



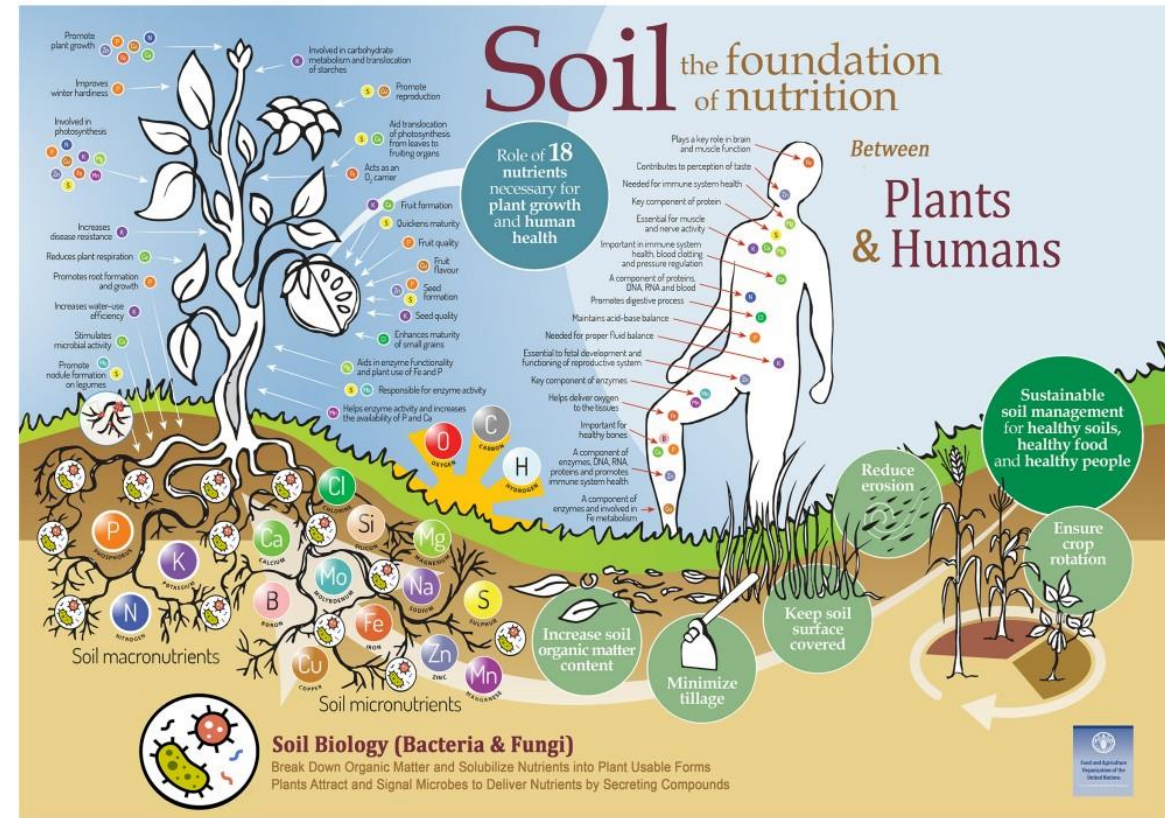
# 2022 Georgia Cotton Commission Annual Meeting

## Soil fertility and soil health consideration in cotton production

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January 25, 2022



UNIVERSITY OF  
**GEORGIA**



# Presentation overview

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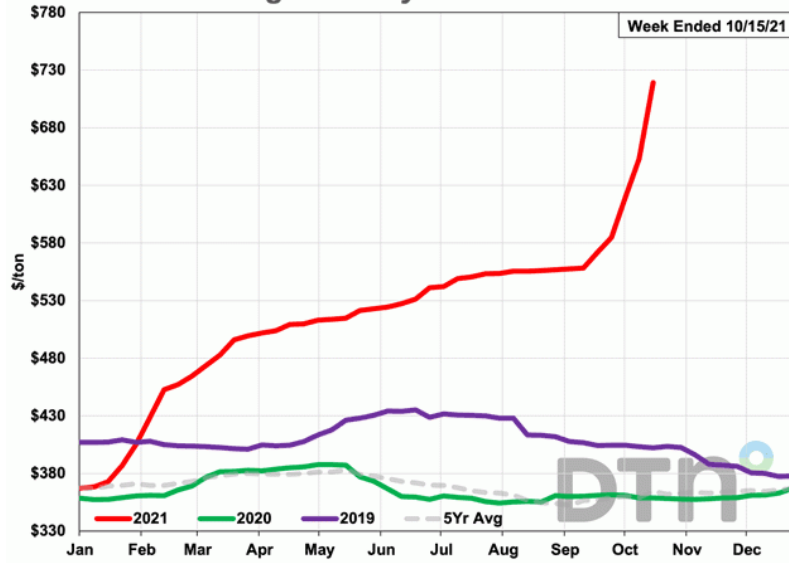
- Nutrient management overview
- Nutrient stress study
- Soil health study
- Conclusions

# Nutrient management overview

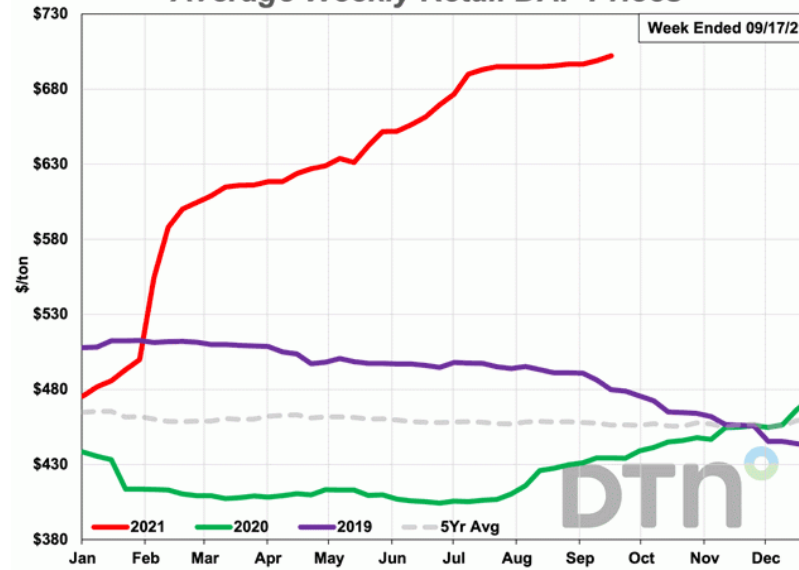


# Fertilizer price trend

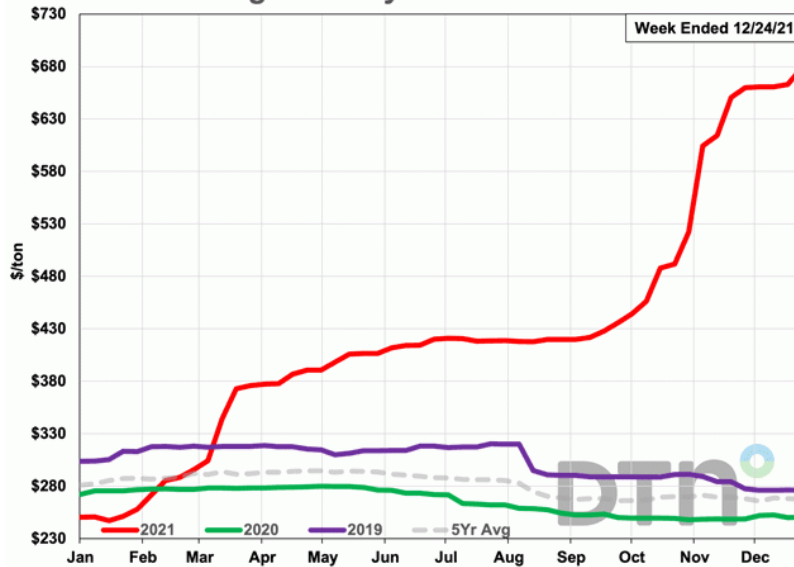
Average Weekly Retail Urea Prices



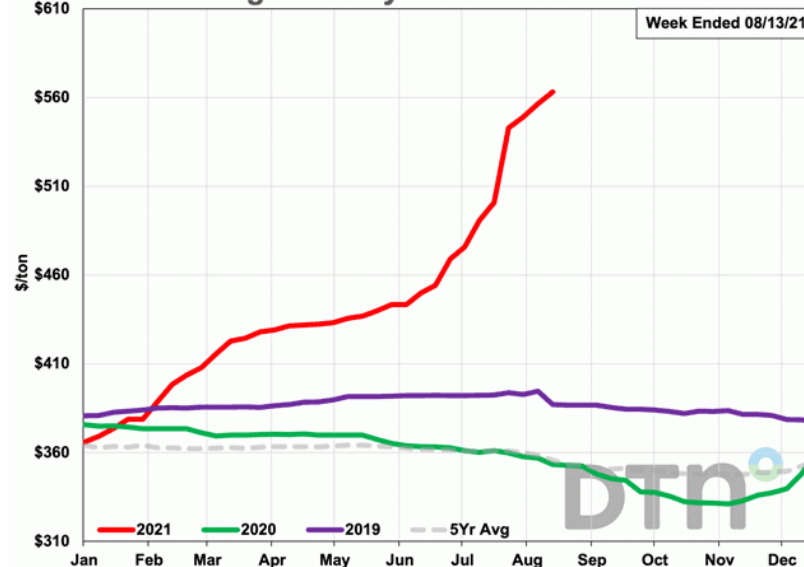
Average Weekly Retail DAP Prices



Average Weekly Retail UAN32 Prices

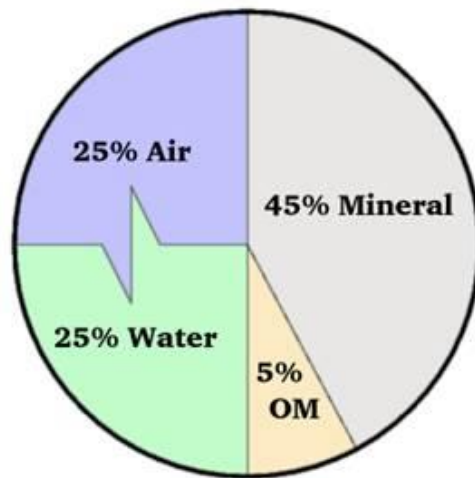
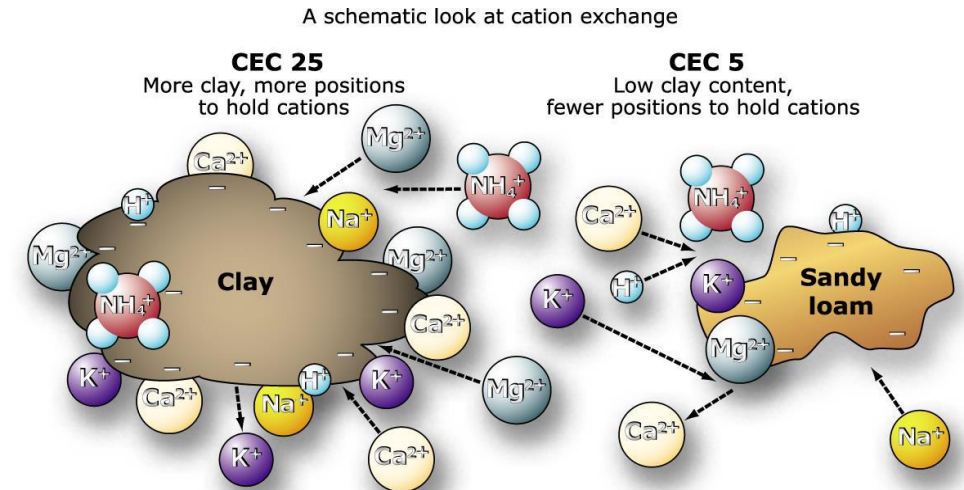
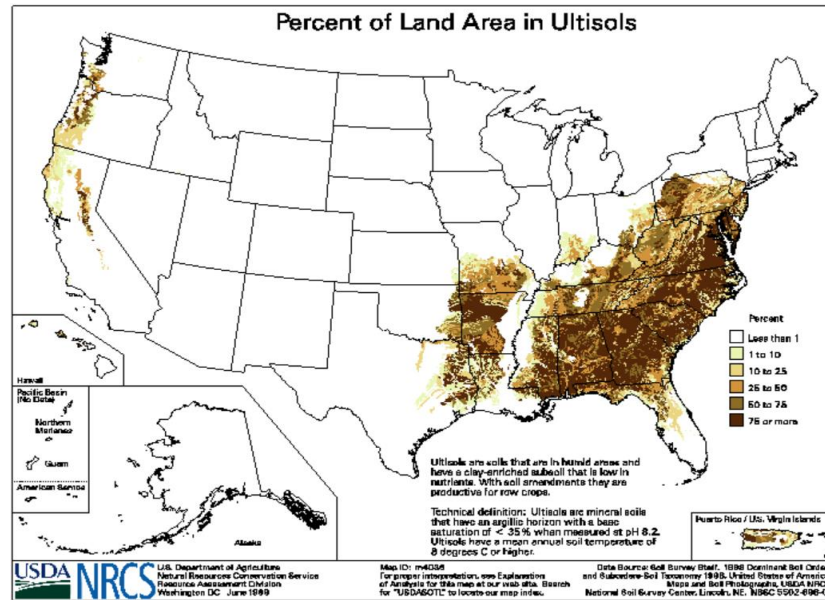


Average Weekly Retail Potash Prices

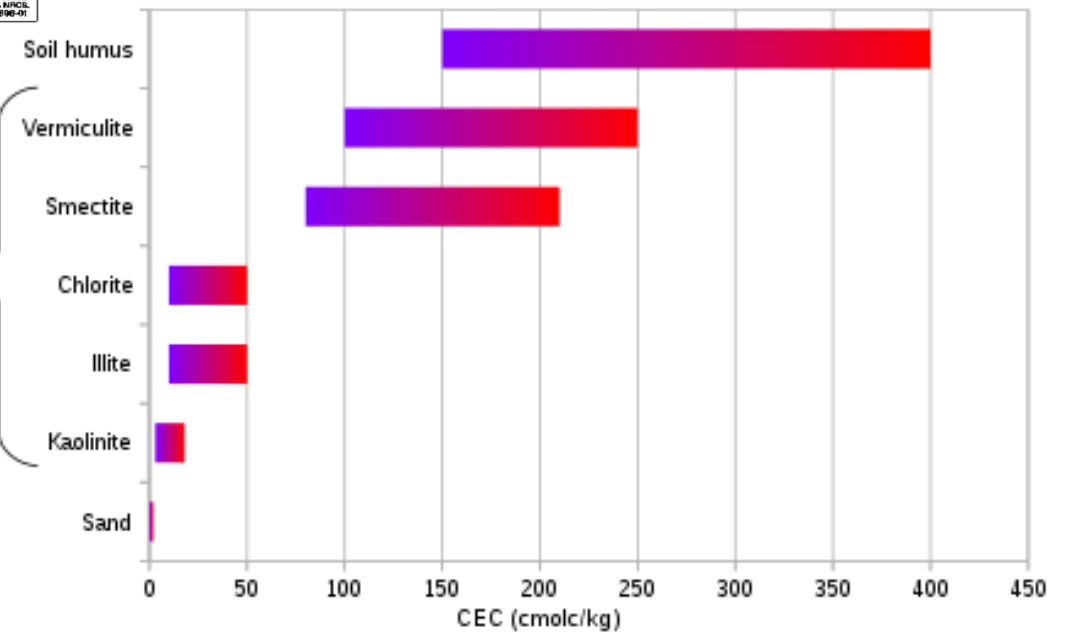


Fertilizer	Price (\$/ton)	
	Nov 3 – Dec 4, 2020	Nov 29 – Dec 3, 2021
DAP	455	836
MAP	499	918
Potash	340	777
Urea	359	873
10-34-0	459	756
ANHYD	427	1313
UAN28	208	575
UAN32	249	661

# Soil conditions in Georgia



clay minerals



# 4Rs of nutrient stewardship



The 4Rs promote best management practices (BMPs) to achieve cropping system goals while minimizing field nutrient loss and maximizing crop uptake.

## 4R Principles of Nutrient Stewardship



### RIGHT SOURCE

Matches fertilizer type to crop needs.



### RIGHT RATE

Matches amount of fertilizer to crop needs.



### RIGHT TIME

Makes nutrients available when crops need them.



### RIGHT PLACE

Keeps nutrients where crops can use them.

# Plant essential nutrients for cotton



Strengthen early  
season vigor



Maximize yield  
potential



Ensure boll  
development



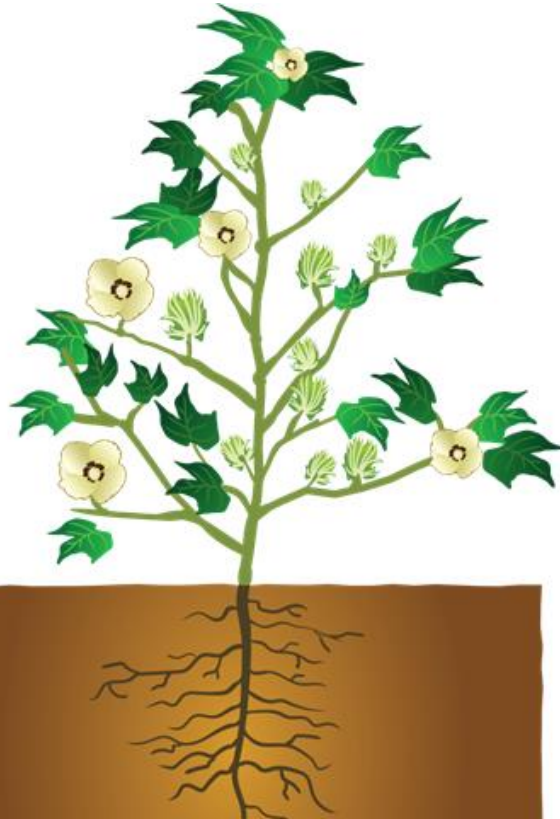


# Plant essential nutrients for cotton



Strengthen early season vigor

N	K	Ca
Mg	Mn	Zn



Maximize yield potential

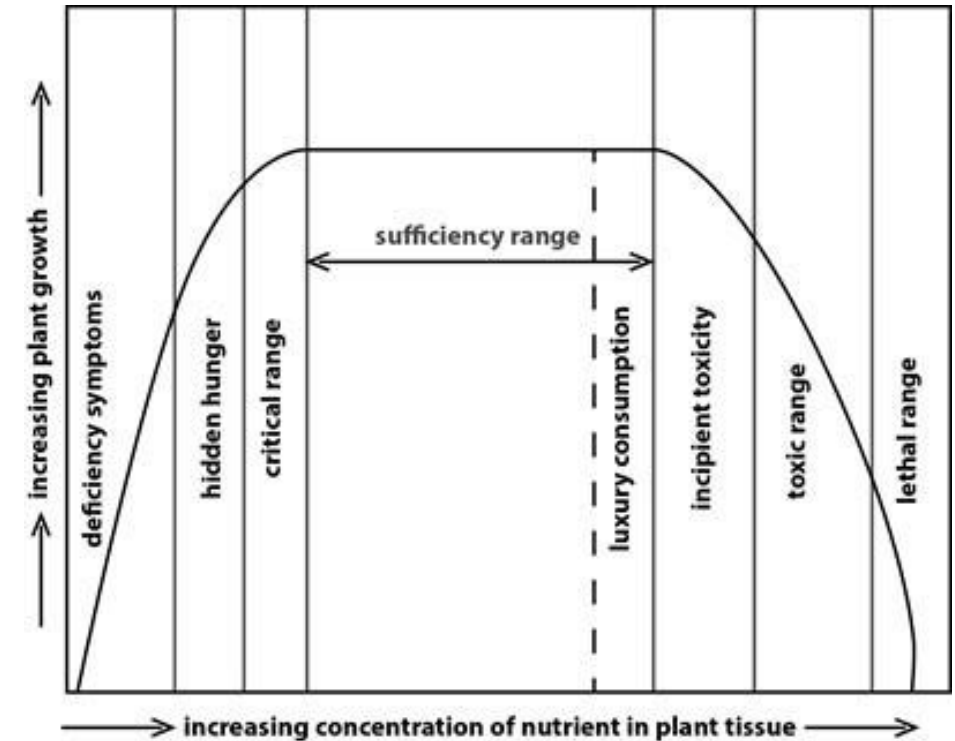
N	P	Ca	S	B
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Ensure boll development

K	B	Mo
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Yara Newsletter



# **Nutrient stress study**

# Experiment

- Experimental sites
  - *UGA REC in Camilla (sub-surface drip irrigation and overhead irrigation)*
  - *UGA REC in Midville (overhead irrigation and rain-fed condition)*
- Treatments (nutrient stress conditions)
  - *Early-season nutrient stress (E-ST)*
  - *Late-season nutrient stress (L-ST)*
  - *Reduced nutrient stress (R-ST)*
  - *UGA-AESL nutrient recommendation (UGA1500)*
- Randomized complete block design of four replications



# 2020 macronutrient levels at square stage

Treatment	N (%)	P (%)	K (%)	Mg (%)	Ca (%)	S (%)
Camilla						
E-ST	4.31a	0.60a	3.06a	0.73a	4.12a	0.62a
L-ST	4.74b	0.58a	3.48b	0.86b	4.58b	1.39b
R-ST	4.79b	0.53a	3.49b	0.82b	4.38ab	1.39b
Midville						
E-ST	2.11a	0.38a	3.63a	0.64a	1.24a	0.24a
L-ST	2.42b	0.37a	3.70a	0.62a	1.33a	0.29ab
R-ST	2.51b	0.37a	3.78a	0.64a	1.58b	0.35b

# 2020 micronutrient levels at square stage

Treatment	B (ppm)	Zn (ppm)	Mn (ppm)	Fe (ppm)	Cu (ppm)
Camilla					
E-ST	74.3a	47.7a	241a	174b	8.67a
L-ST	87.0c	60.7c	297b	177b	11.0a
R-ST	80.7b	54.0b	248a	157a	9.67a
Midville					
E-ST	30.3a	26.3a	30.7a	45.3a	7.67a
L-ST	30.0a	27.7a	35.3b	52.3b	7.67a
R-ST	31.7a	30.7b	43.3c	61.0c	8.00a

# Effects on cotton lint yield in 2020

Treatments	Midville dryland	Camilla SSDI
	Lint yield (lbs/ac)	
UGA1500		1086a
L-ST	731a	1064a
E-ST	1144b	1102a
R-ST	1239c	1163b

# Effects on cotton lint yield in 2021

Treatments	Midville dryland	Midville overhead	Camilla SSDI	Camilla overhead
	Lint yield (lbs/ac)			
UGA1500	874	1156	1090	920
L-ST	735	960	814	832
E-ST	1022	1116	1394	1145
R-ST	1096	1168	1177	1109

# Effects on cotton quality in 2020

Treatment	Gin turnout %	Micronaire	Micronaire Rating	Strength g/tex	Rd % ref	+B % ref	Uniformity %
Camilla							
E-ST	39.9a	4.08a	Premium	30.5a	74.9a	7.8a	81.9a
L-ST	41.3b	4.33b	Base	30.5a	75.8a	7.4a	81.1a
R-ST	40.5ab	4.20ab	Premium	30.6a	73.6a	7.6a	81.5a
R-ST UGA	40.7ab	4.20ab	Premium	30.1a	74.3a	7.5a	81.6a
Midville							
E-ST	36.9a	4.35a	Base	30.1a	76.5a	9.1a	83.7b
L-ST	36.4a	4.68b	Base	29.9a	76.2a	8.4b	82.9a
R-ST	37.2a	4.38a	Base	30.1a	76.9a	8.8ab	83.6b



# Soil health study

# Experiment

- Randomized complete block design of four replications
- Five integrated management systems
  - *Conventional tillage + no cover crop + no organic amendment (control; CT+NC+NA)*
  - *Conventional tillage + cover crop + no organic amendment (CT+CC+NA)*
  - *Conventional tillage + cover crop + organic amendment (CT+CC+OA)*
  - *Reduced tillage + no cover crop + no organic amendment (RT+NC+NA)*
  - *Reduced tillage + cover crop + organic amendment (RT+CC+OA)*

# Effects on cotton

Management systems	Cotton stand	Lint yield	Cottonseed yield	Residual biomass
	#/ac	lbs/ac	lbs/ac	lbs/ac
CT+NC+NA	36512a	1512a	2468a	8665a
CT+CC+NA	37618a	1483a	2420a	8455a
CT+CC+OA	37618a	1534a	2503a	8637a
RT+NC+NA	34299a	1386a	2262a	8102a
RT+CC+OA	35406a	1357a	2214a	8308a
<i>P</i> -value	0.445	0.213	0.213	0.977



# Effects on cotton lint yield in 2021

