Rice Fertility Research in Louisiana

Irish Lorraine B. Pabuayon

Assistant Professor – Agronomy

H. Rouse Caffey Rice Research Station

LSU AgCenter, Rayne, LA

Outline

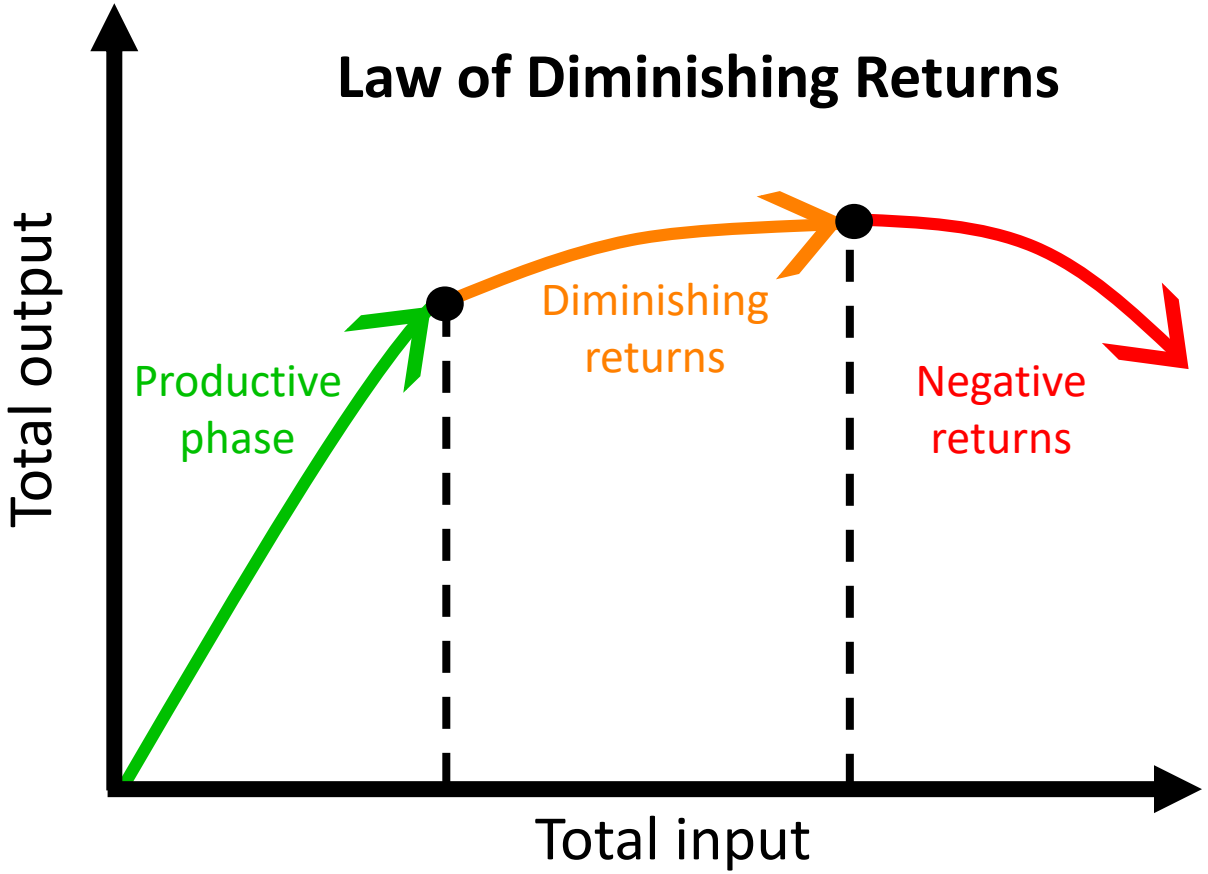
1. Nitrogen management research results

- 2022 growing season
- 5-year meta-analysis (2018-2022)
  - different N rates
  - Rice Research Station and producer fields
  - conventional, Clearfield, Provisia
  - RiceTec, Dyna-Gro

2. Questions

Overview

- High prices of N fertilizer
- Evaluate crop production target
  - Top yields?
  - Maximum profit?
- Law of diminishing returns applies to nitrogen rates
  - max yield → X max profit
- Main objective:
  - Provide the agronomic and economic optimum N rate



Profit = Gross earnings from yield - Cost of production

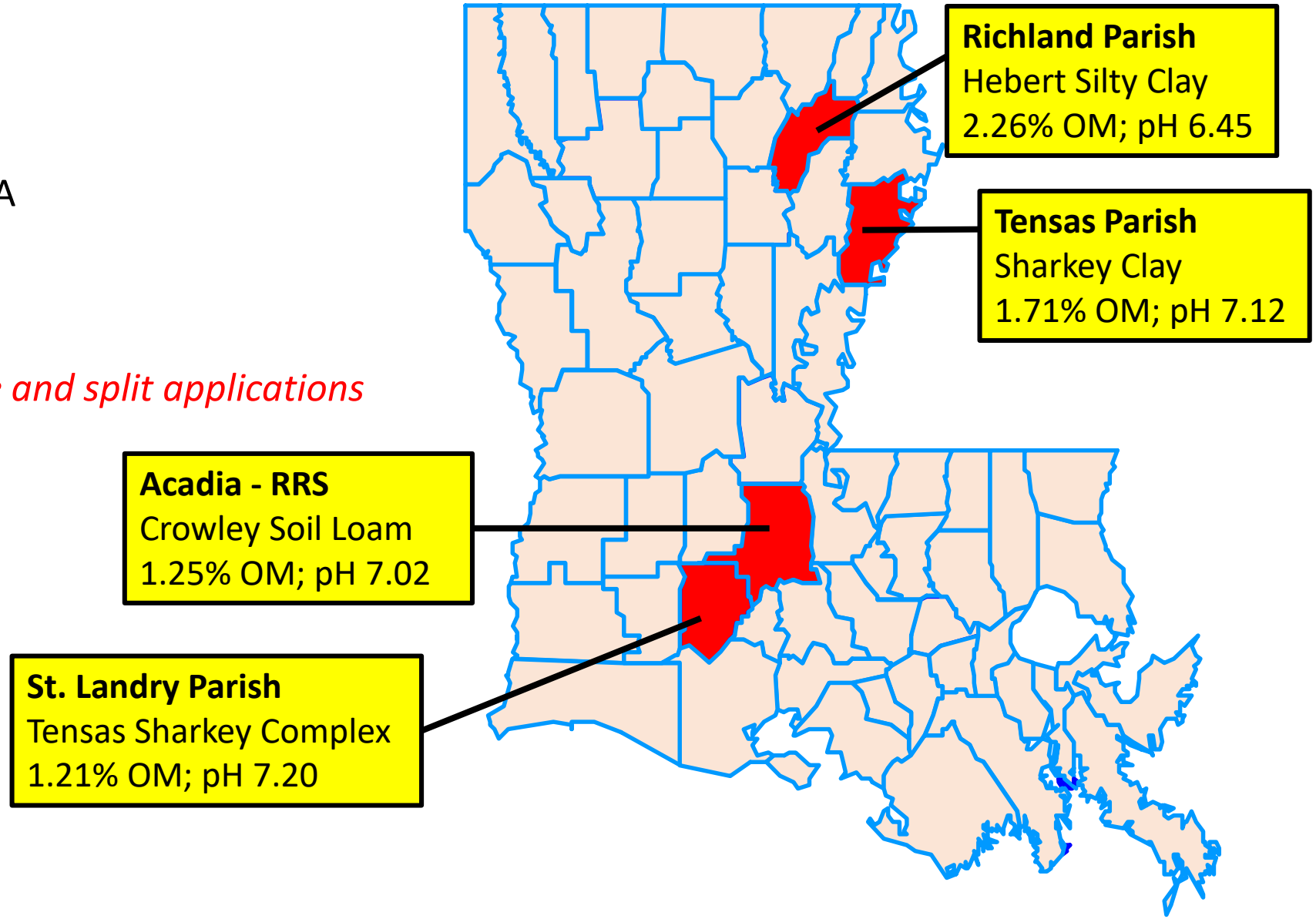
2022 Rice Fertility Study Design

I. Multiple locations

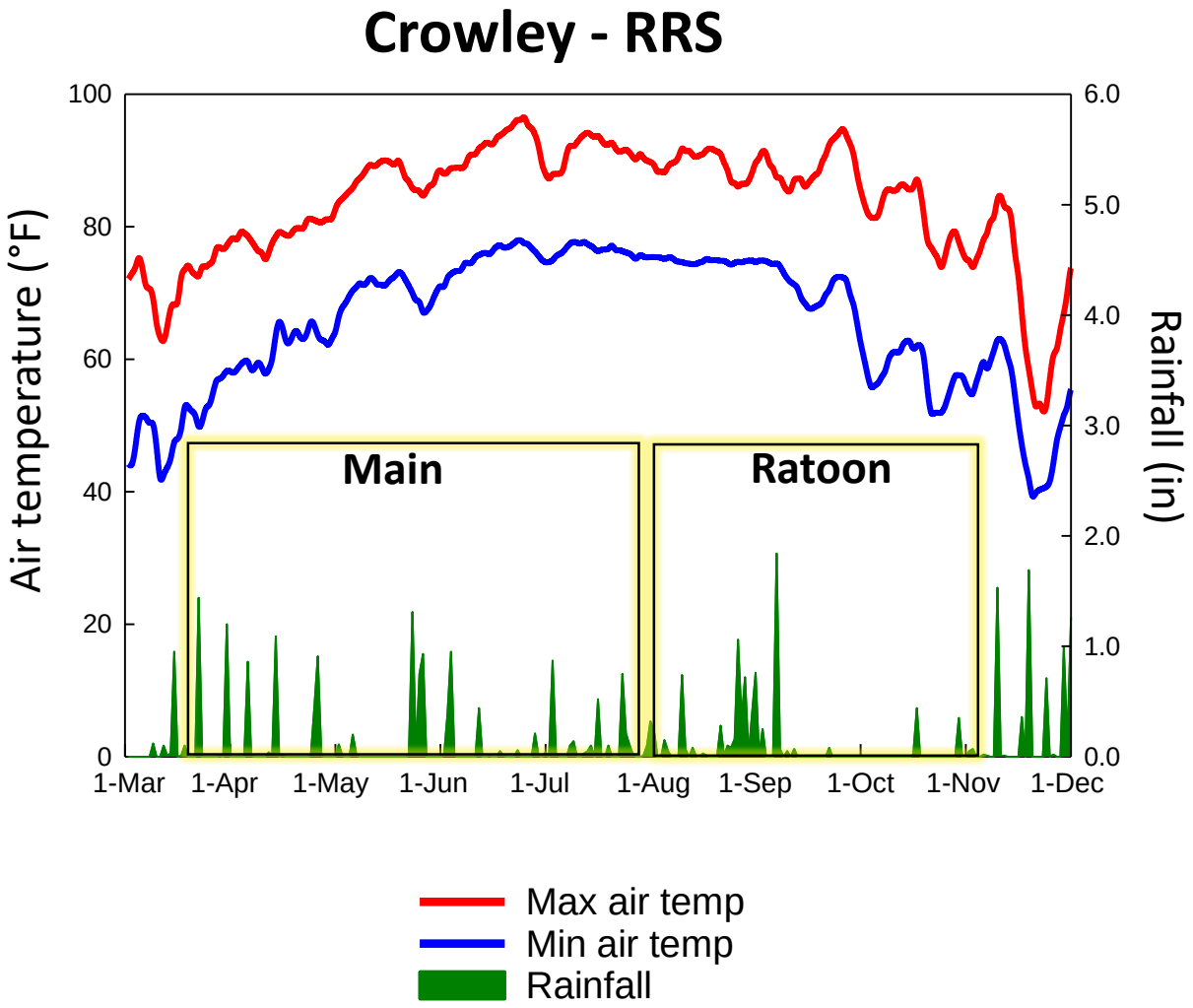
II. Multiple N treatments
- 0, 45, 90, 120, 150, 180 lb N/A
- Single application at preflood
- Split application

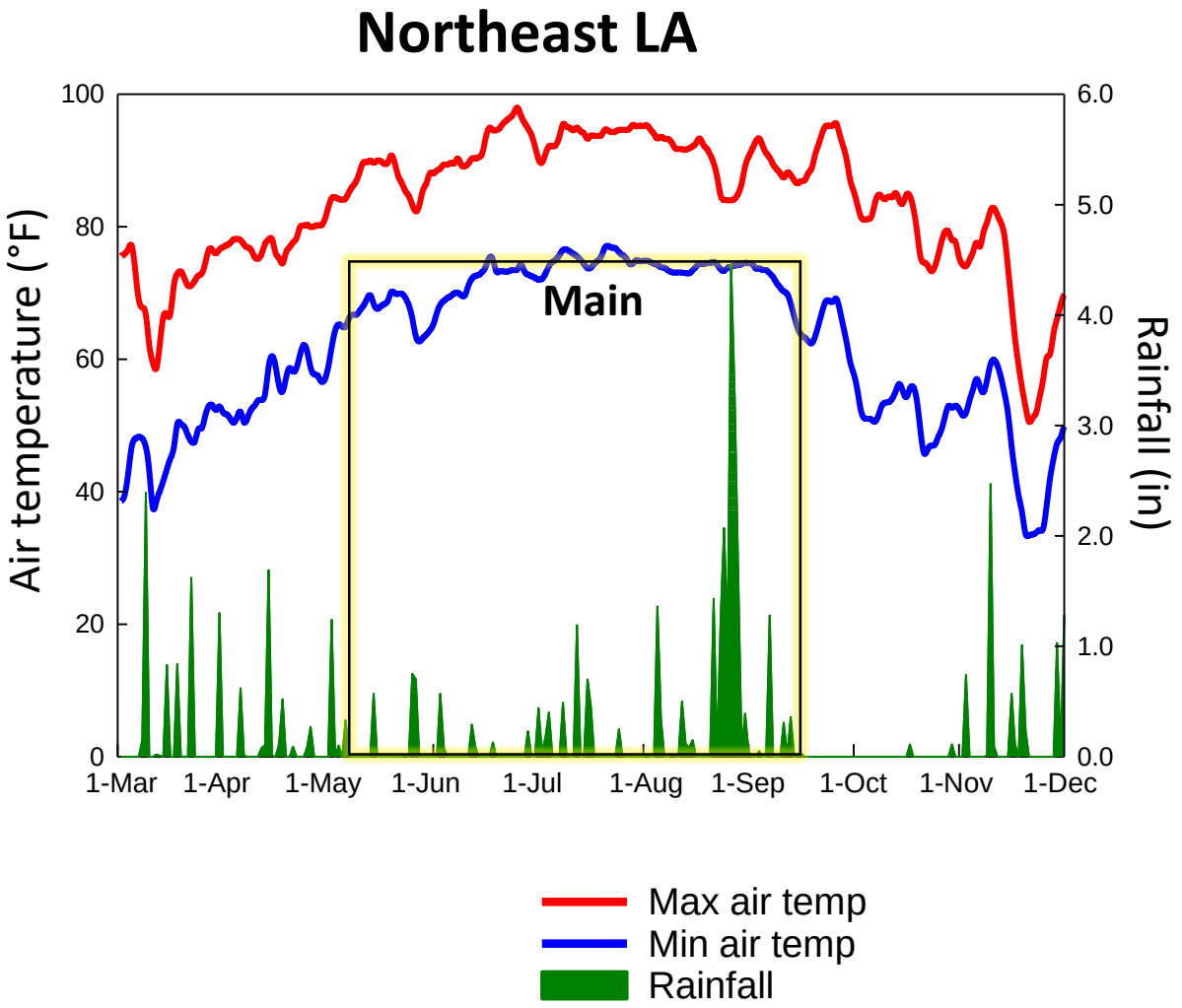
*** no difference between single and split applications*

III. Multiple rice lines
- Conventional
- Clearfield
- Provisia
- DynaGro
- RiceTec



2022 Weather

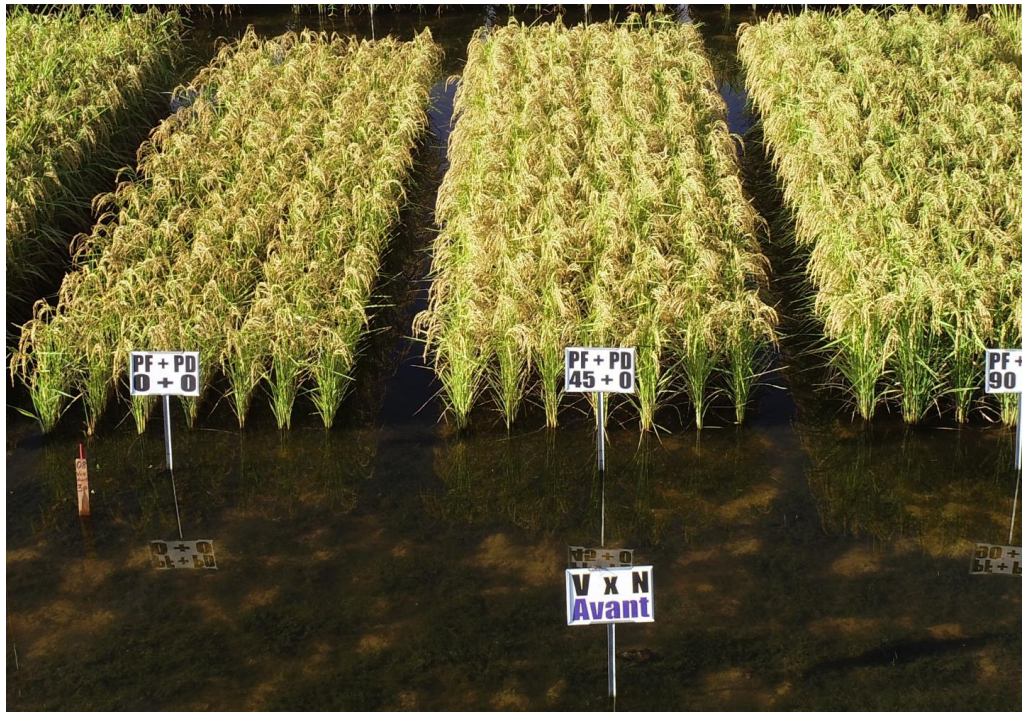




2022 Rice Fertility Research

Avant

- Long grain, conventional variety
- Very early maturity

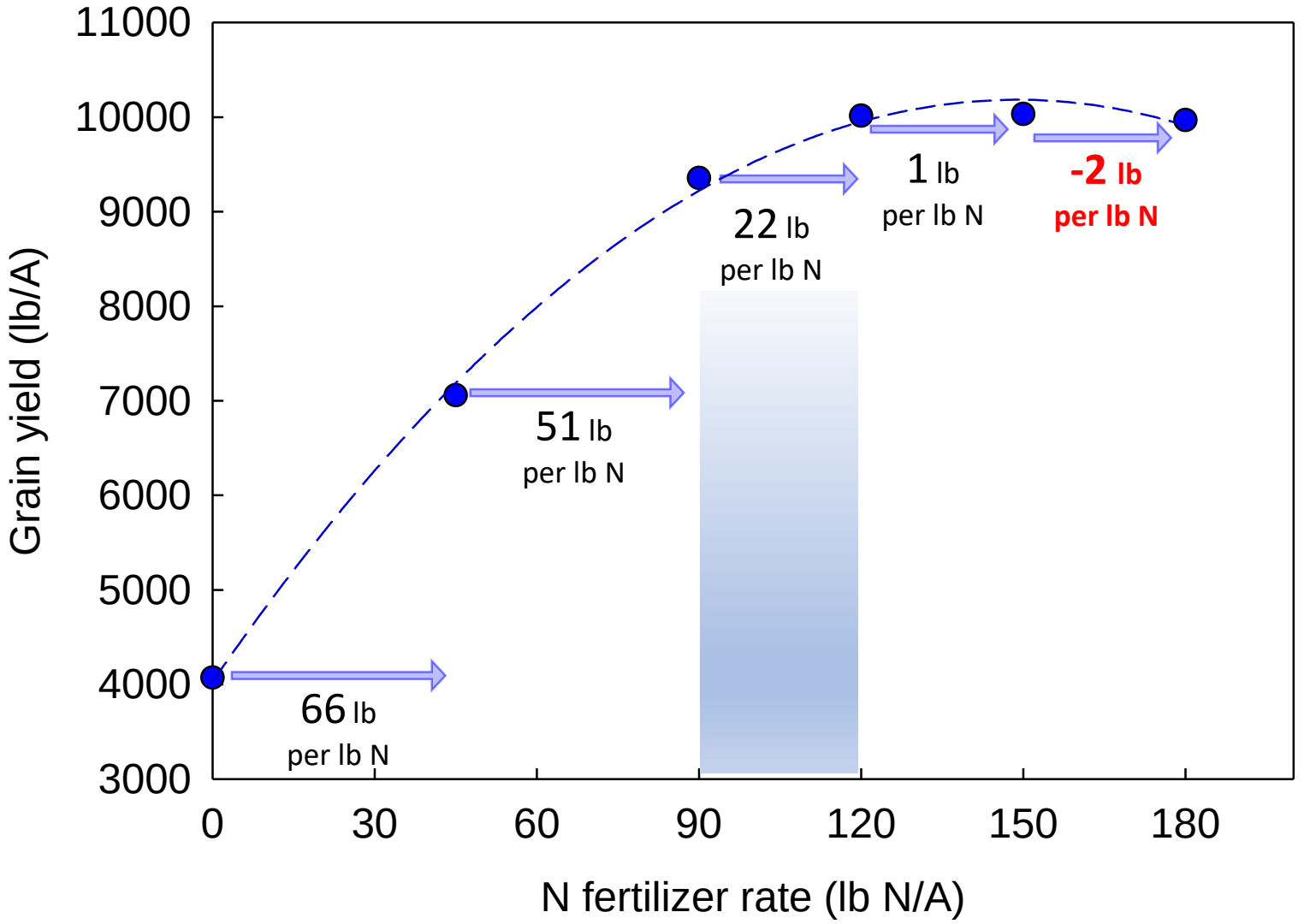


	Main Crop - Grain yield (lb/A)		
N Rate	Crowley-RRS	St. Landry	Tensas
0	4072	3958	4354
45	7058	6189	5947
90	9356	7817	7737
120	10014	8222	8160
150	10033	8432	8452
180	9967	9082	8927

	Crowley-RRS Grain yield (lb/A)	
N Rate	Main	Ratoon
0	4072	2689
45	7058	2871
90	9356	2679
120	10014	2431
150	10033	2304
180	9967	2258

2022 Rice Fertility Research

Avant



Crowley-RRS

2022 Rice Fertility Research

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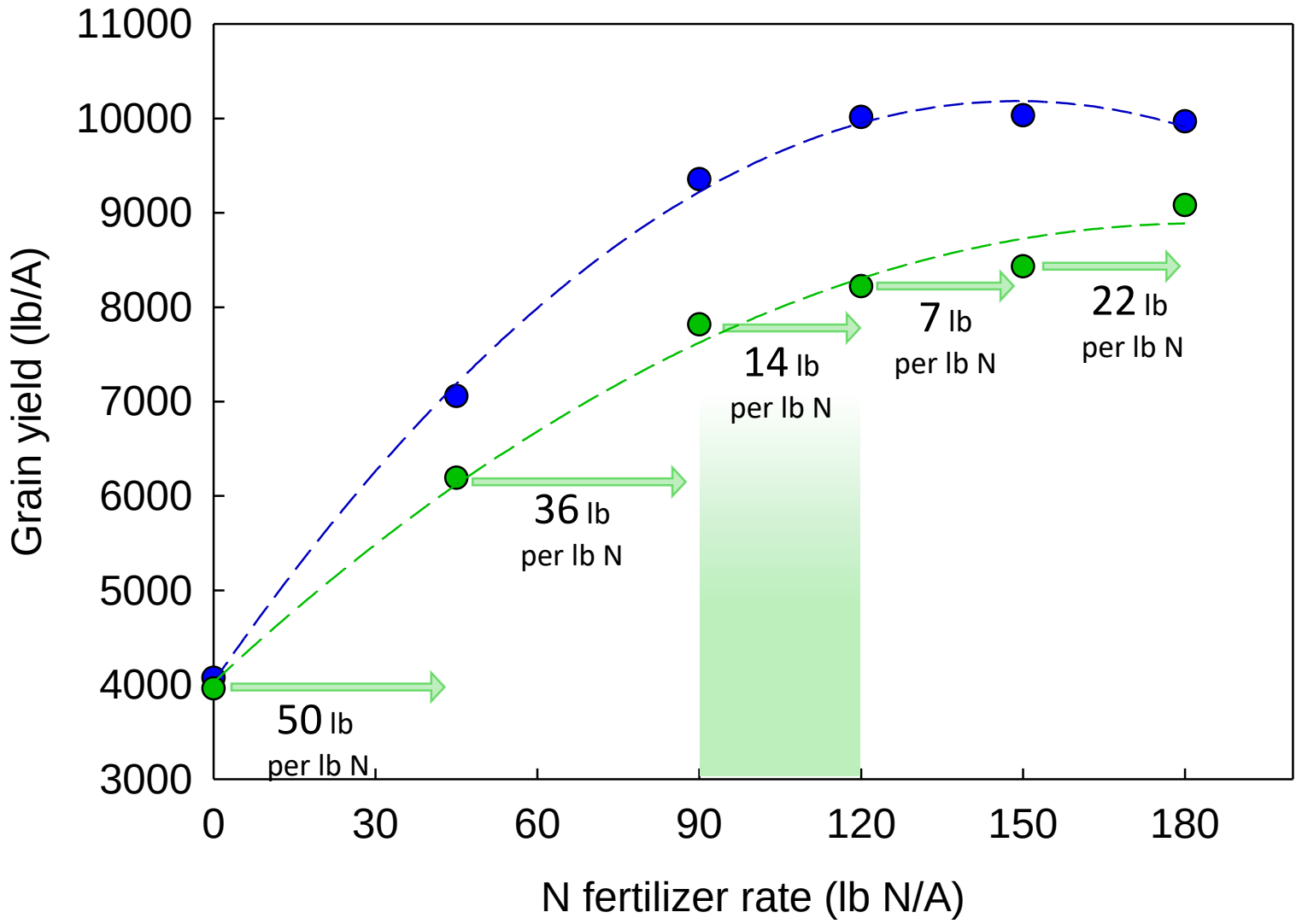
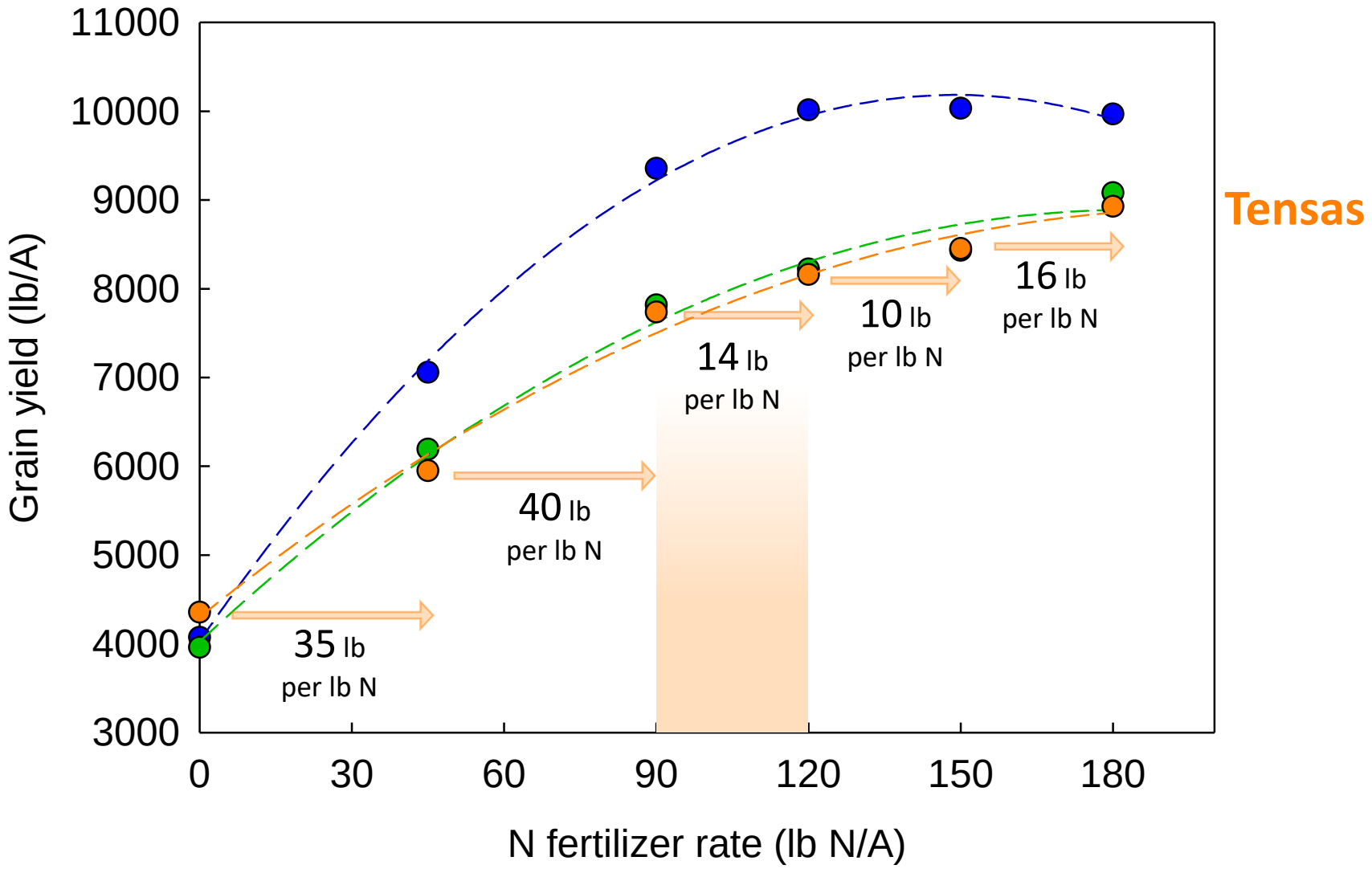


St. Landry

2022 Rice Fertility Research

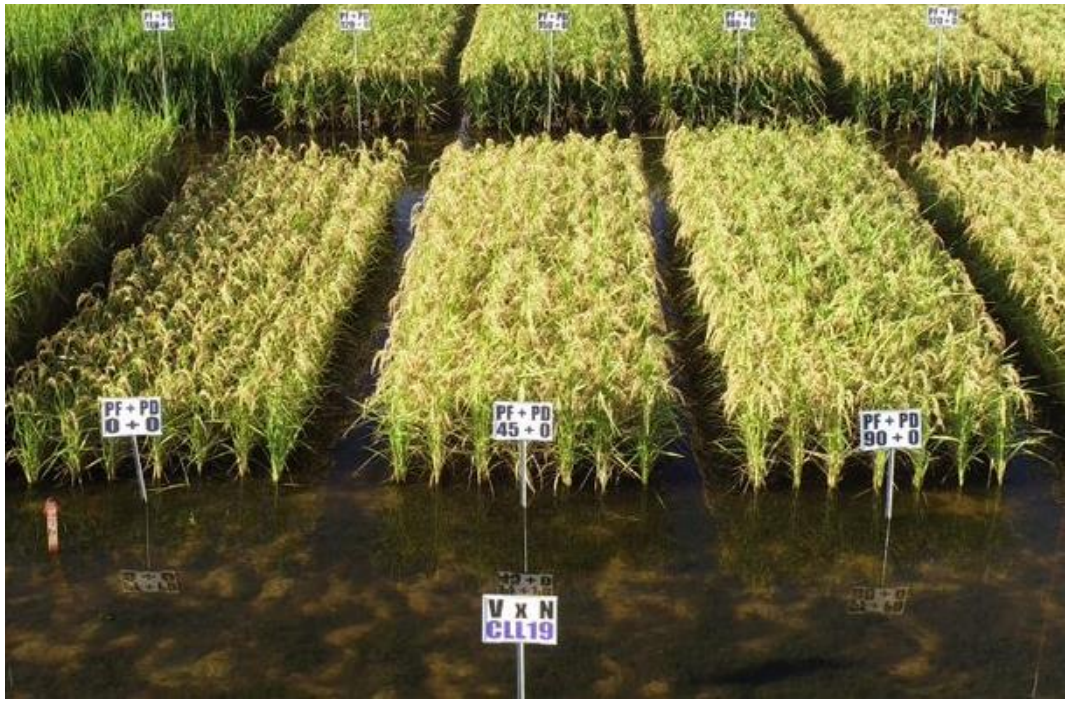
Avant



2022 Rice Fertility Research

CLL19

- Long grain, Clearfield variety
- Early maturity

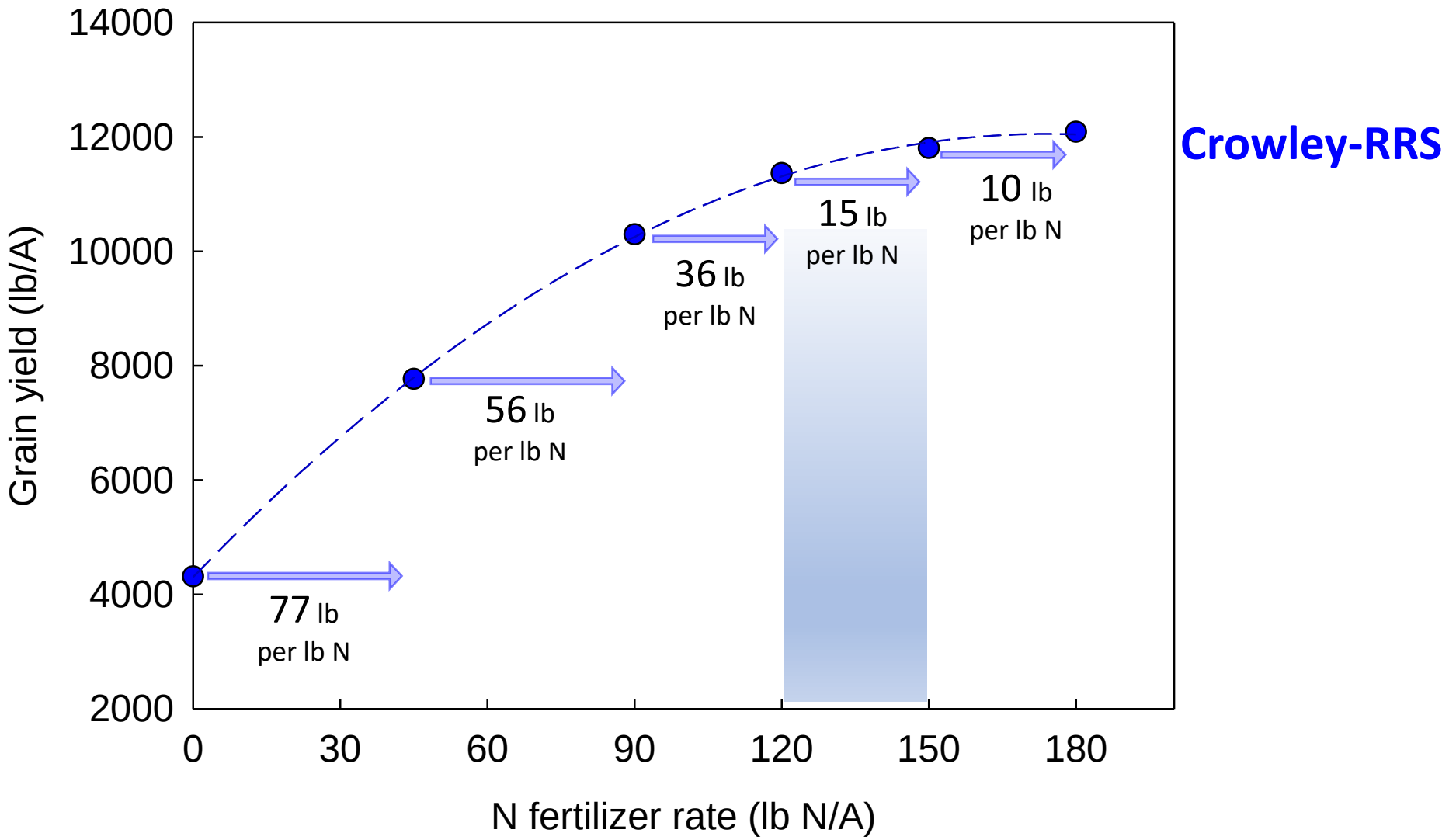


	Main Crop - Grain yield (lb/A)		
N Rate	Crowley-RRS	St. Landry	Richland
0	4311	4116	5325
45	7768	5110	6942
90	10296	6626	8480
120	11364	6286	8518
150	11803	6621	8784
180	12088	7164	9347

	Crowley-RRS Grain yield (lb/A)	
N Rate	Main	Ratoon
0	4311	2161
45	7768	2358
90	10296	2169
120	11364	0
150	11803	1367
180	12088	0

2022 Rice Fertility Research

CLL19



2022 Rice Fertility Research

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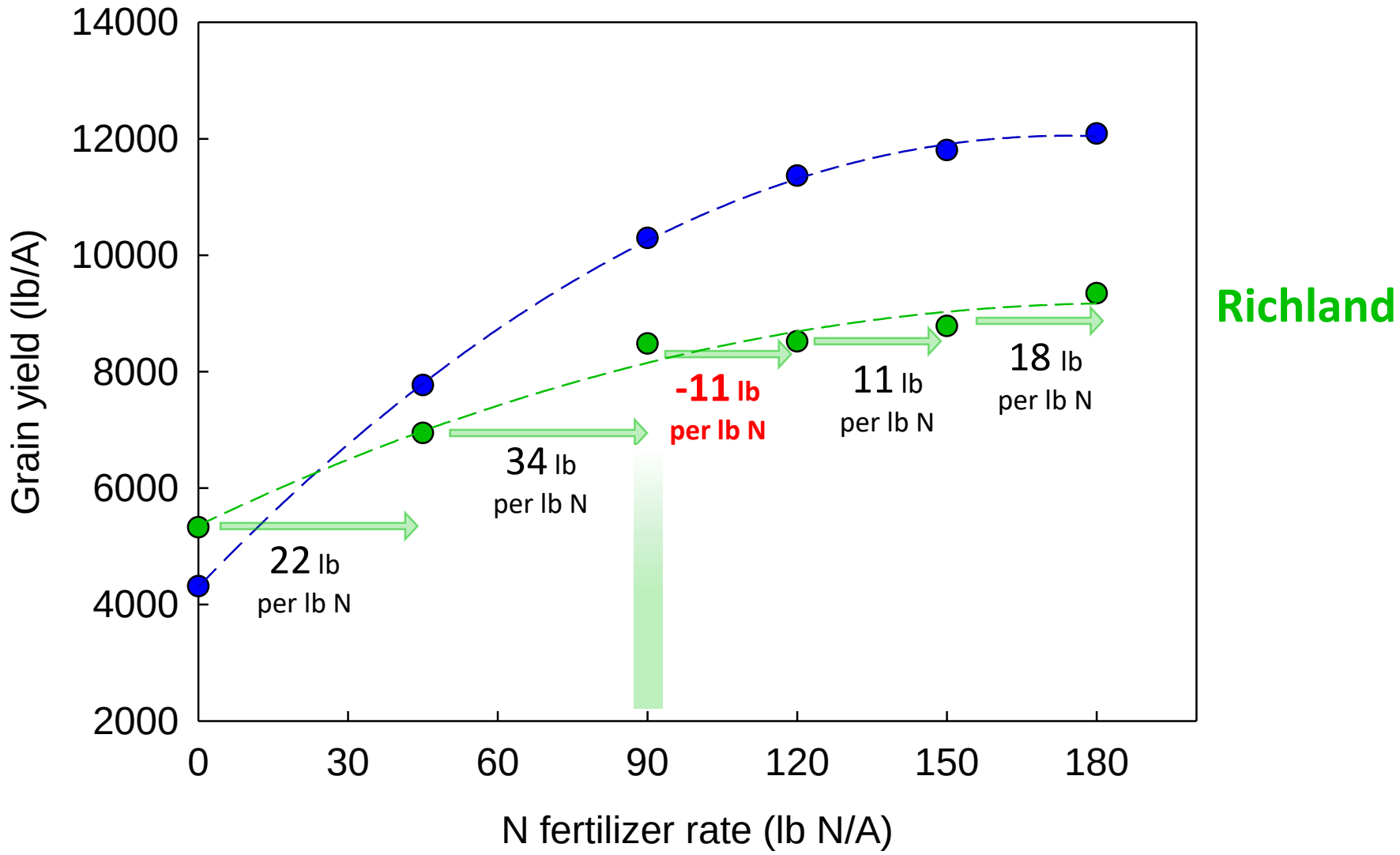

2022 Rice Fertility Research

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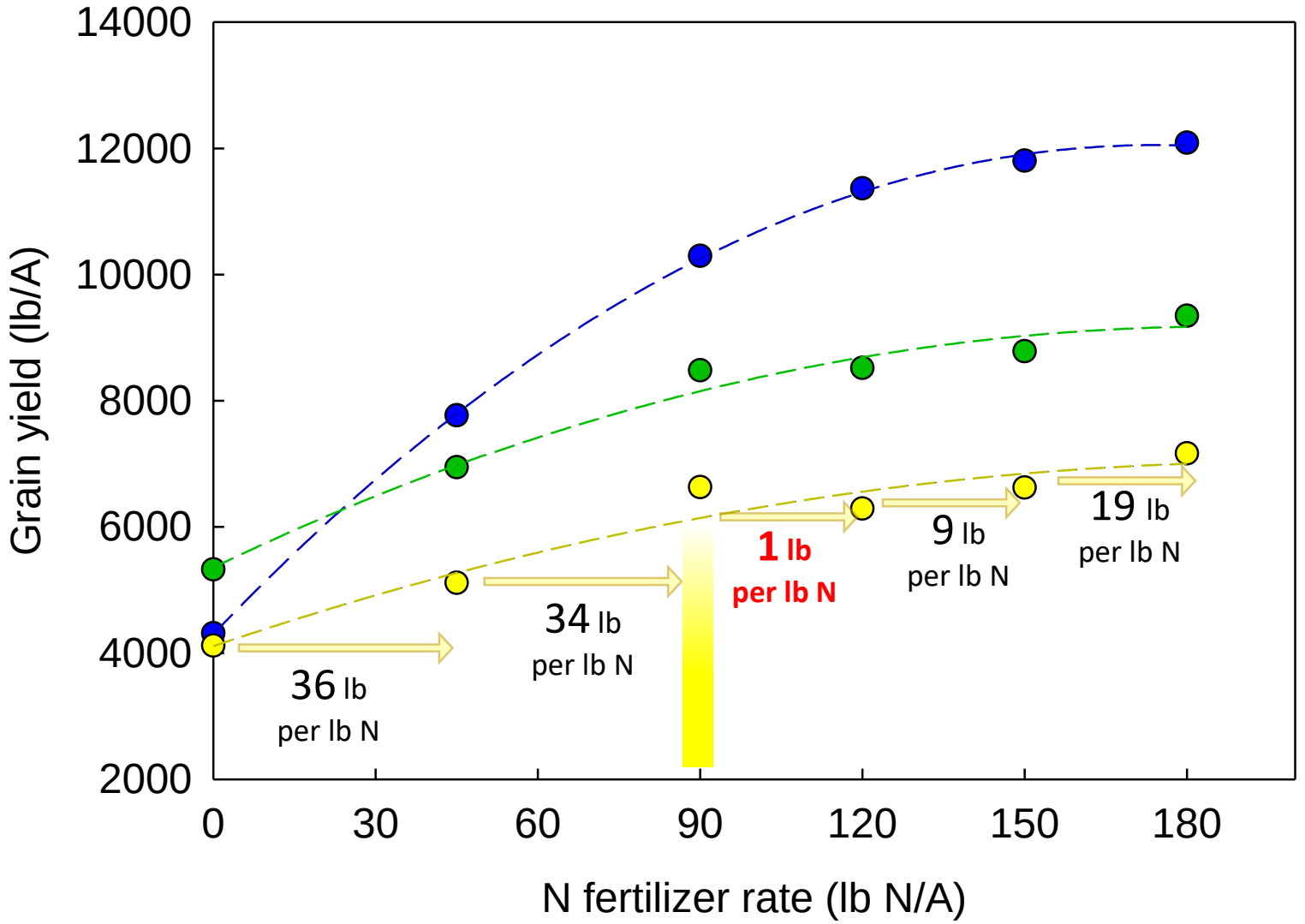
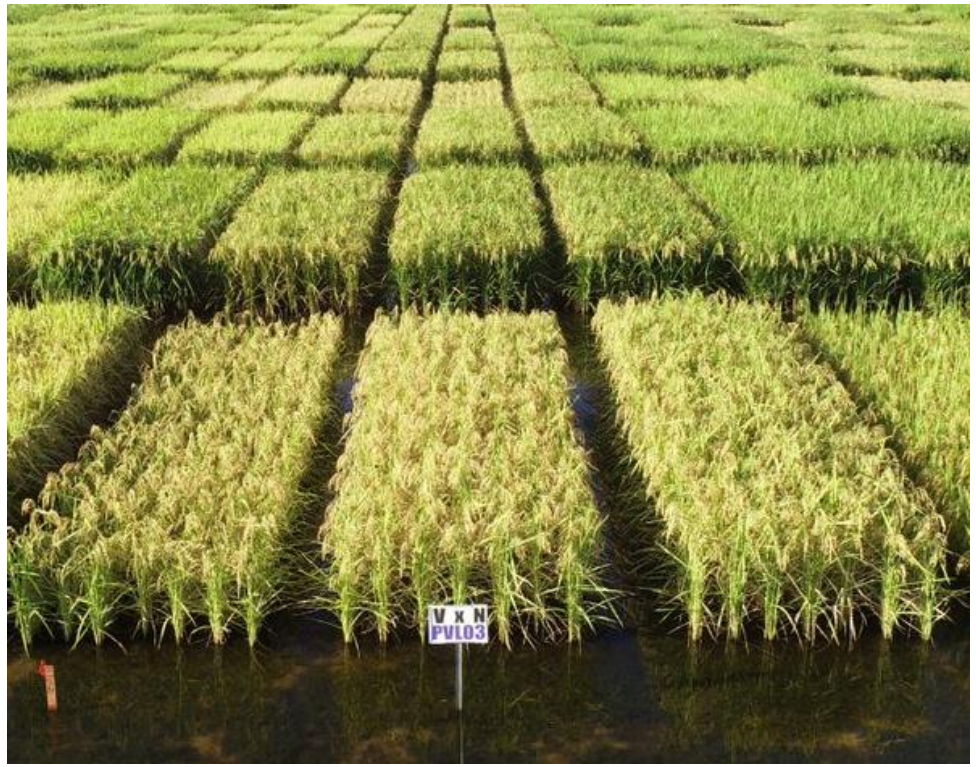


St. Landry

2022 Rice Fertility Research

PVL03

- Long grain, Provisia variety
- Early maturity

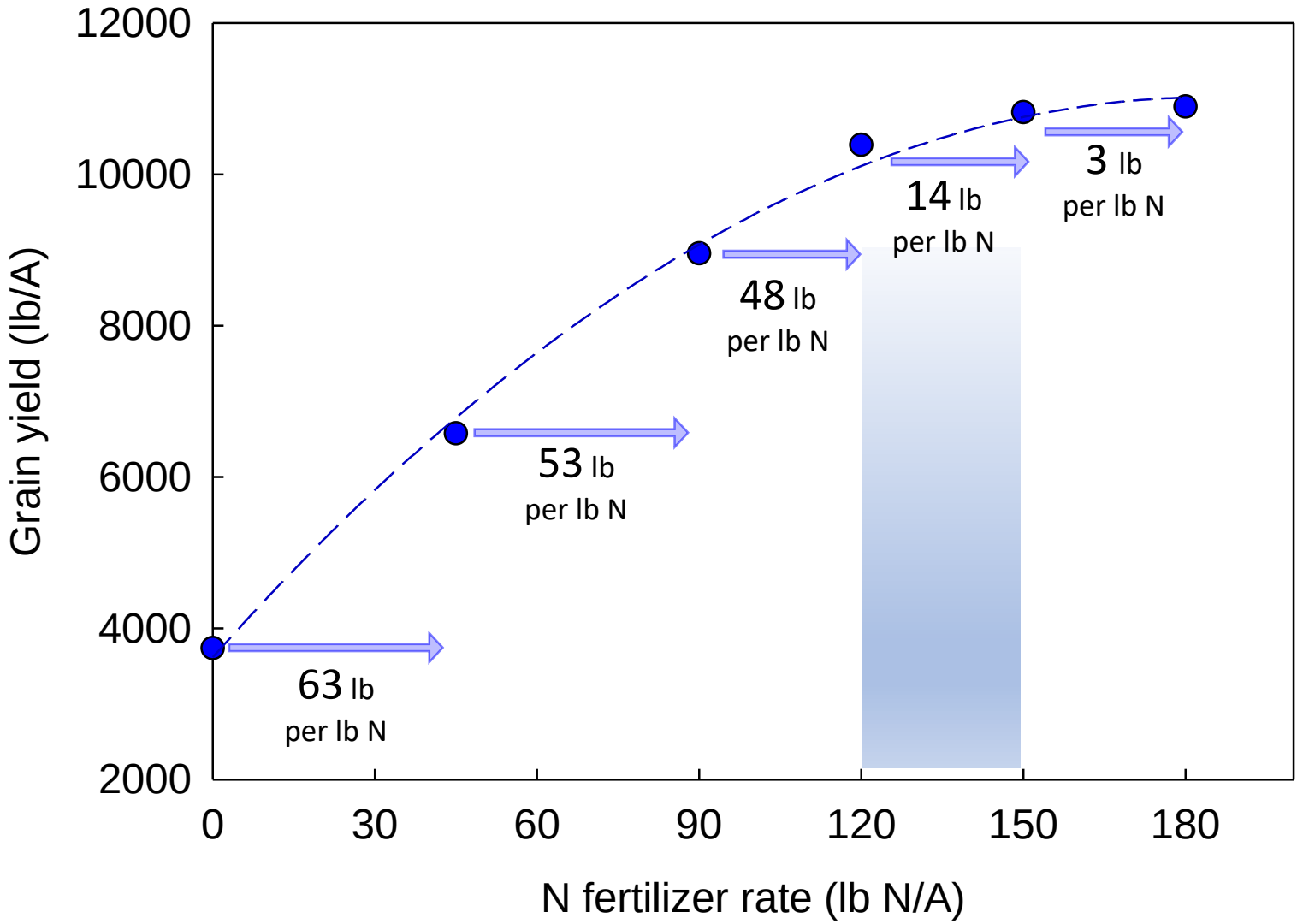


	Main Crop - Grain yield (lb/A)			
N Rate	Crowley-RRS	Richland	St. Landry	Tensas
0	3736	3635	3100	4204
45	6575	4443	5650	5833
90	8957	5373	7473	6747
120	10391	5695	8057	6756
150	10822	5961	8706	6760
180	10897	5805	8893	6761

	Crowley-RRS Grain yield (lb/A)	
N Rate	Main	Ratoon
0	3736	1680
45	6575	1792
90	8957	1493
120	10391	1355
150	10822	1309
180	10897	1382

2022 Rice Fertility Research

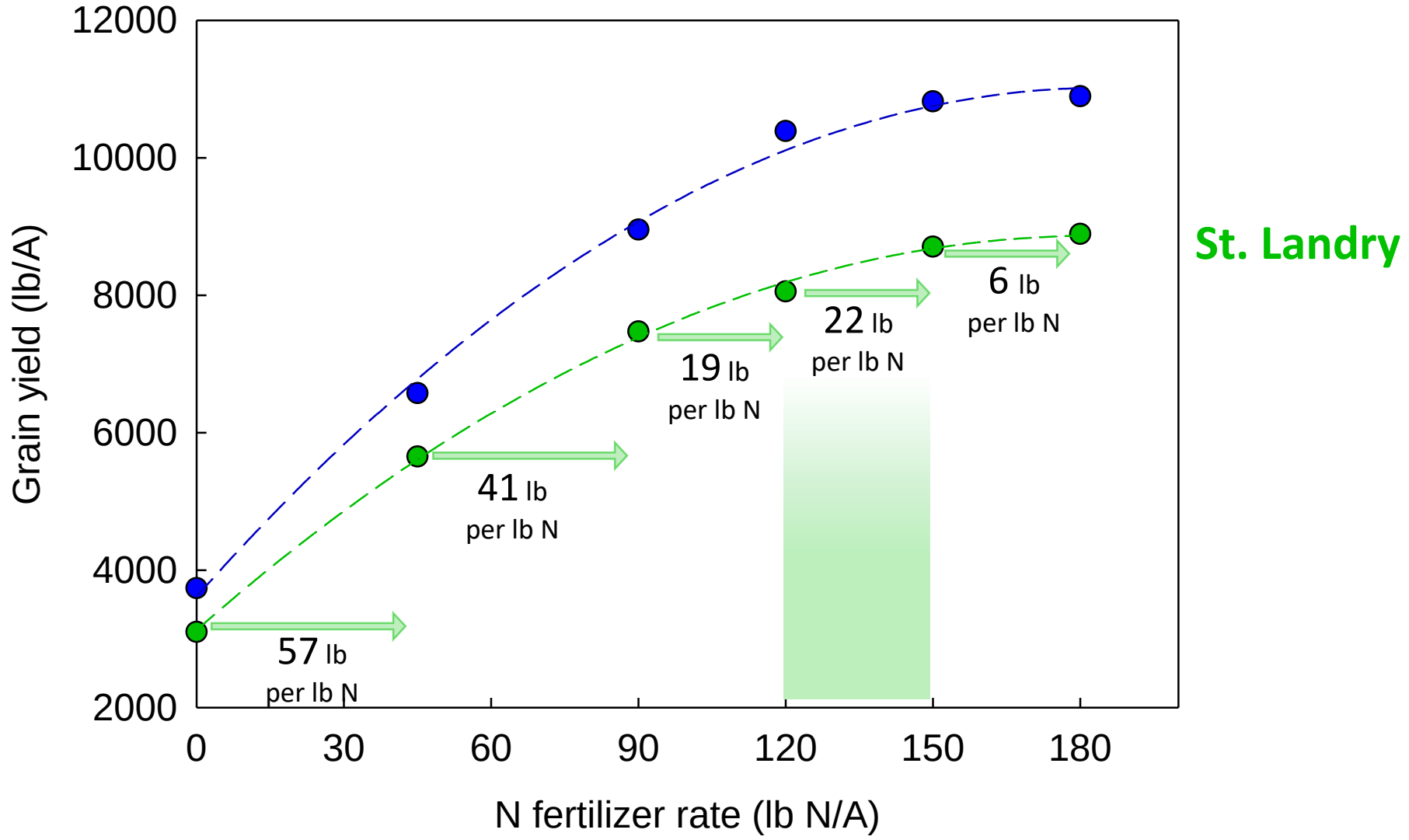
PVL03



Crowley-RRS

2022 Rice Fertility Research

PVL03



2022 Rice Fertility Research

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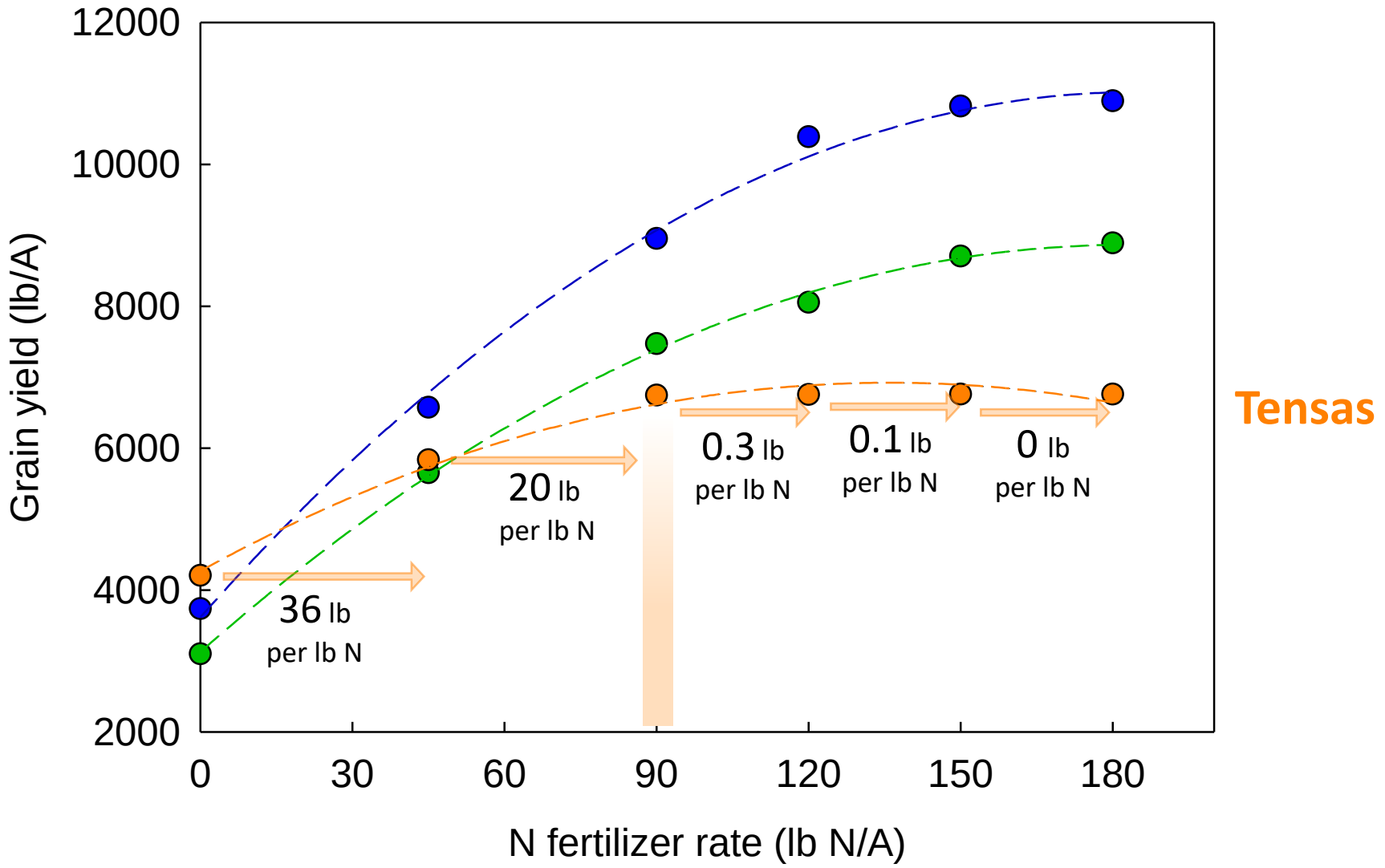
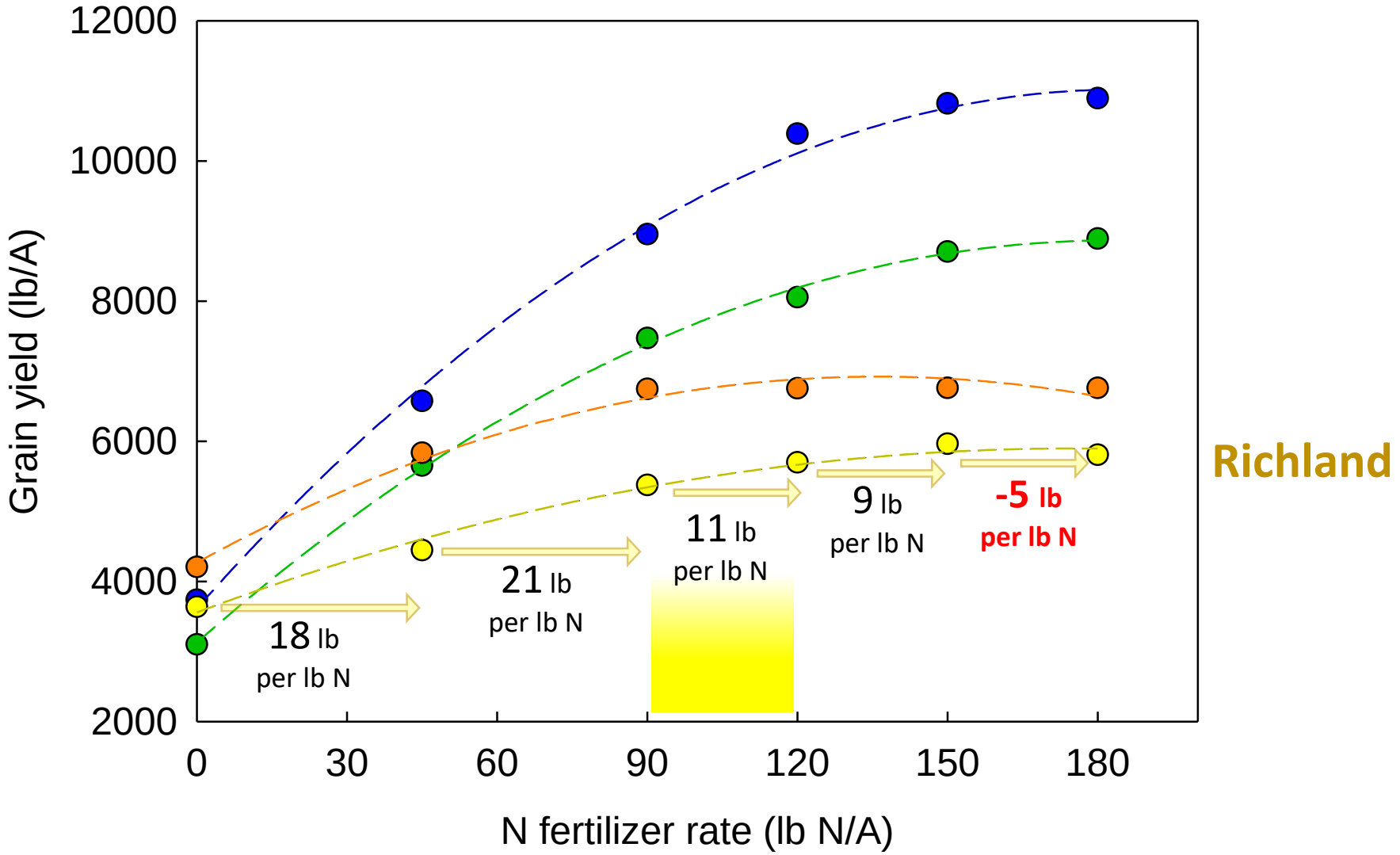


2022 Rice Fertility Research

PVL03

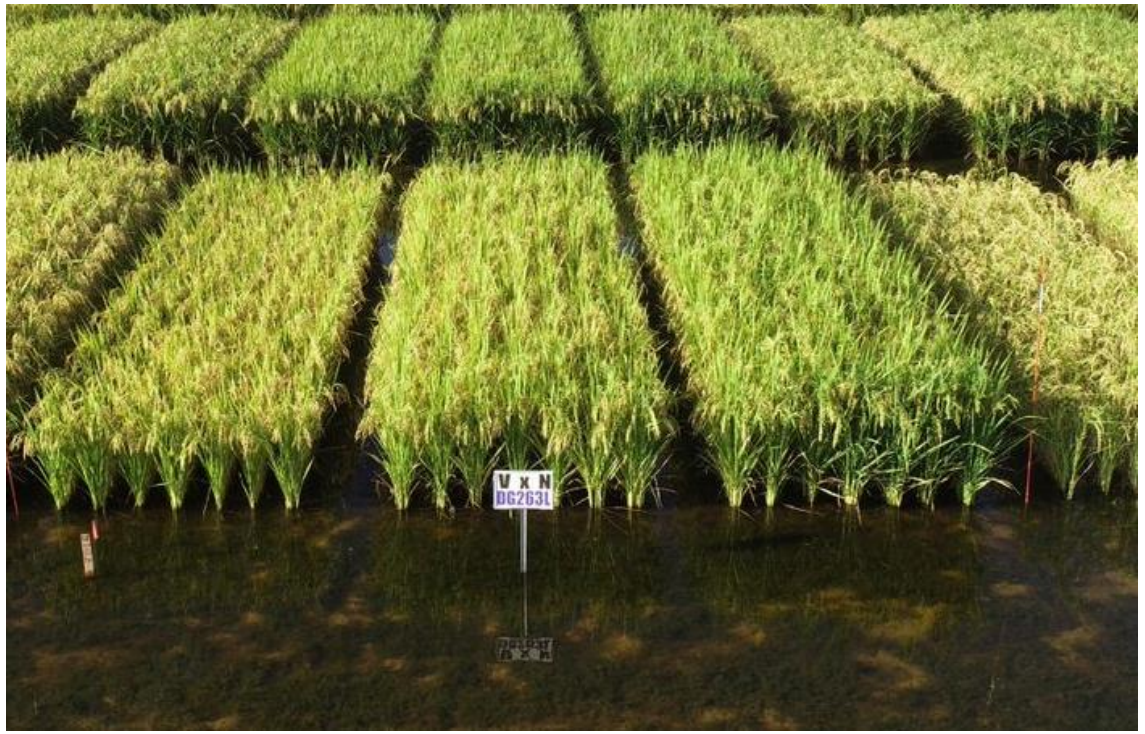


Richland

2022 Rice Fertility Research

DG263L

- Long grain, conventional variety
- Nutrien Dyna-Gro
- Early maturity

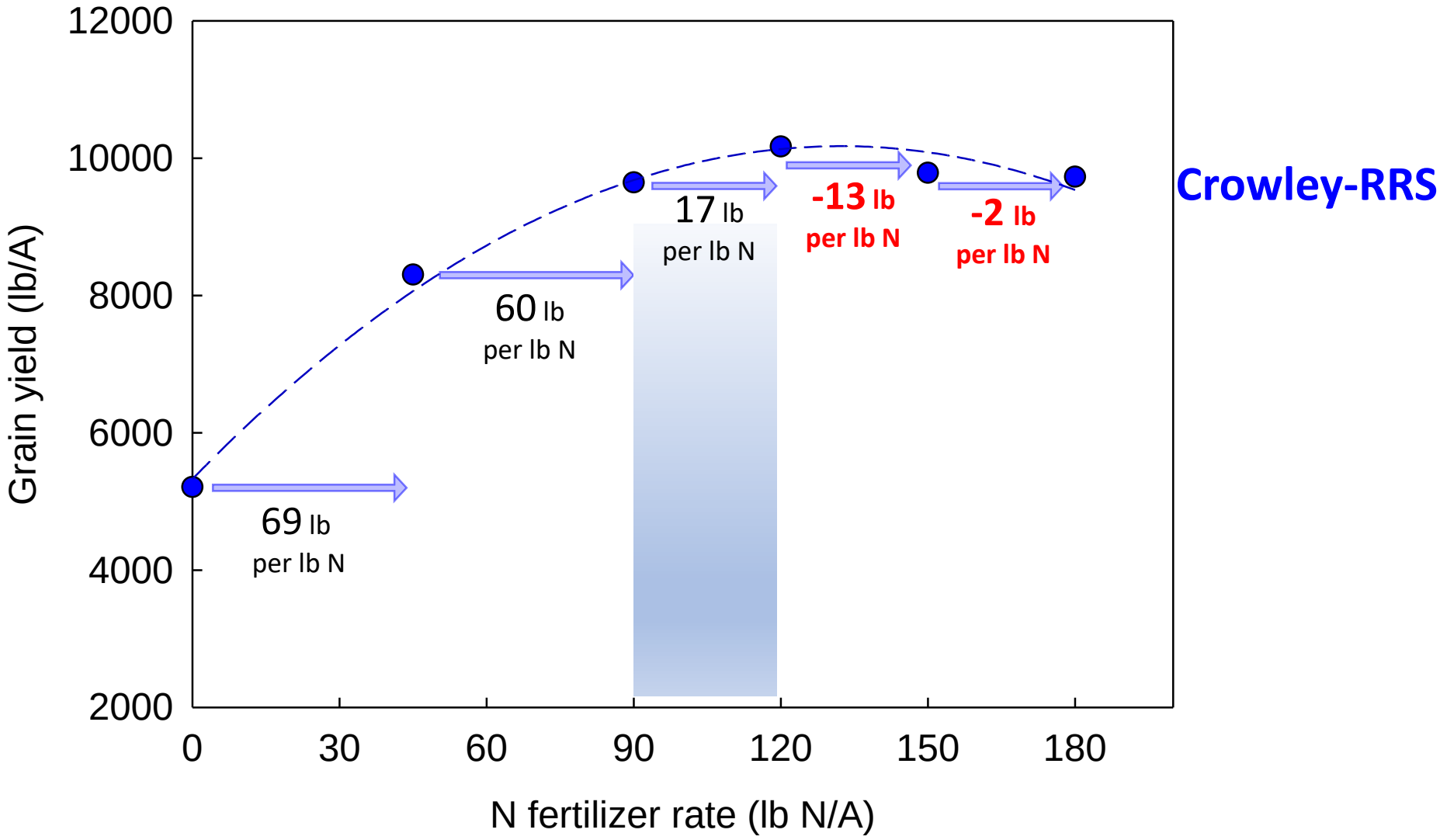


	Main Crop - Grain yield (lb/A)		
N Rate	Crowley-RRS	Richland	St. Landry
0	5208	5385	5953
45	8305	6298	8187
90	9648	6986	9501
120	10171	7079	9704
150	9786	6854	9940
180	9729	6808	9888

	Grain yield (lb/A)	
N Rate	Main	Ratoon
0	5208	0
45	8305	0
90	9648	0
120	10171	0
150	9786	0
180	9729	0

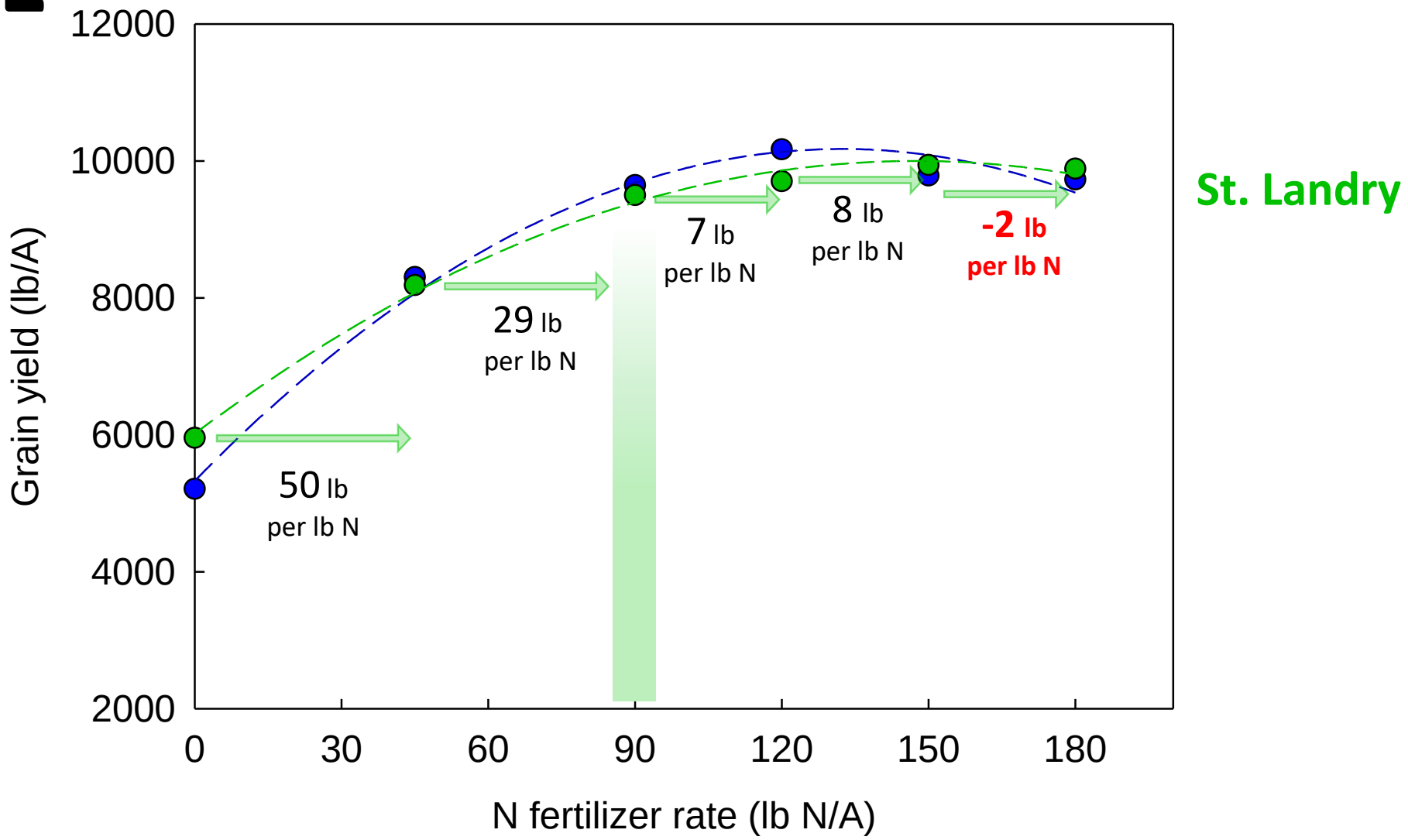
2022 Rice Fertility Research

DG263L



2022 Rice Fertility Research

DG263L



2022 Rice Fertility Research

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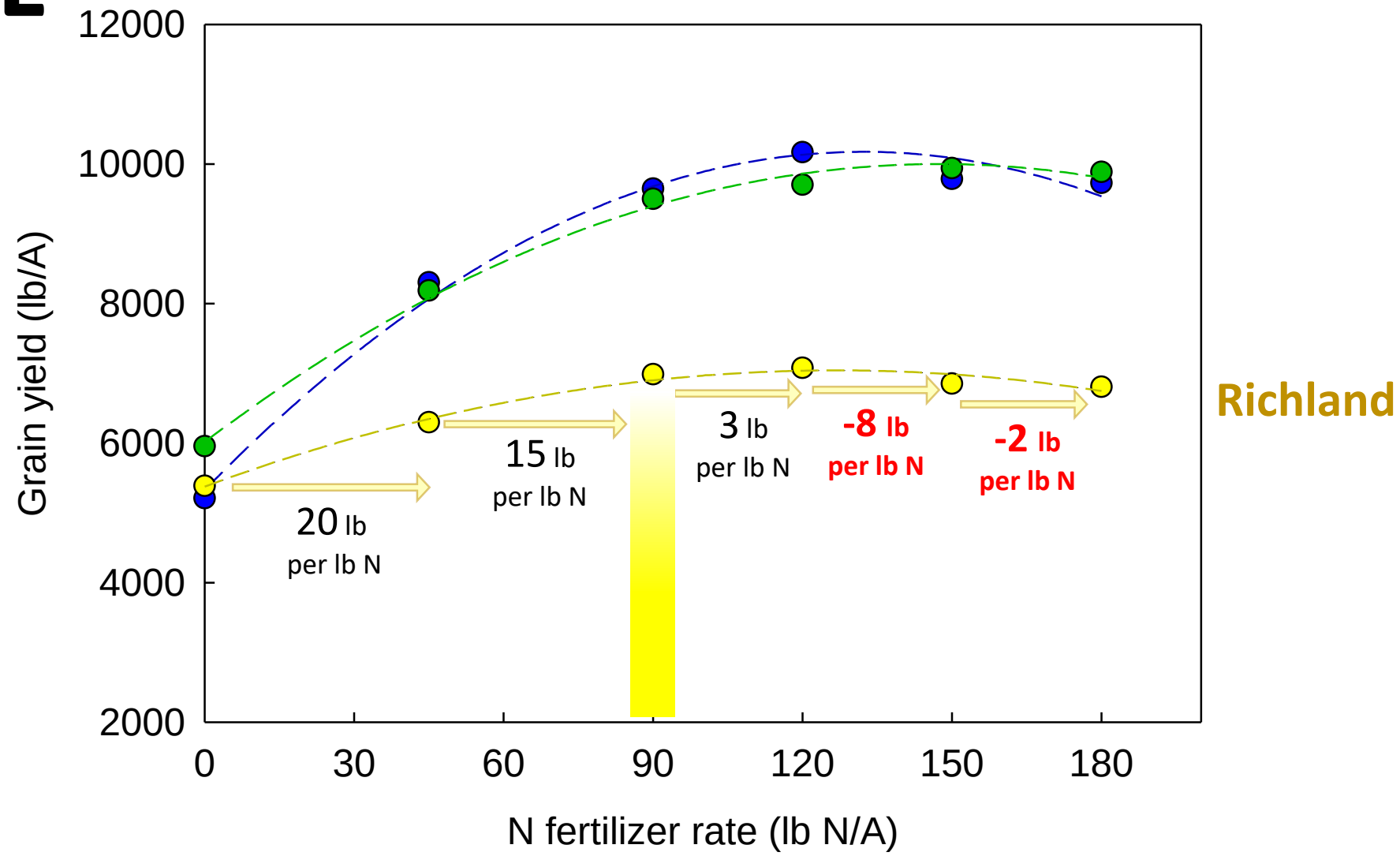


Richland

2022 Rice Fertility Research

RT 7331

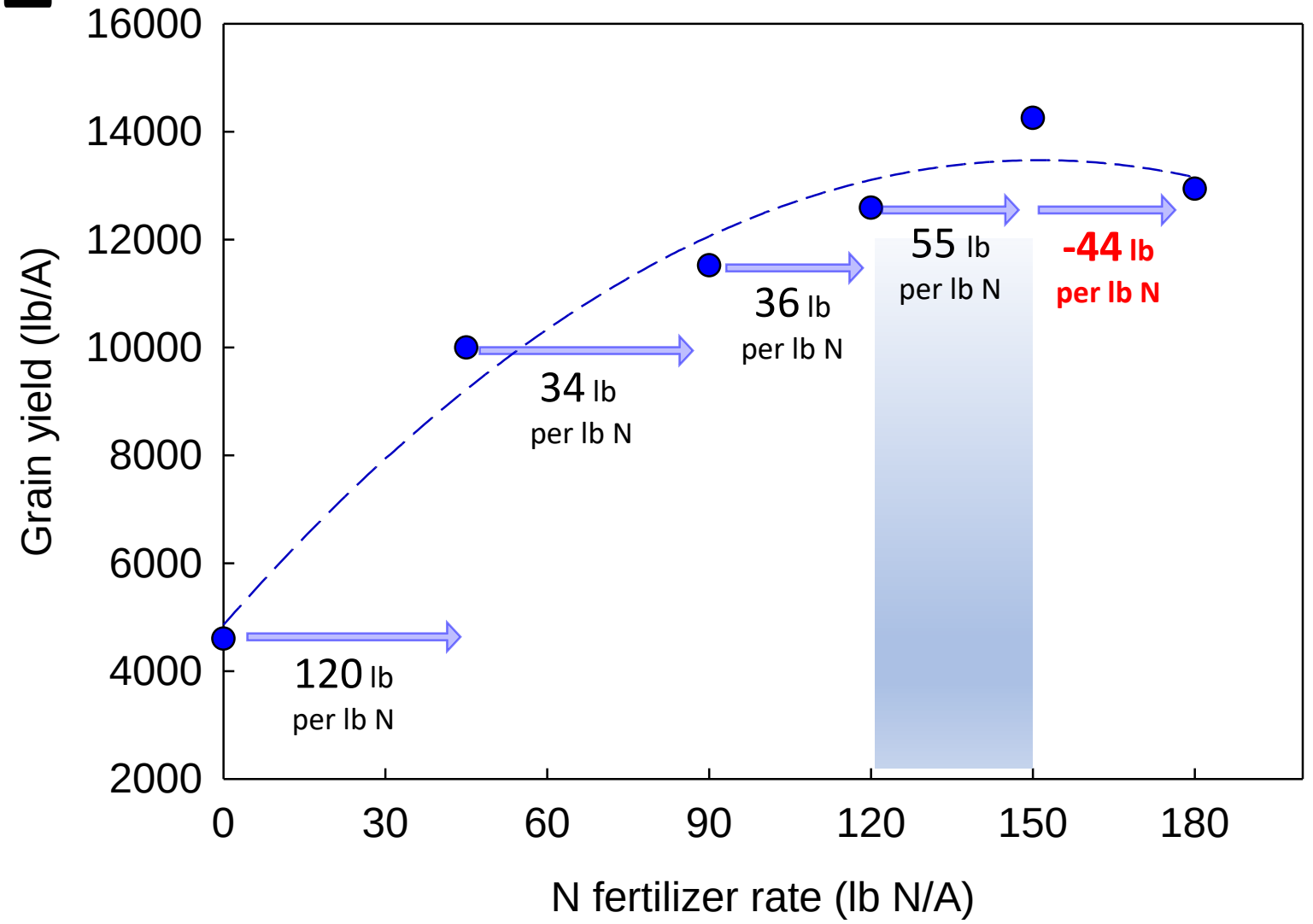
- RiceTec Max-Ace hybrid
- Long grain
- Early maturity

	Main Crop - Grain yield (lb/A)		
N Rate	Crowley-RRS	Richland	St. Landry
0	4597	4690	5547
45	9998	6487	9475
90	11522	7893	10903
120	12590	8165	12055
150	14252	8066	12742
180	12940	8942	13372

	Grain yield (lb/A)	
N Rate	Main	Ratoon
0	4597	2625
45	9998	2433
90	11522	0
120	12590	2355
150	14252	2028
180	12940	1472

2022 Rice Fertility Research

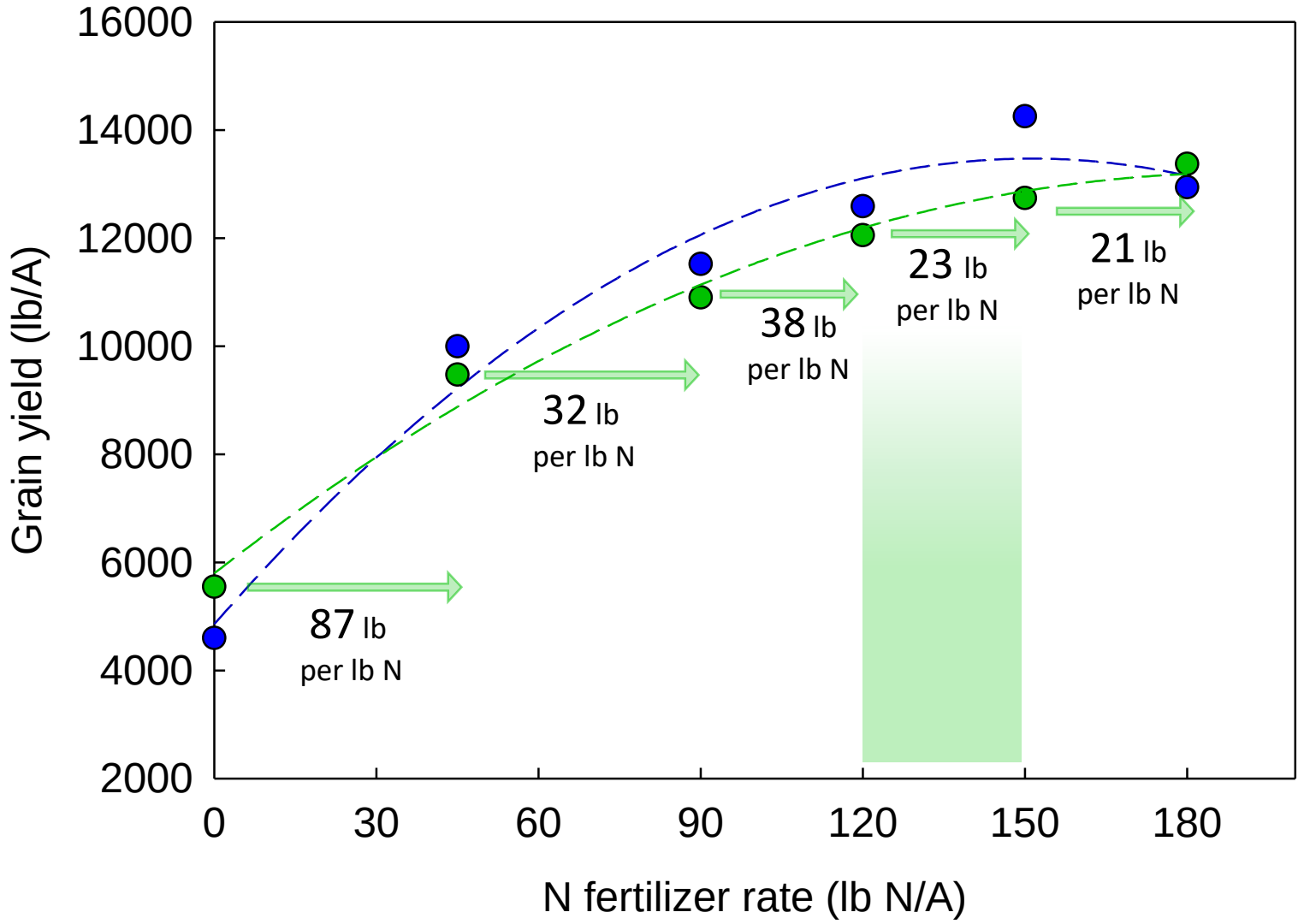
RT 7331



Crowley-RRS

2022 Rice Fertility Research

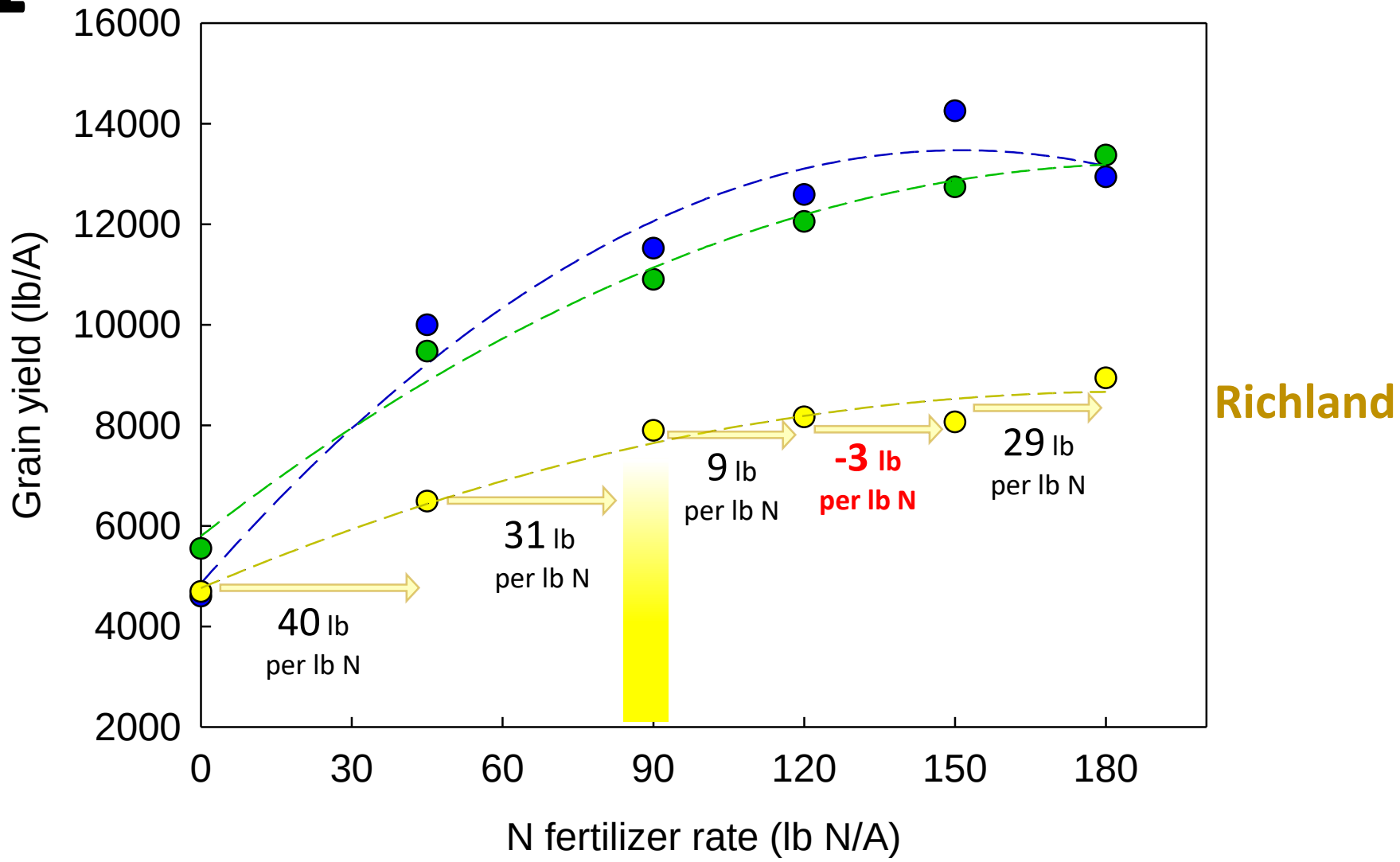
RT 7331



St. Landry

2022 Rice Fertility Research

RT 7331



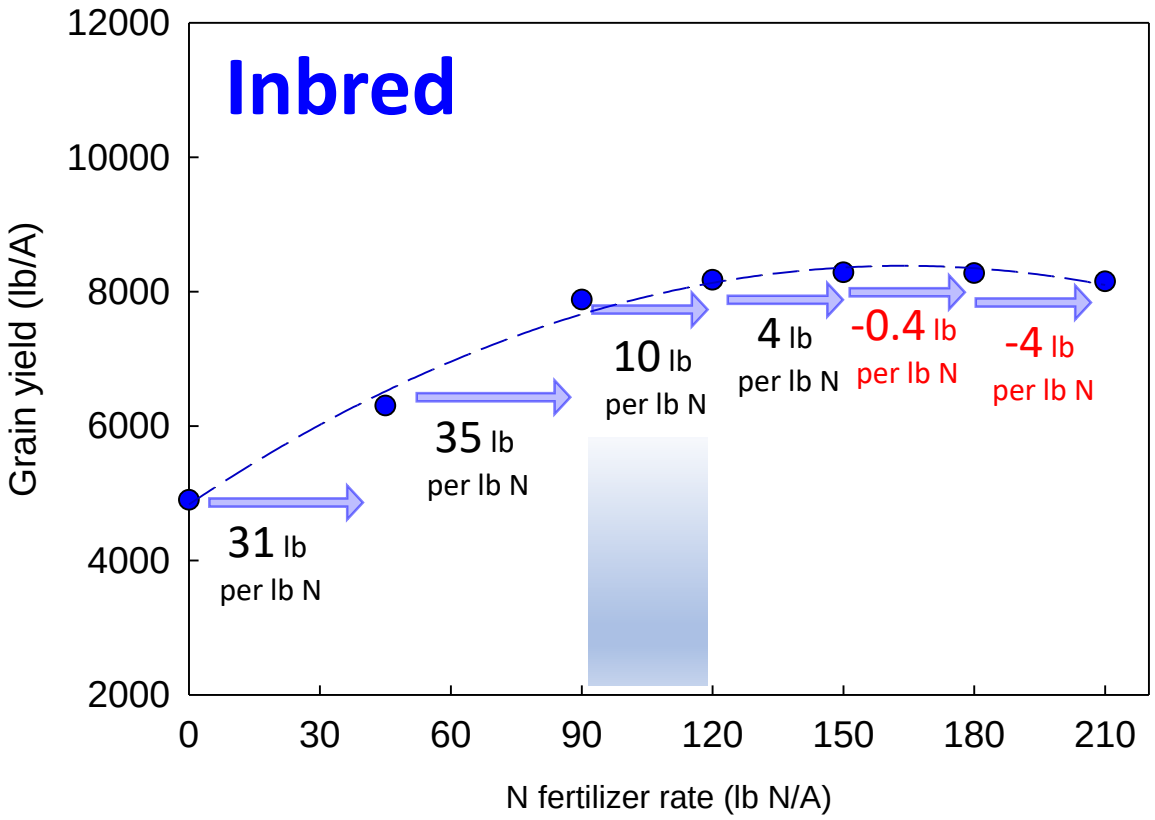
Rice yield response to N: meta-analysis

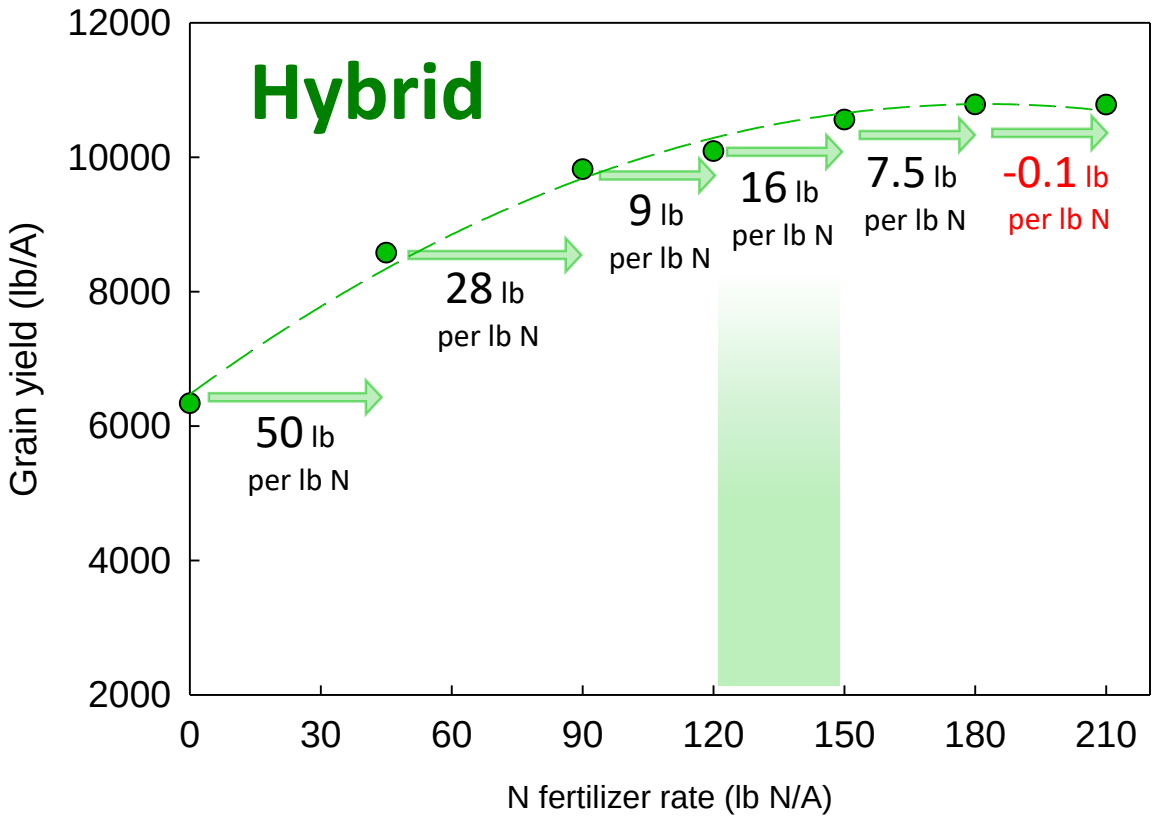
5 years (2018-2022)

6 locations in LA

30 inbred lines

13 hybrid lines





Summary

1. Less than 90 lb N/A
    - critical in the most productive phase
2. Beyond 90-120 lb N/A
    - increase in grain yield becomes smaller per unit of N added
    - **inbred**: negative return past 150 lb N/A
    - **hybrid**: negative return past 180 lb N/A
3. Agronomic and economic optimal N point varies:
    - rice line, soil, weather, location
4. Updated site-specific N recommendations

Acknowledgements

Louisiana Rice Research Board
Agronomy Program
H. Rouse Caffey Rice Research Station
LSU AgCenter
Nutrien, RiceTec

Thank you!
Questions?