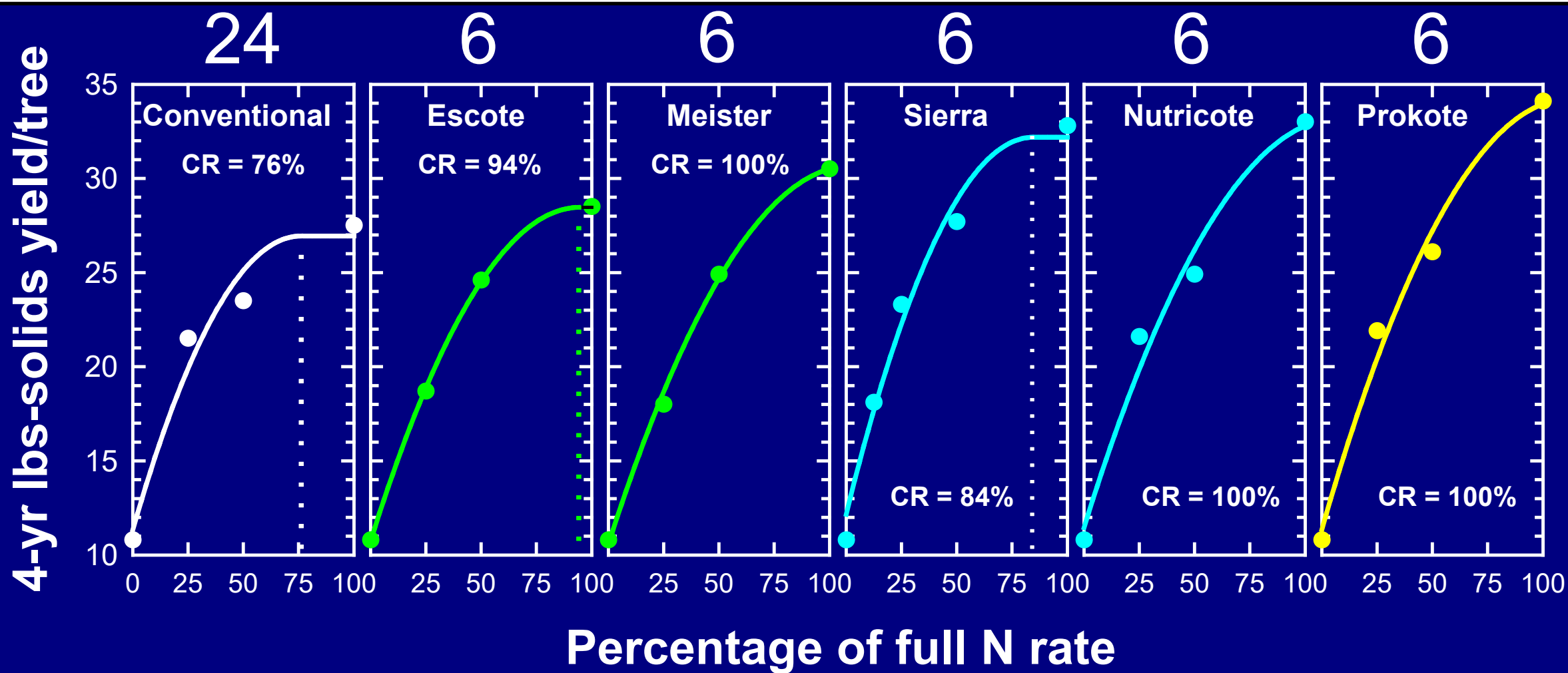
Amm Nit	31
AN/IBDU	16
AN/MU	14



Conventional vs. coated, new grove



No. of applications in 6 years:

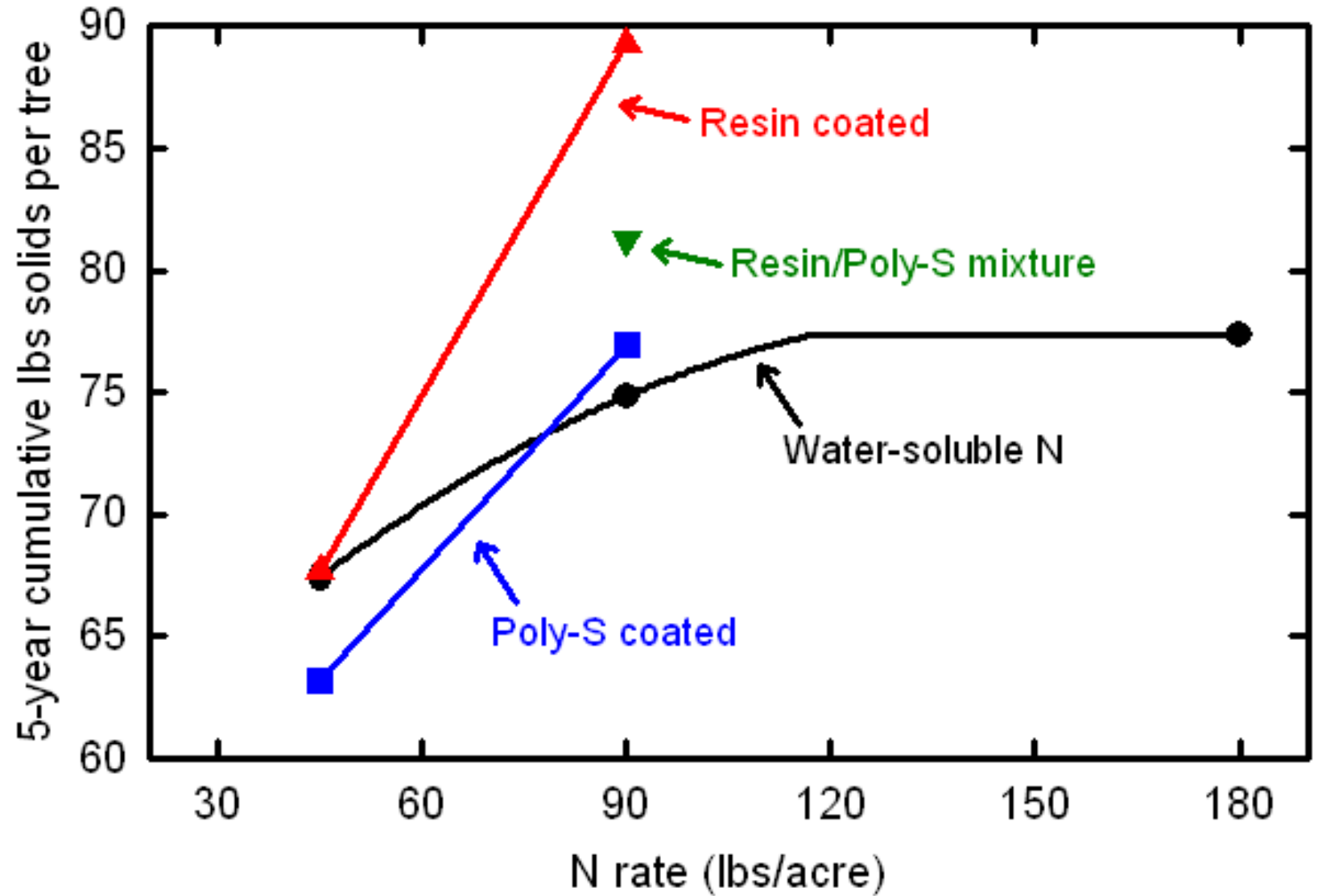


Conventional vs. coated, bearing grove



No. of applications
in 6 years

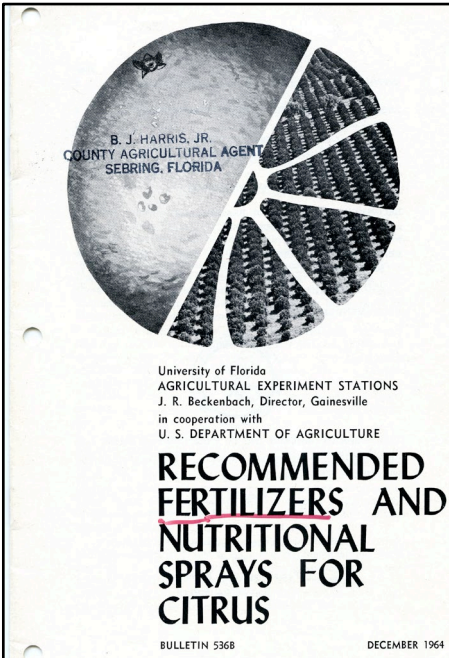
WSN	18
Resin coated	6
Poly S coated	6
Resin/PS mix	6



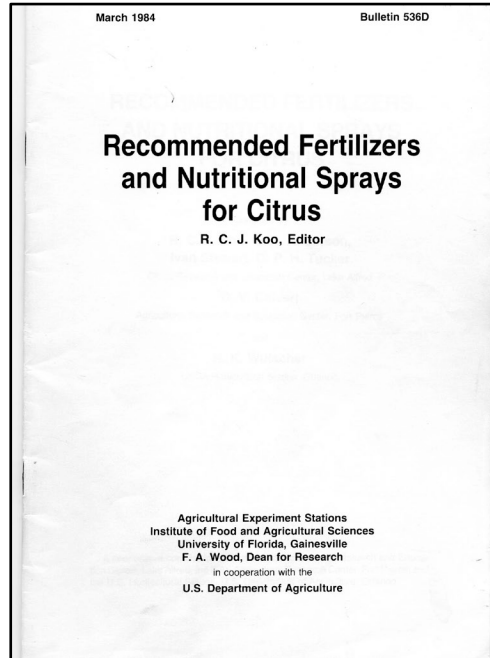
Do we have evidence to answer citrus grower questions?

- Increased N fertilizer efficiency? Yes.
- Fewer applications per year? Yes.
- Environmental advantage? Yes.
- Worked in the real world? Yes.
- Release pattern matched citrus need? Yes.
- One application per year worked? Yes.
- Can I afford it? ??????

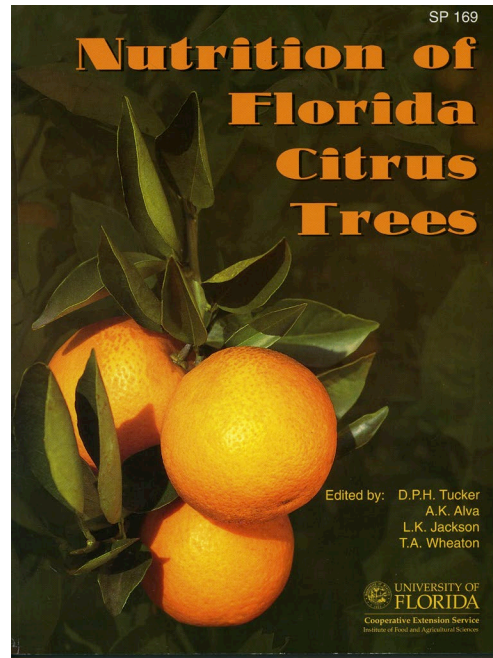
Citrus nutrition recommendations – Last 60 yrs



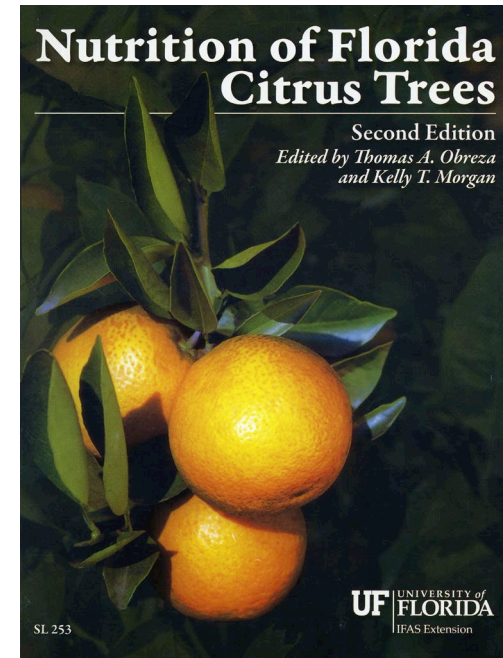
1964
Reitz
Leonard
Stewart
Koo
Calvert
Anderson
Smith
Rasmussen



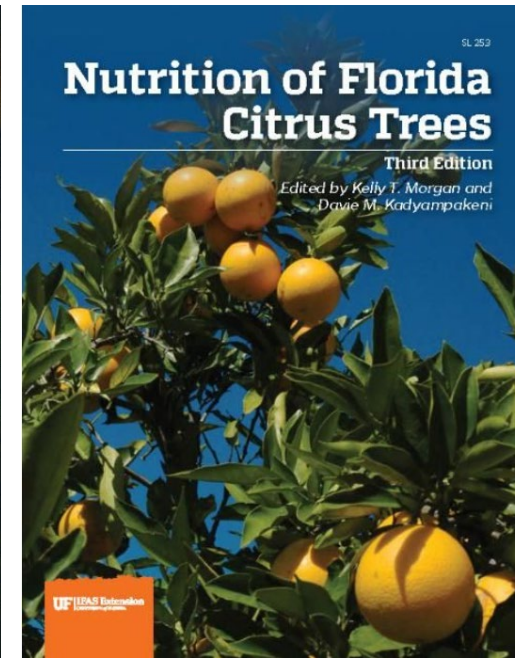
1984
Koo
Anderson
Stewart
Tucker
Calvert
Wutscher



1995
Tucker
Alva
Jackson
Wheaton
(editors)



2008
Obreza
Morgan
(editors)



2020-current
Morgan
Kadyampakeni
(editors)

Thank you!

