



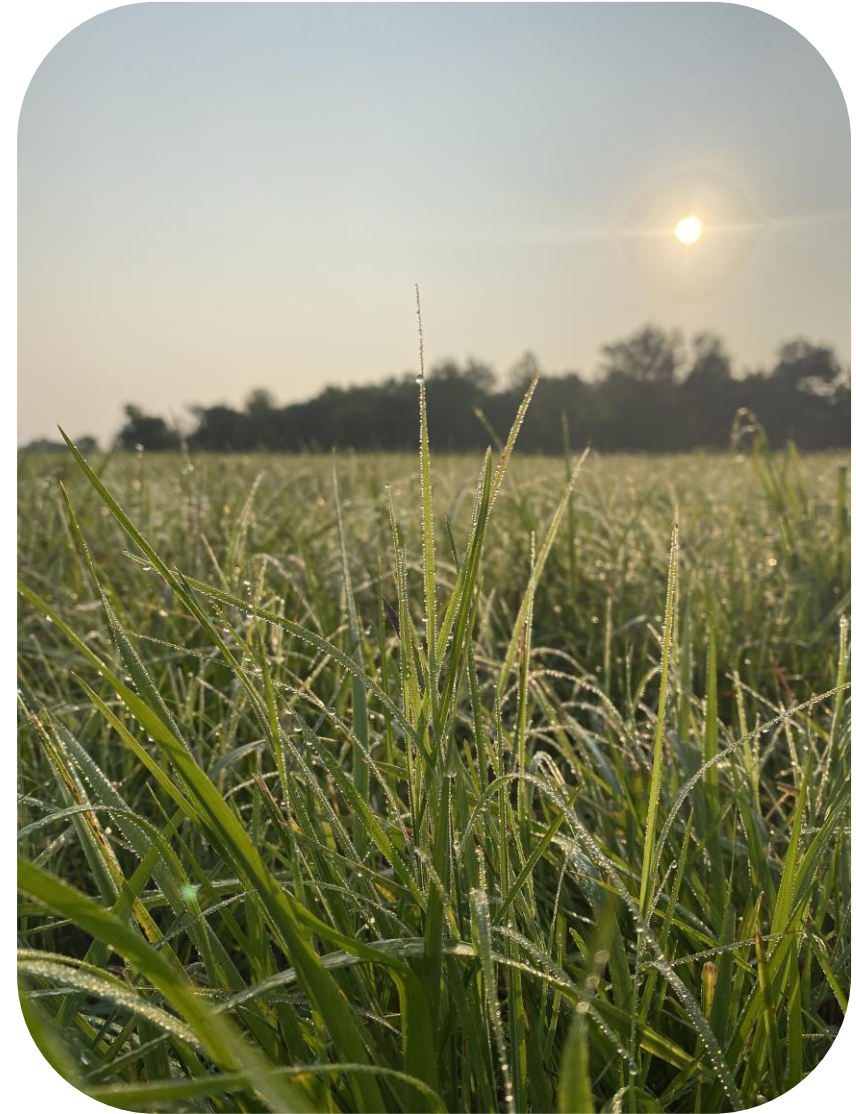
Strategies to increase yield and forage quality in hayfields

Bruno C. Pedreira

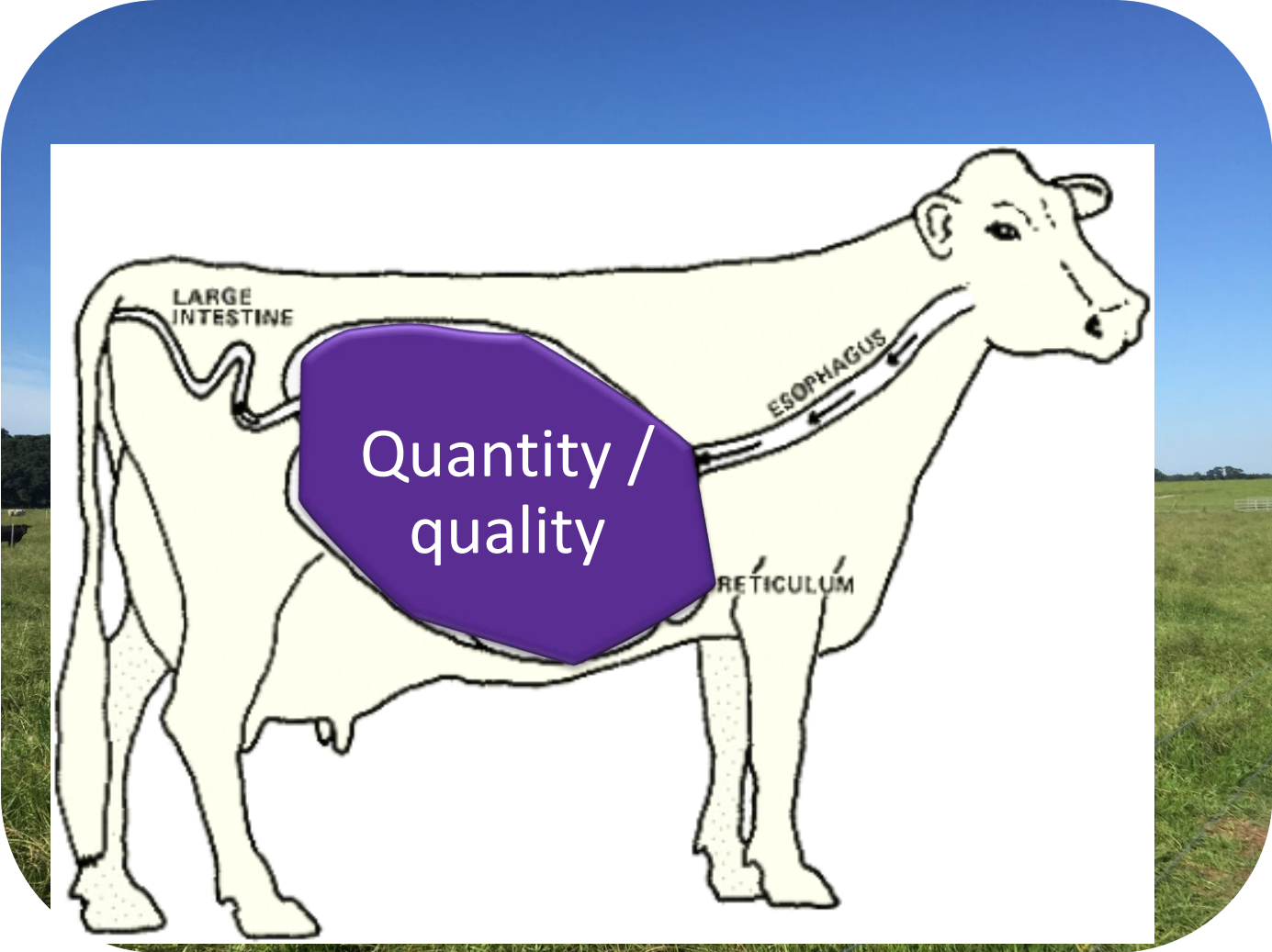
Agronomist

Outline

- Brief overview and concepts
- Factors affecting yield and quality
 - Weather
 - Maturity
 - Genotype
 - Fertilization
 - Management



Forage-based system



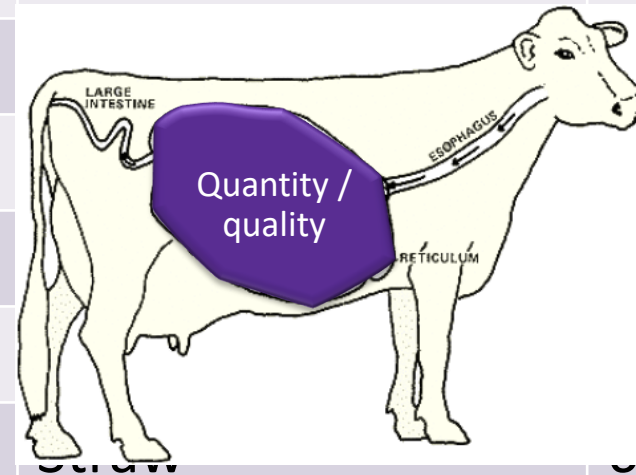
Bale of hay

Tue Jul 27, 2021



Hay	Classification	\$/ton
Alfalfa	Premium/Supreme	180.00-280.00
	Good	150.00
	Fair/Good	140.00-150.00
Bluestem	Premium	110.00-160.00
		100.00-135.00
Brome		5.00
		35.00
		5.00-150.00
Wheat	Straw	50.00

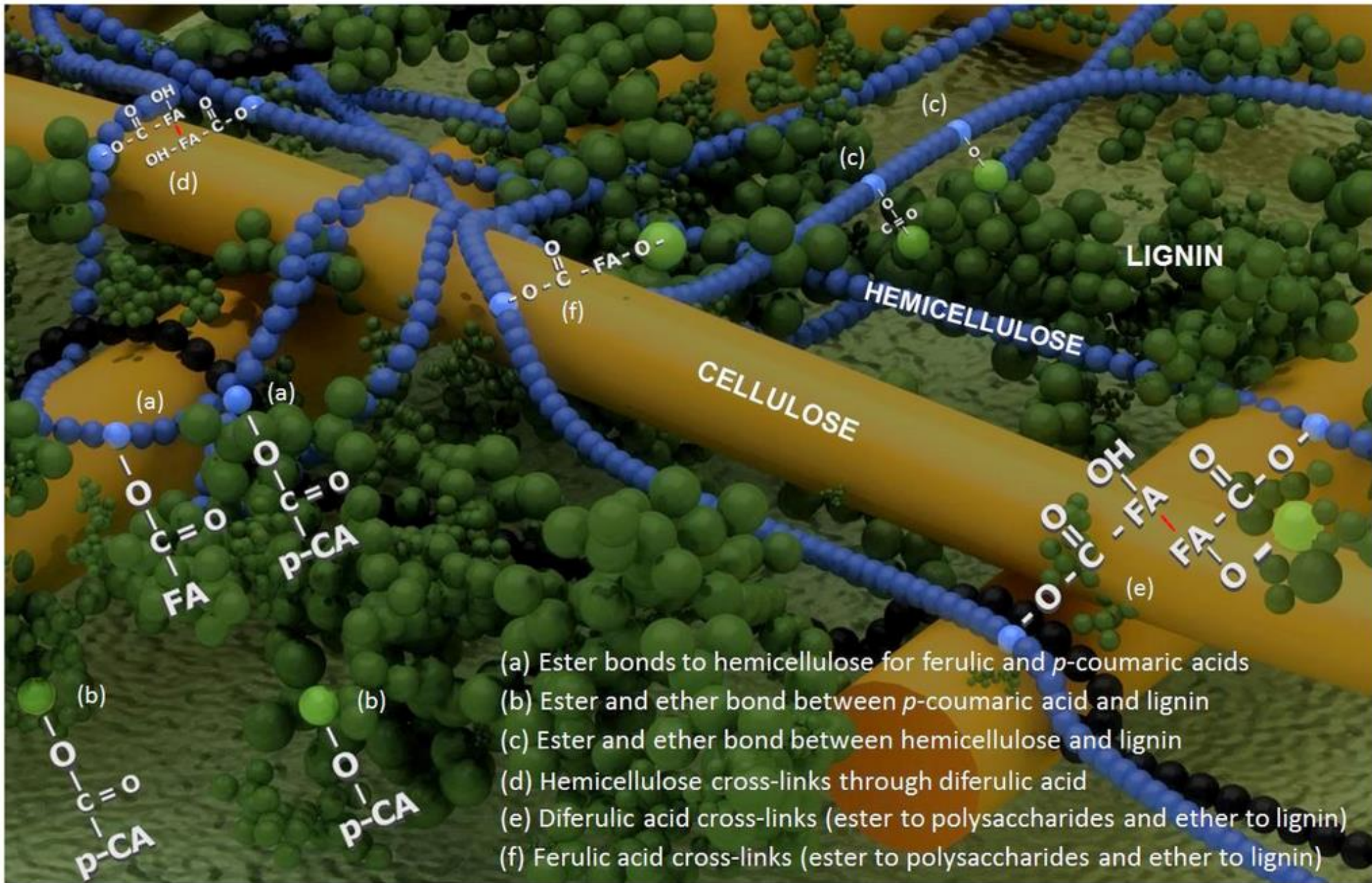
1. How much does it cost?
 2. What am I buying?
 3. How much CP?



Nutritive value

Based on chemical composition, digestibility and nature of digested products, as estimated by *in vitro* or *in vivo* chemical analyses.





Hay Quality Designation Guidelines

Hay	Classification	% CP
Grass	Premium/Supreme	Over 13
	Good	9 to 13
	Fair	5 to 9
	Low	Under 5
Alfalfa	Supreme	Over 22
	Premium	20 to 22
	Good	18 to 20
	Fair	16 to 18
	Utility	Under 16



Factors affecting yield and quality

The most variable composition of any feedstuff

- Weather
- Maturity
- Genotype



Weather -> Growth -> Maturity

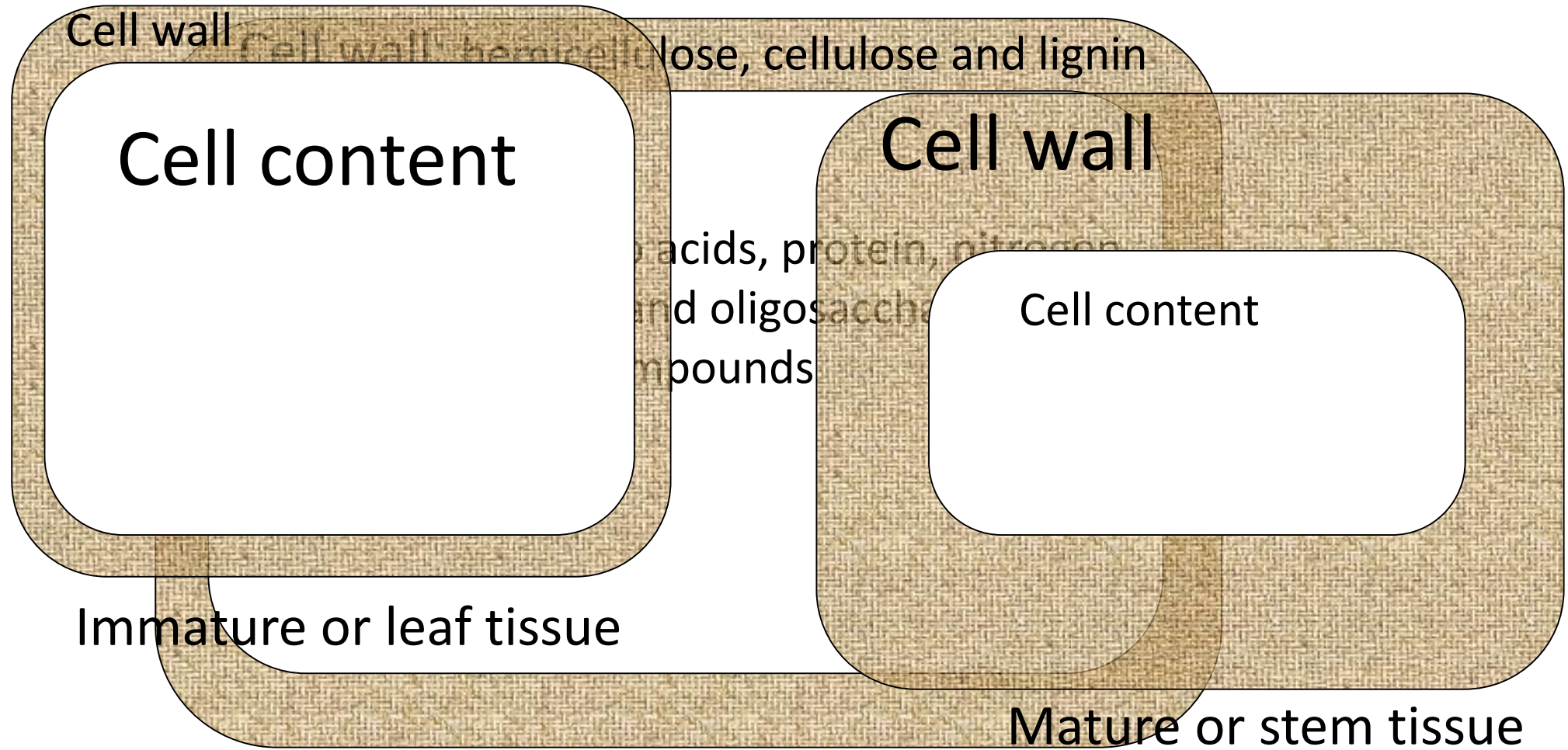
Temperature

Rainfall

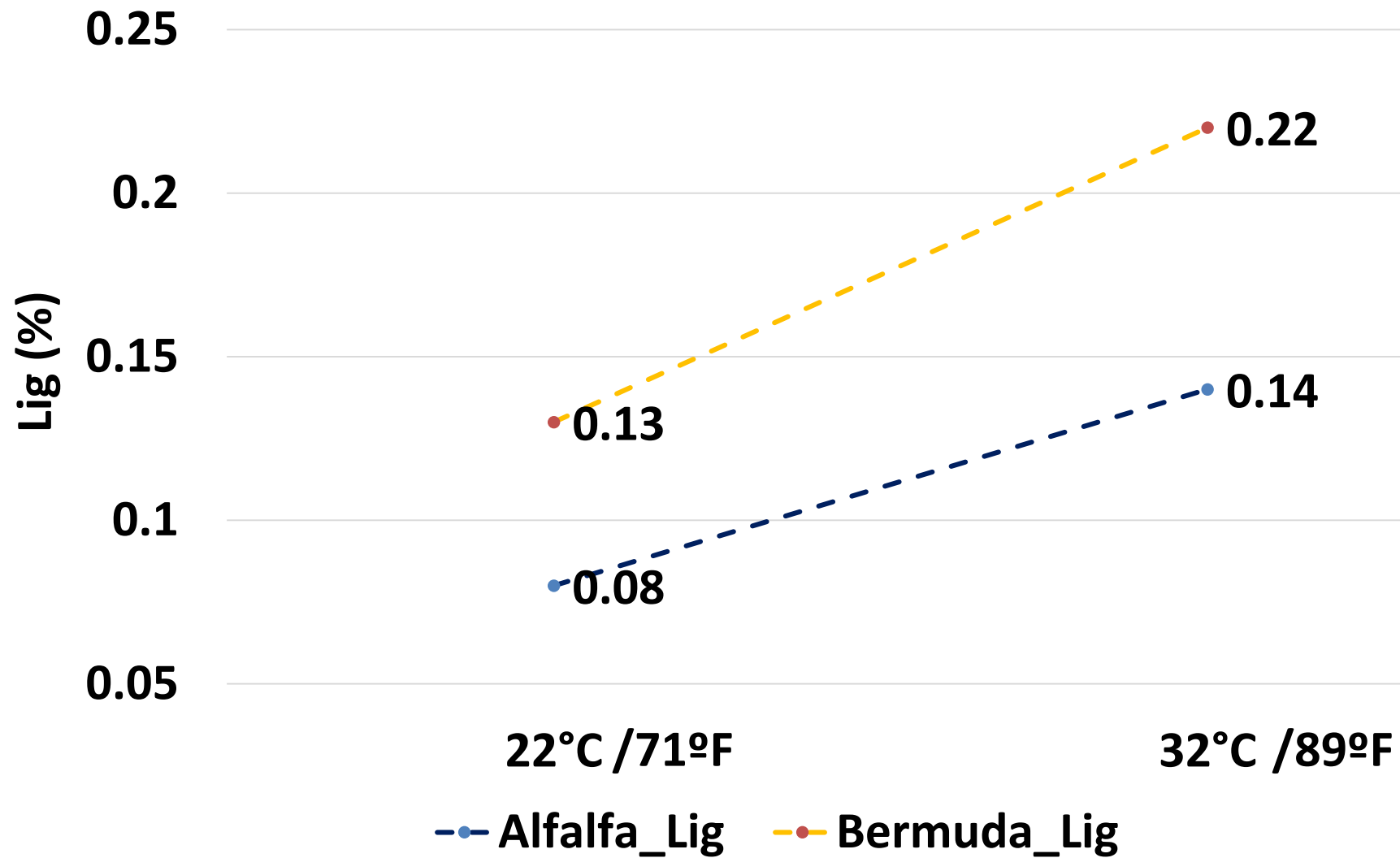
Daylength



Maturity – Plant cell

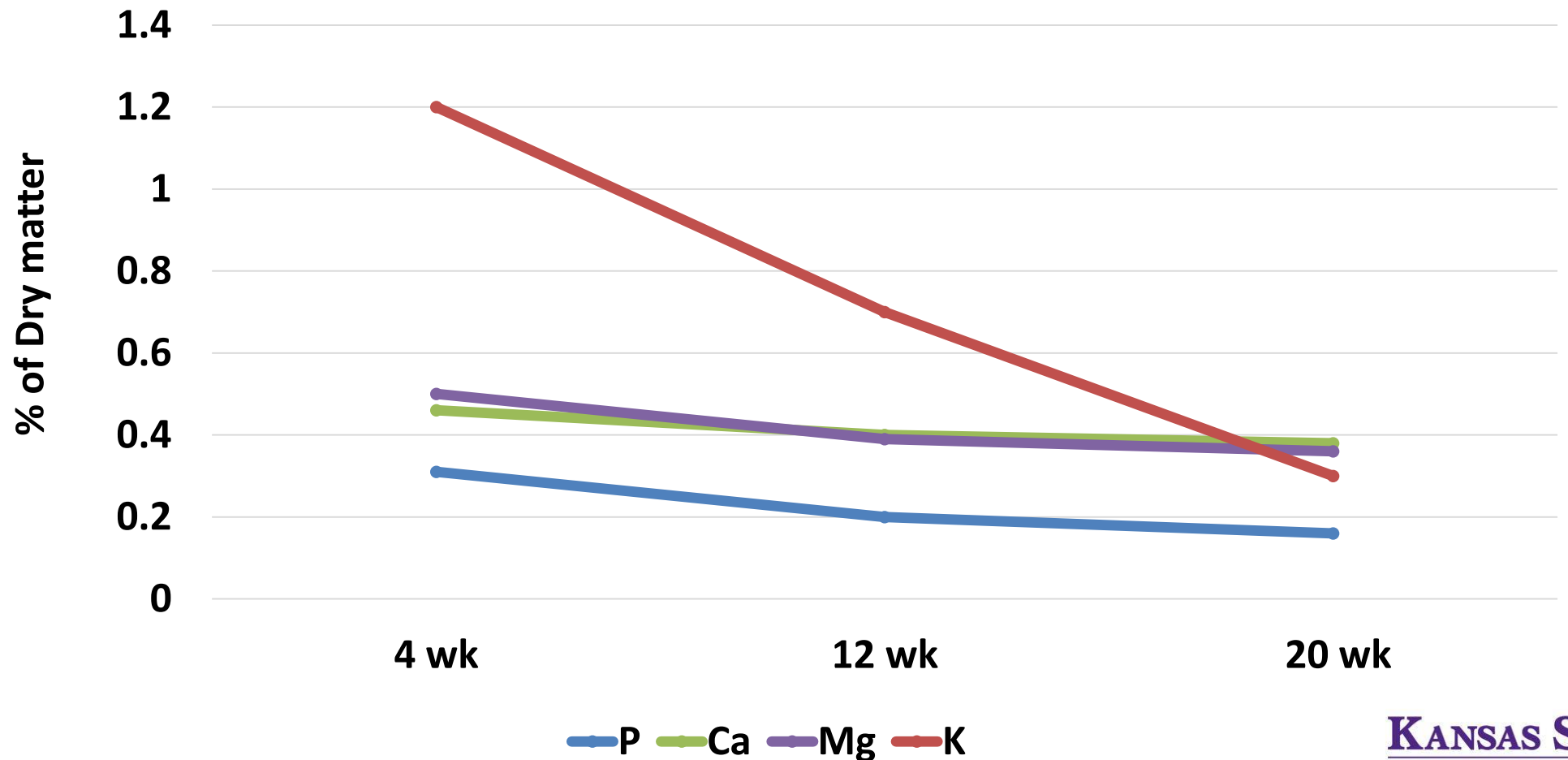


Weather/Maturity

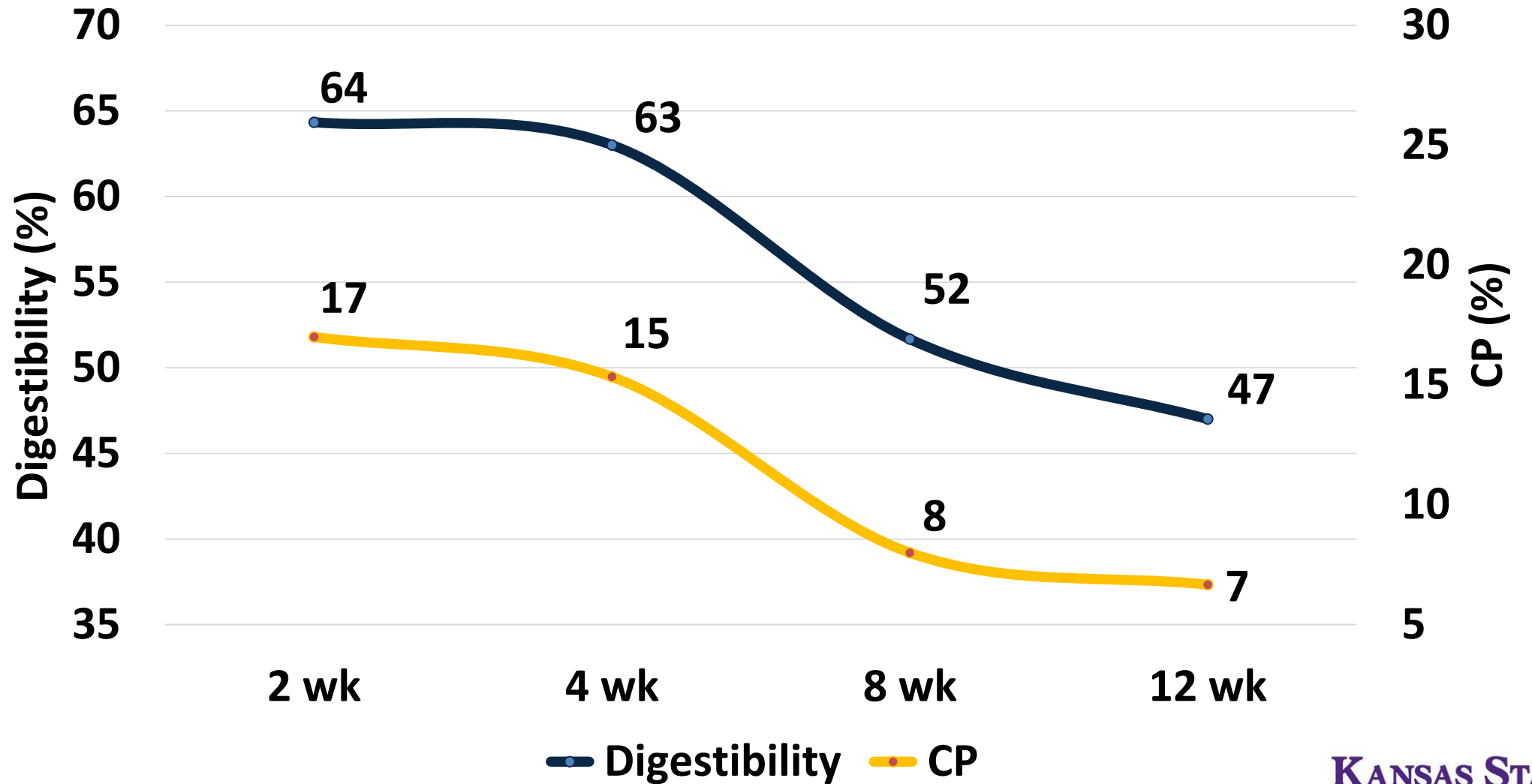


Maturity

- Effect on mineral concentration

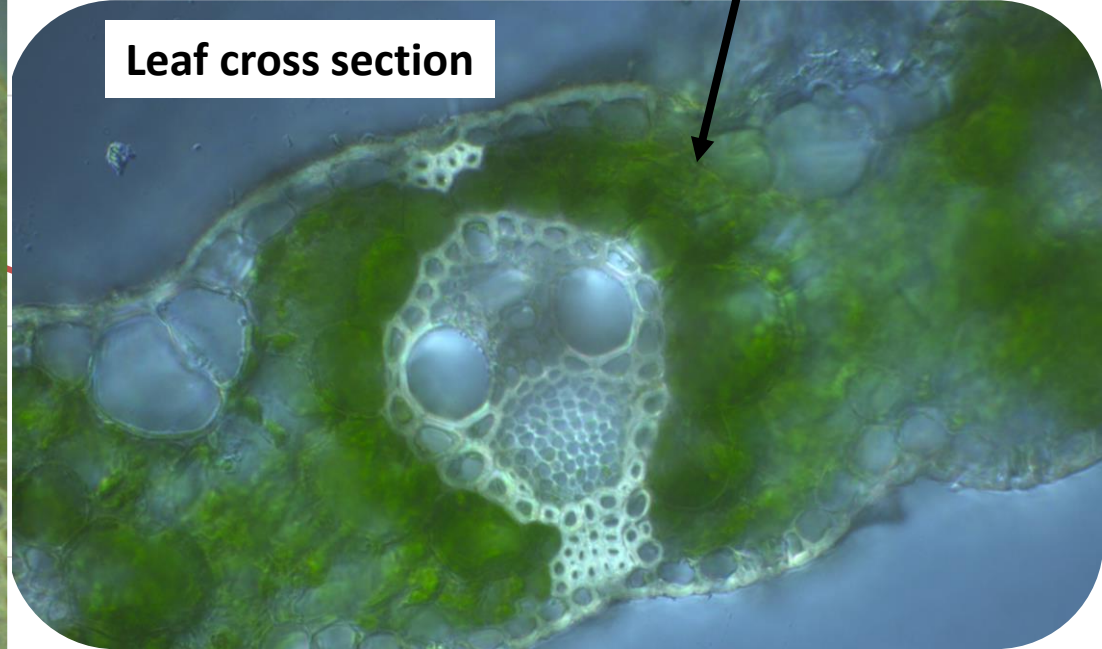
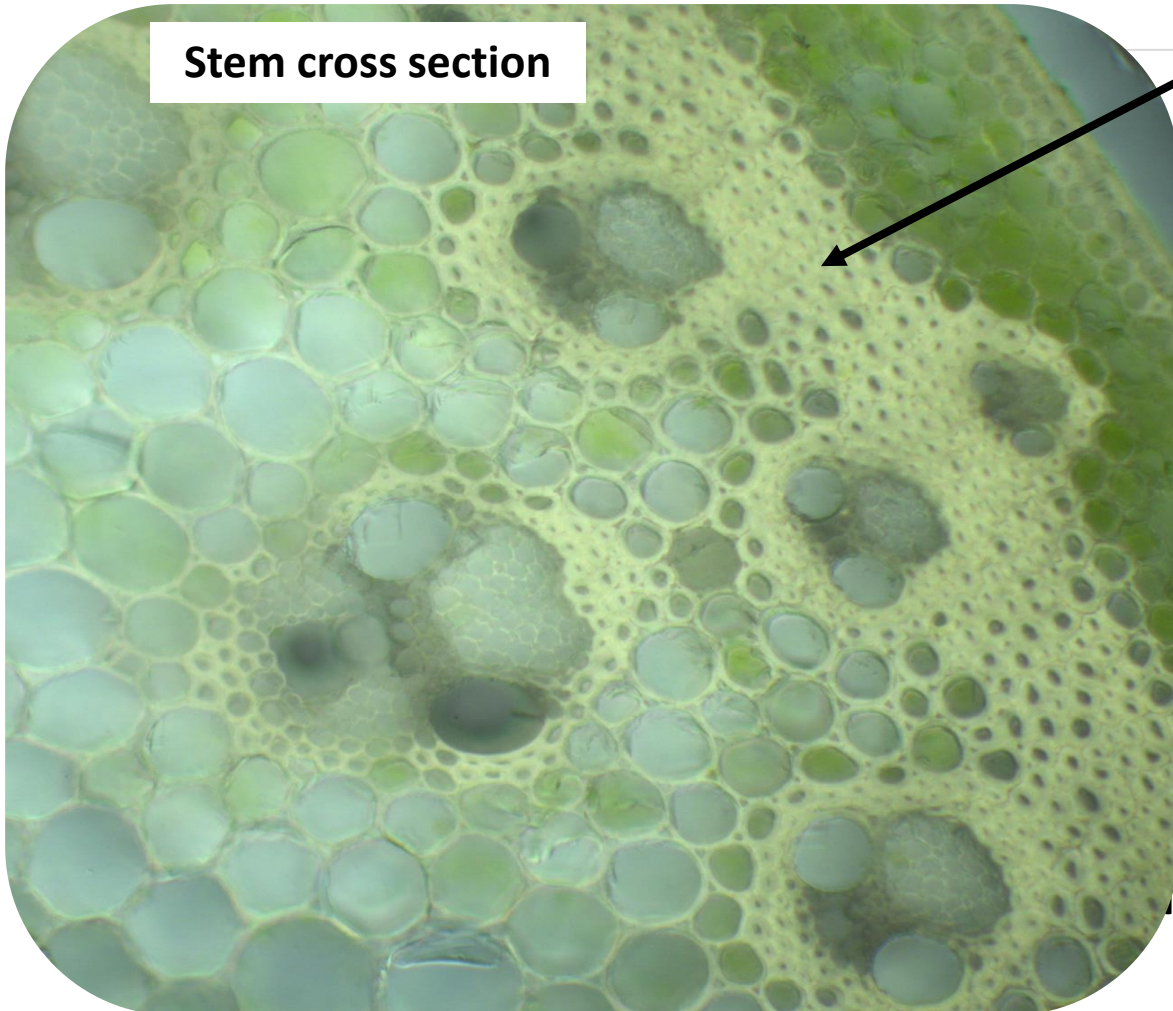


Maturity (grasses)



Maturity

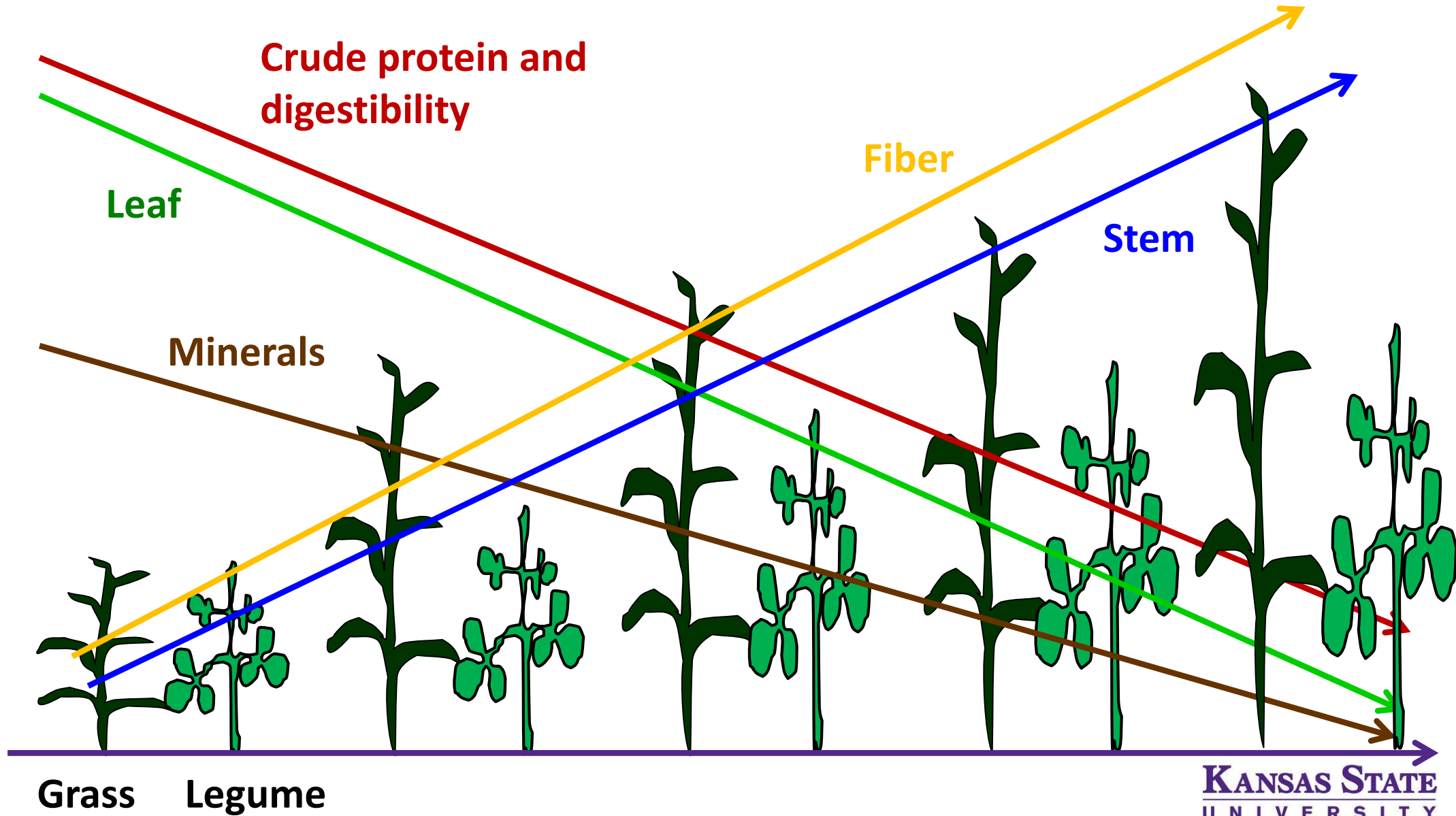
- Effect on leaf/stem ratio



Cell wall

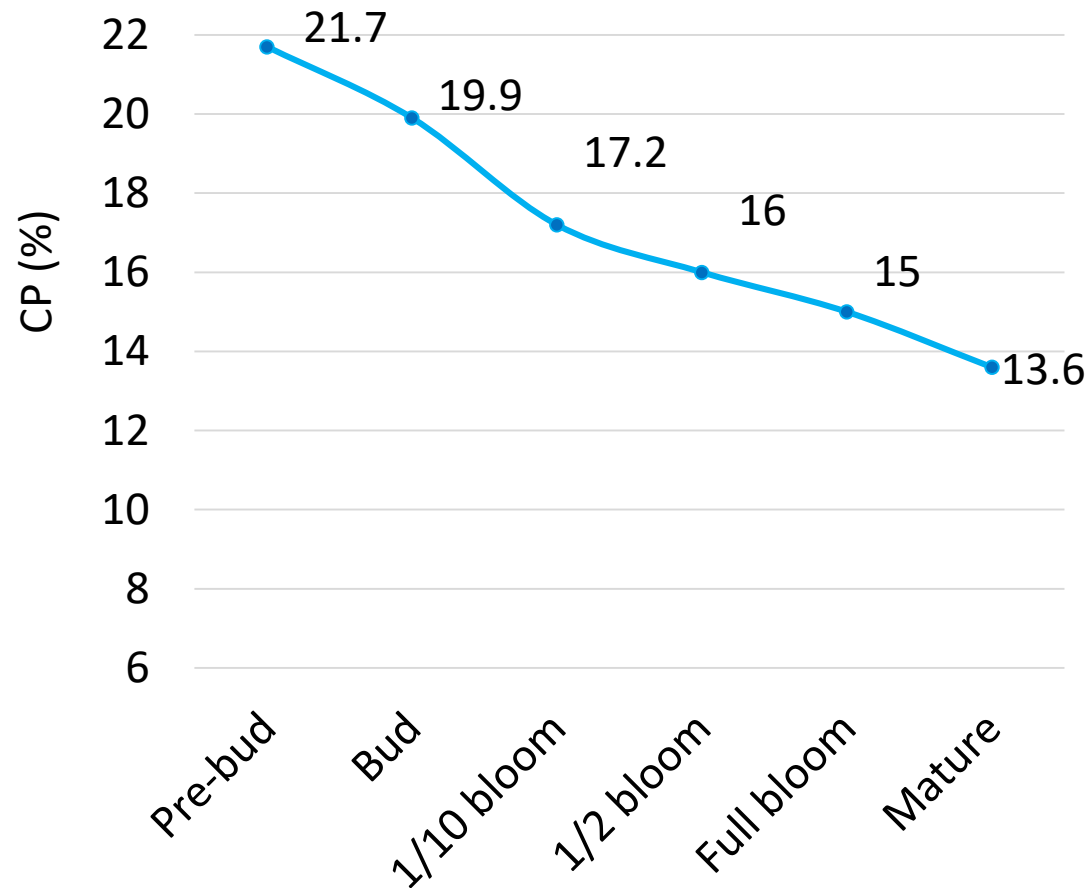
Cell content

Maturity



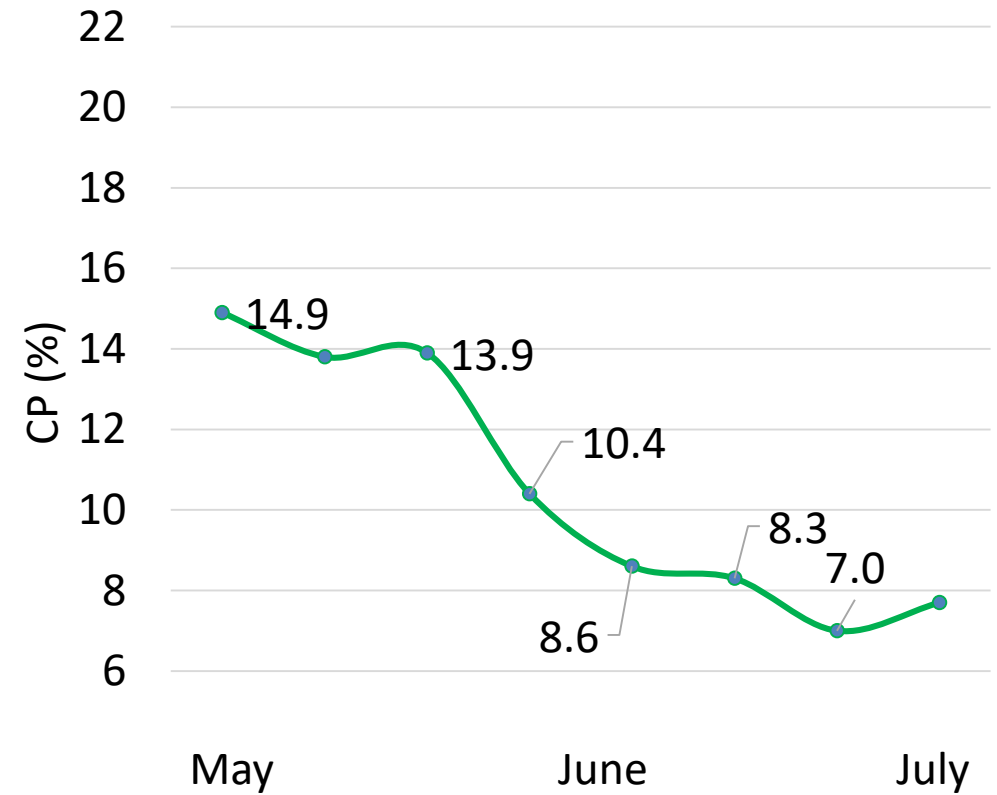
Genotype

Alfalfa (legume)



NRC, 1978.

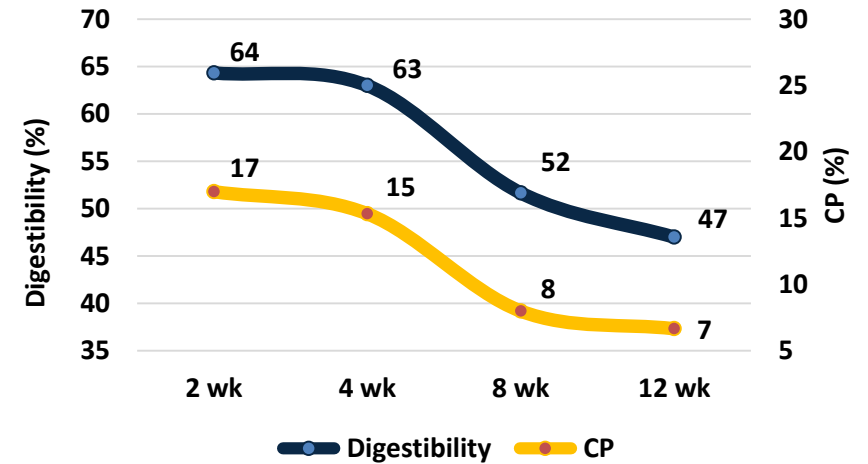
Tall fescue (C_3 cool-season grass)



Bates, 2000.

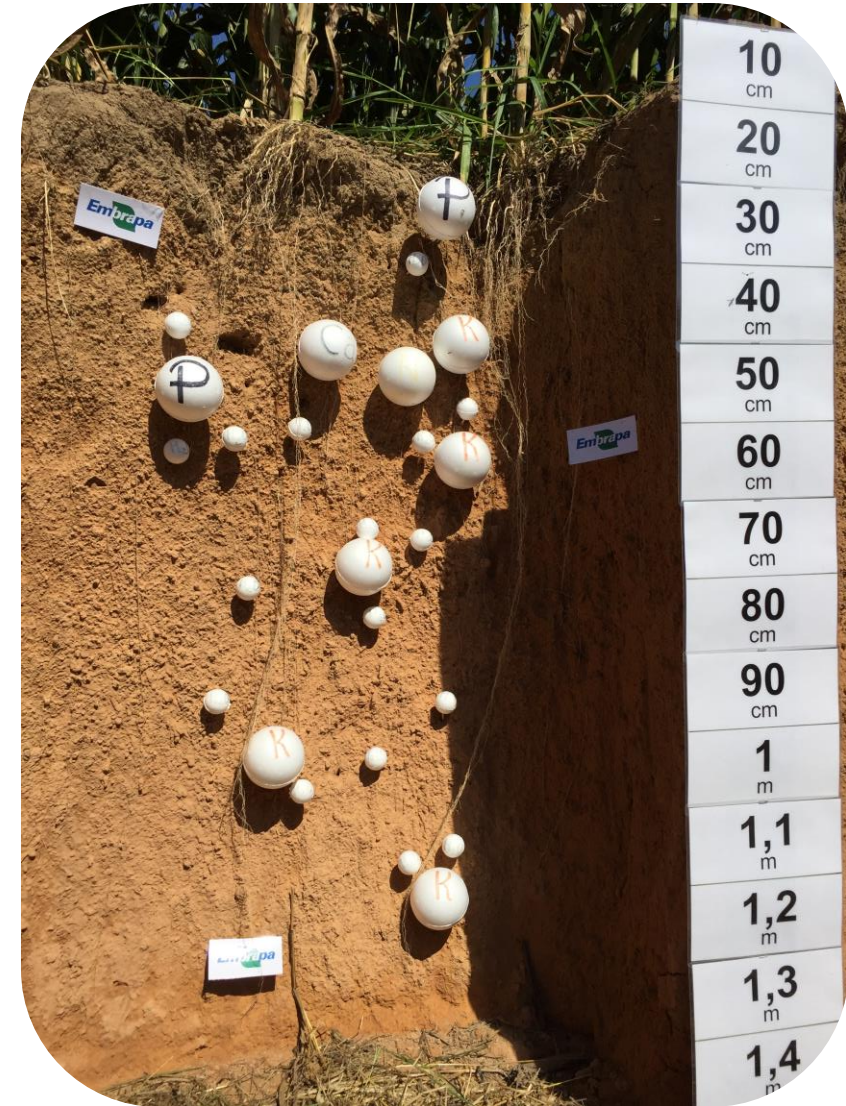
Factors affecting yield and quality

- Weather
- Maturity
- Genotype
- Fertilization



Fertilization

- Fertilizing plants, not soils, to obtain a desired plant response.
- Fertilization depends upon:
 - ✓ Soil characteristics;
 - ✓ Forage species;
 - ✓ Objectives and needs of the production system.



How do I start a fertility program?



Kansas State University Soil Testing Laboratory
 2308 Throckmorton Plant Sciences Center
 Manhattan, KS 66506-5503
 Tel: 785-532-7897 Fax: 785-532-7412
 www.agronomy.ksu.edu/soiltesting/

Soil Information Sheet



Package*	Analysis Included	Cost
Soil Preparation	One time charge per sample	\$1.25
#1	pH, Buffer pH, P, K	\$5.75
#2	Package #1 + O.M. + Zn	\$11.50

Submitted by (billing address):

Submitted For:

Kansas State Soil Testing Lab

Tel: 785-532-7897 soiltesting@ksu.edu

Customer: Sassenrath, Gretchen

Received: 4/6/2021 Reported: 4/16/2021

Tests Results For Order # 32328

Pasture fertility -Sassenrath, Gretchen

Lab # (s)	Sample Name	Ca ppm	Mg ppm	Na ppm	OM LOI %	P-M ppm	pH	pHBUF	NO3-N ppm	NH4-N ppm	K ppm	S ppm	Sand %	Silt %	Clay %	CEC meq/100g
312865	Crawford - Fescue 0-6"	1,314.30	147.2	70.4	3.2	5.2	5.8	6.5	9.1	17.1	57.1	7.5	24	58	18	16.5
312866	Montgomery Native 0-6"	1,559.70	253.5	19.9	4.3	2.1	5.8	6.2	1	26.6	83.2	3.8	30	48	22	21.3

For Lab Use	Sample	In Inches	Intended Crop	Average	Alternative Crop	Average	Tillage	Irrigated	Crop	Test Requested
			<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat		<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat		<input type="checkbox"/> Conv. <input type="checkbox"/> No-Till	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat	
			<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat		<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat		<input type="checkbox"/> Conv. <input type="checkbox"/> No-Till	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat	
			<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat		<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat		<input type="checkbox"/> Conv. <input type="checkbox"/> No-Till	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat	
			<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat		<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat		<input type="checkbox"/> Conv. <input type="checkbox"/> No-Till	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Corn <input type="checkbox"/> Milo <input type="checkbox"/> Soybeans <input type="checkbox"/> Wheat	

Today

Next season

Type of Fertilizer Recommendation for (Refer back of sheet for explanation):

- Sufficiency** – Sufficiency recommendations are based upon meeting the intended crops nutrient requirements.
- Build** – Build-maintenance recommendations can be used to build soil test P and K within a certain number of years.

Number of years to build P and K: _____

Comments:

Factors affecting yield and quality

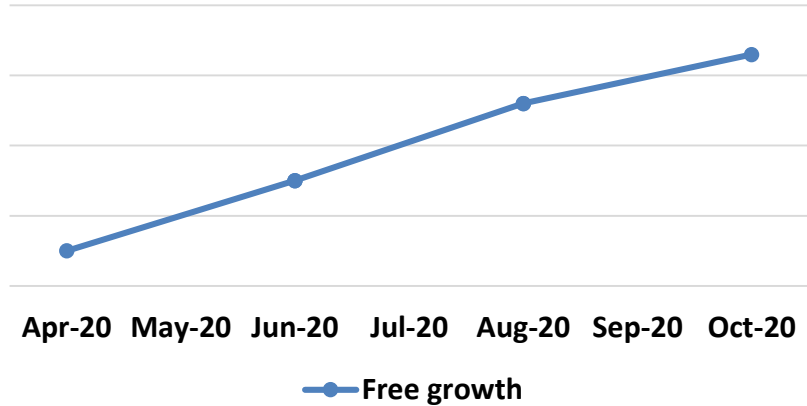
- Weather
- Maturity
- Genotype
- Fertilization
- Harvest management



Bermudagrass

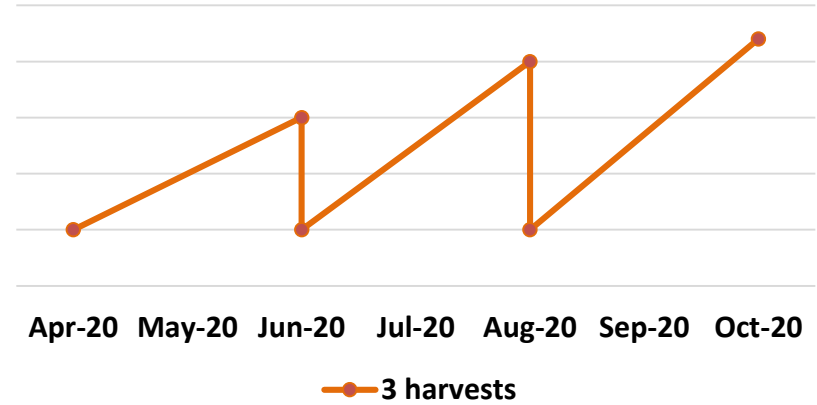
T1

Production (lbs/ac)



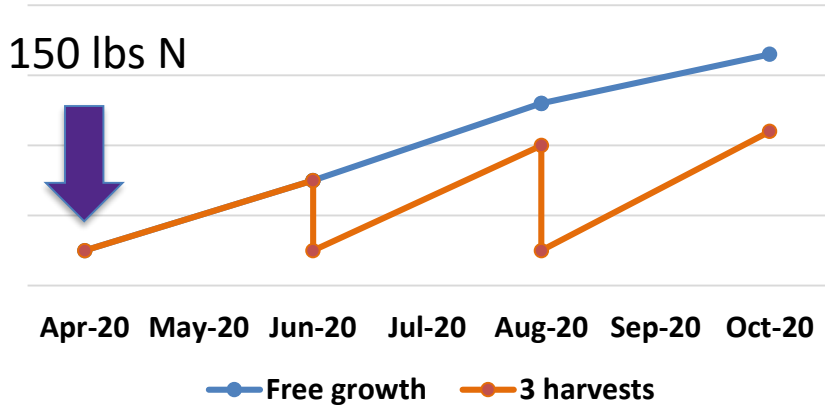
T2

Production (lbs/ac)



T3

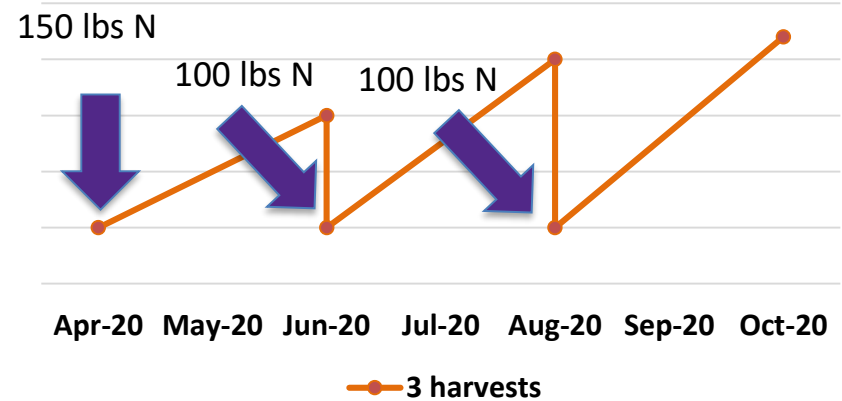
Production (lbs/ac)



T4

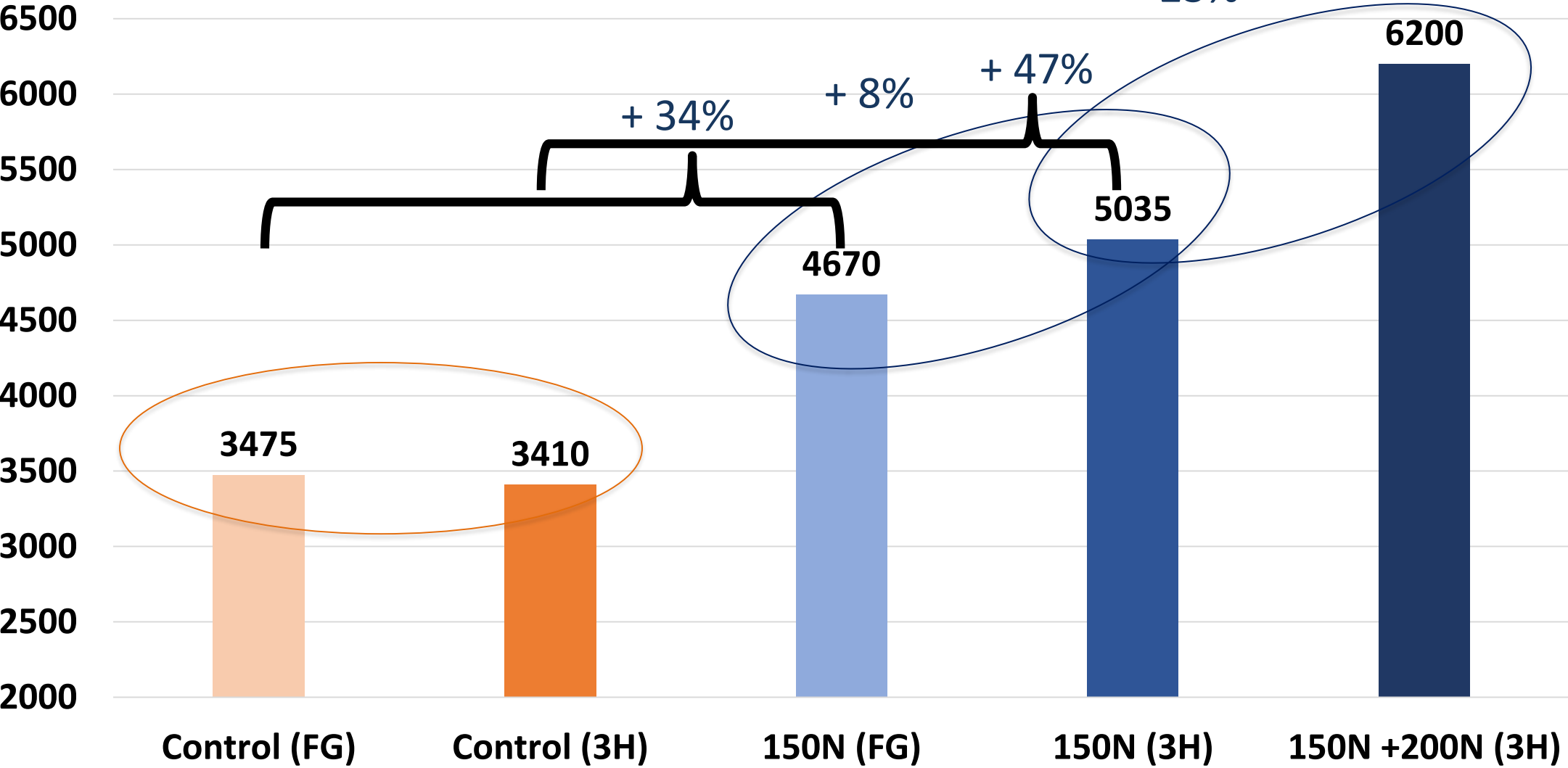
T5

Production (lbs/ac)

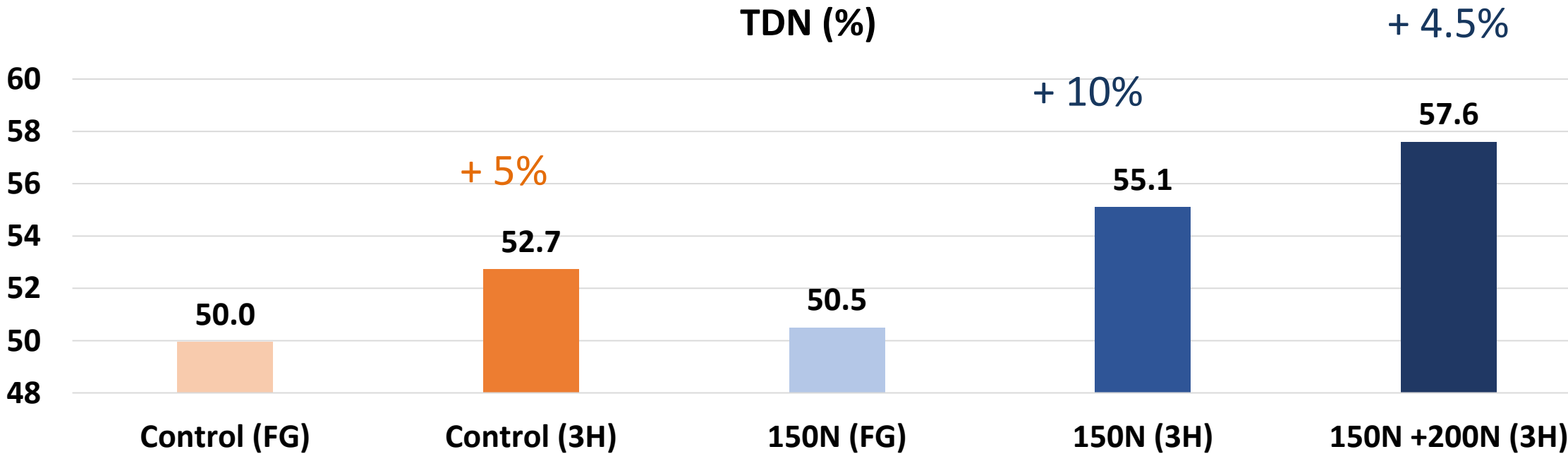
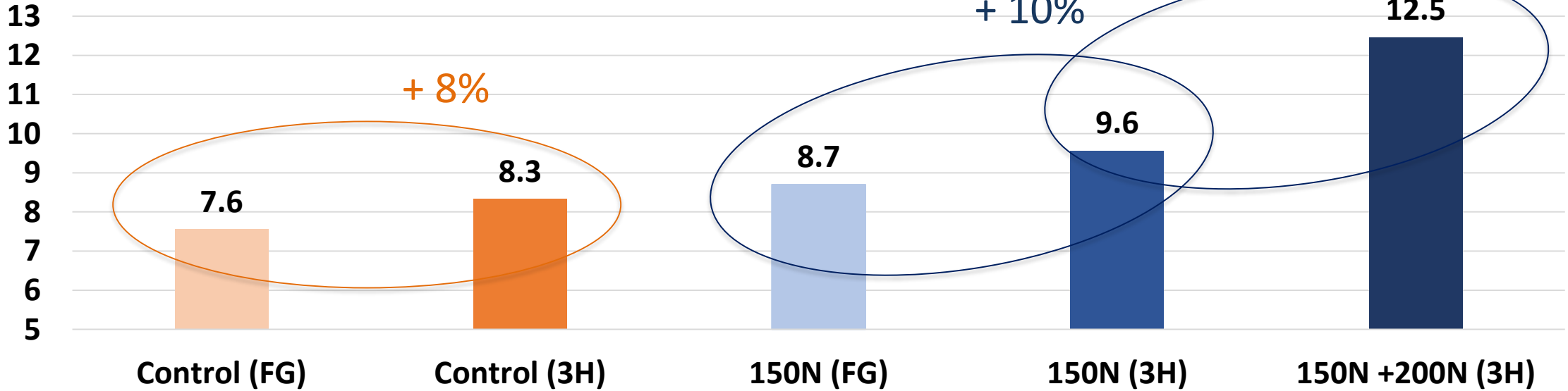


Bermudagrass

Total FA_DM (#/acre)

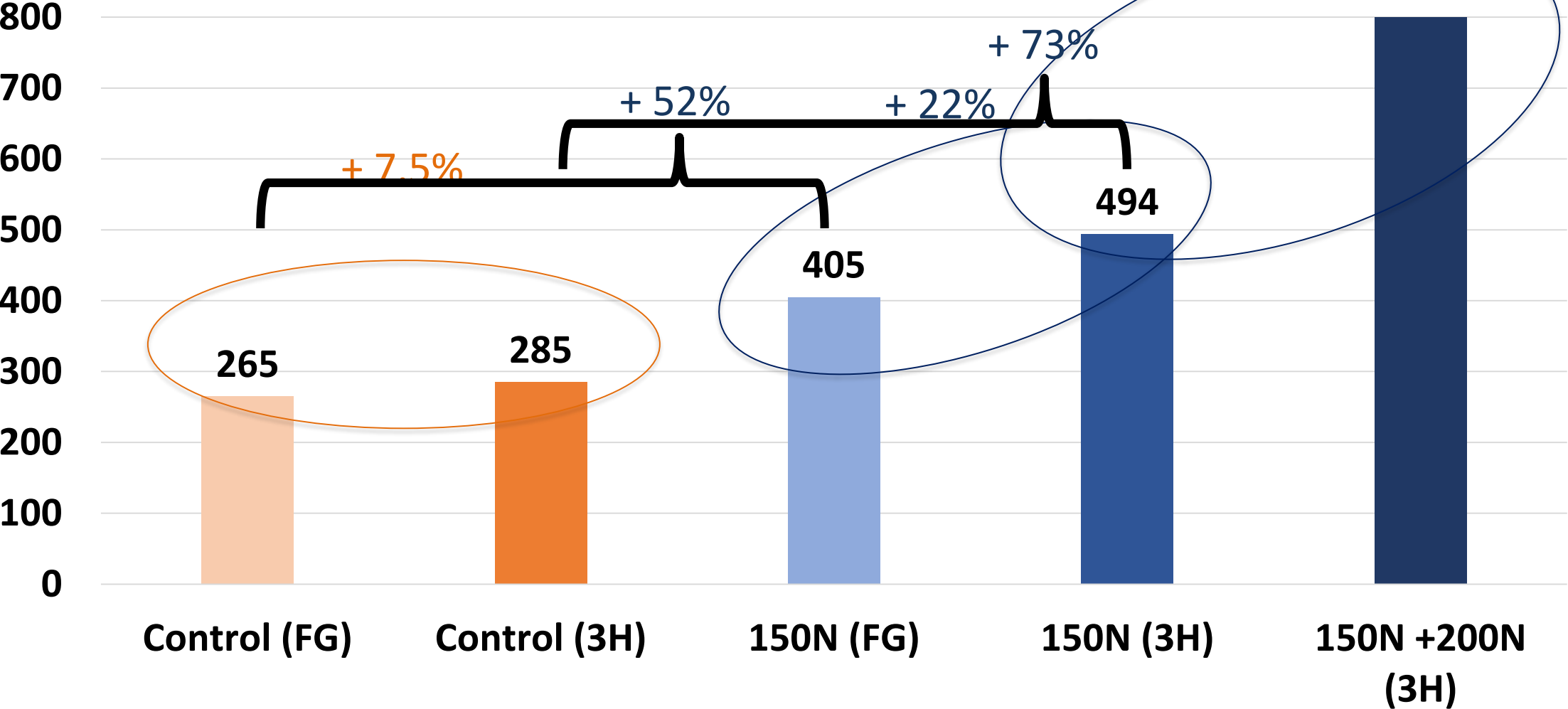


Bermudagrass



Bermudagrass

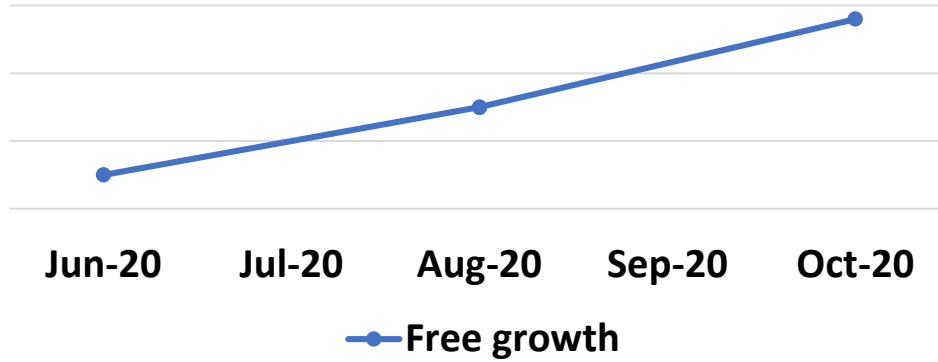
CP (#/ac)



Crabgrass (Mojo)

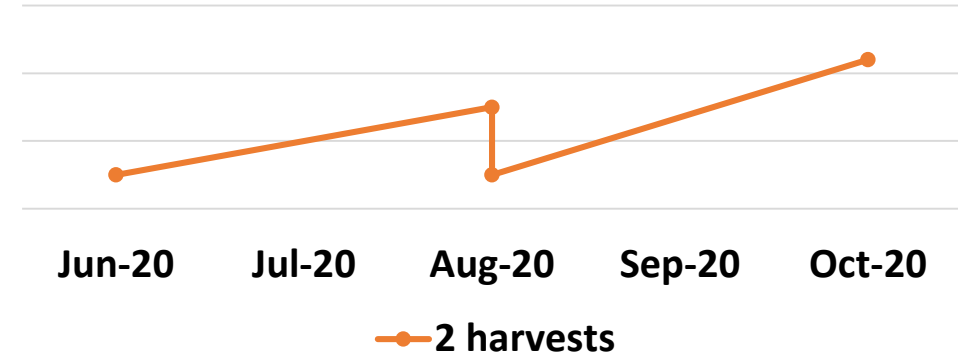
T1

Production



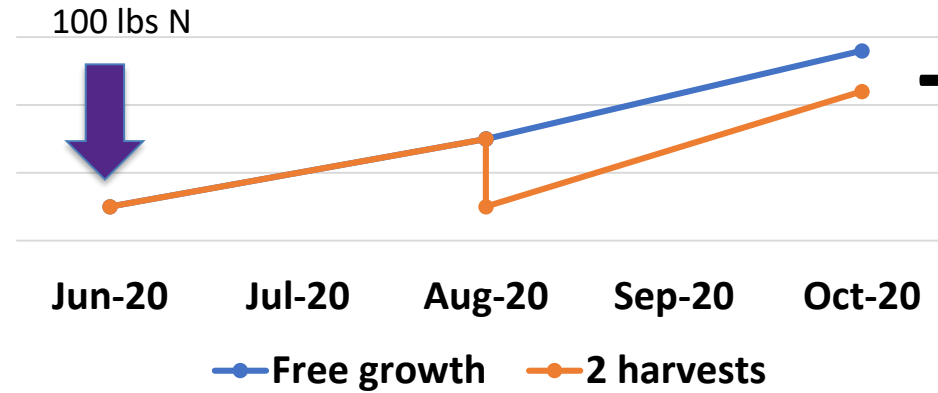
T2

Production



T3

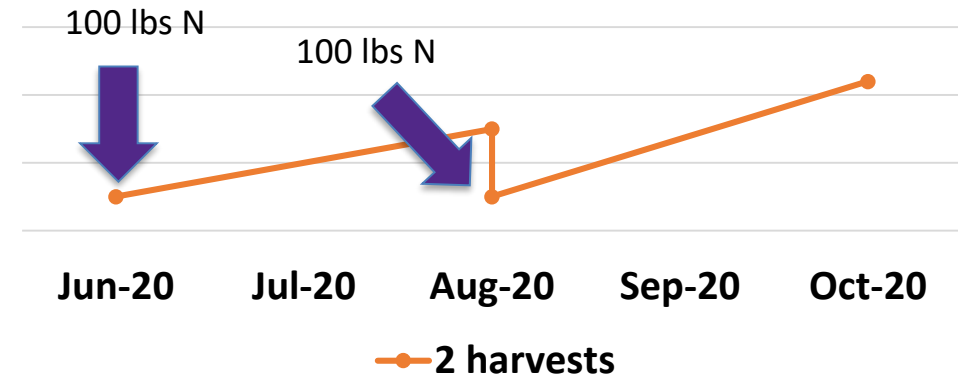
Production



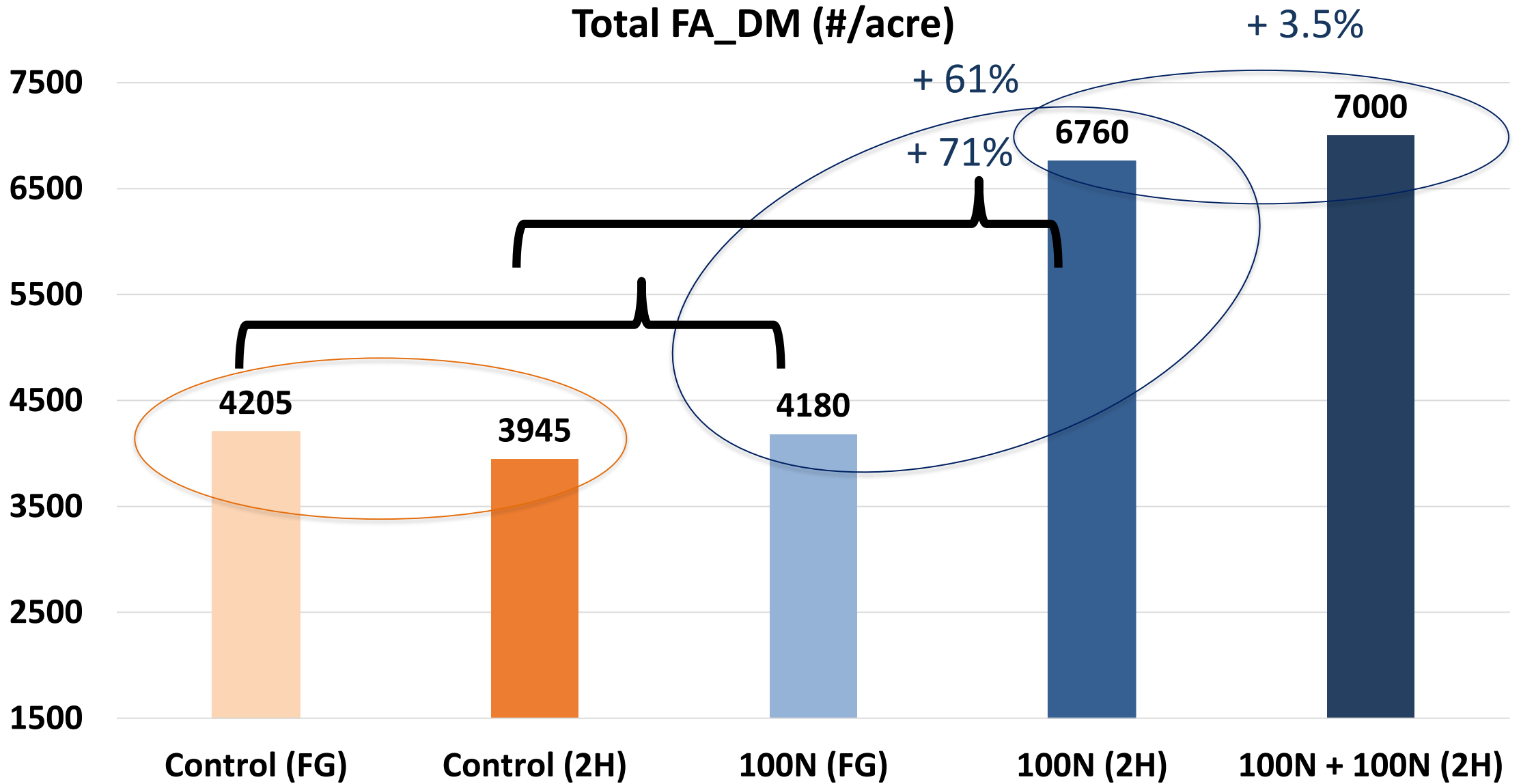
T4

T5

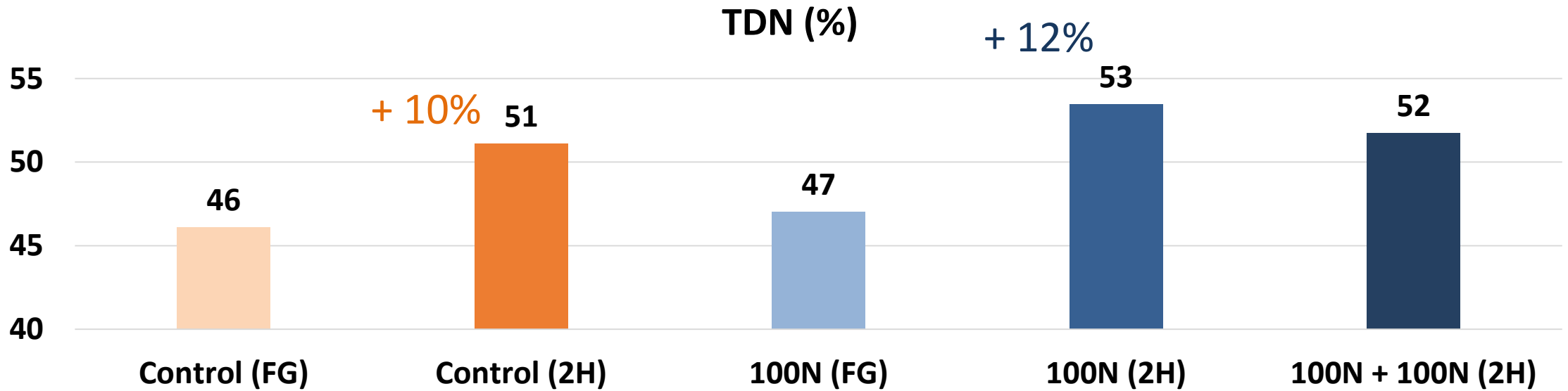
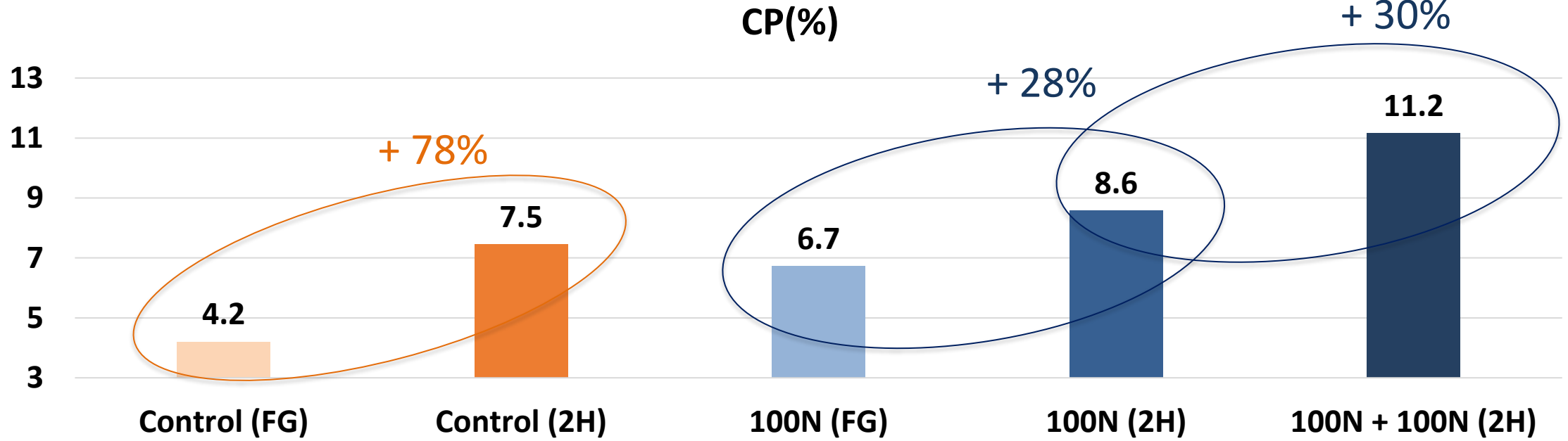
Production



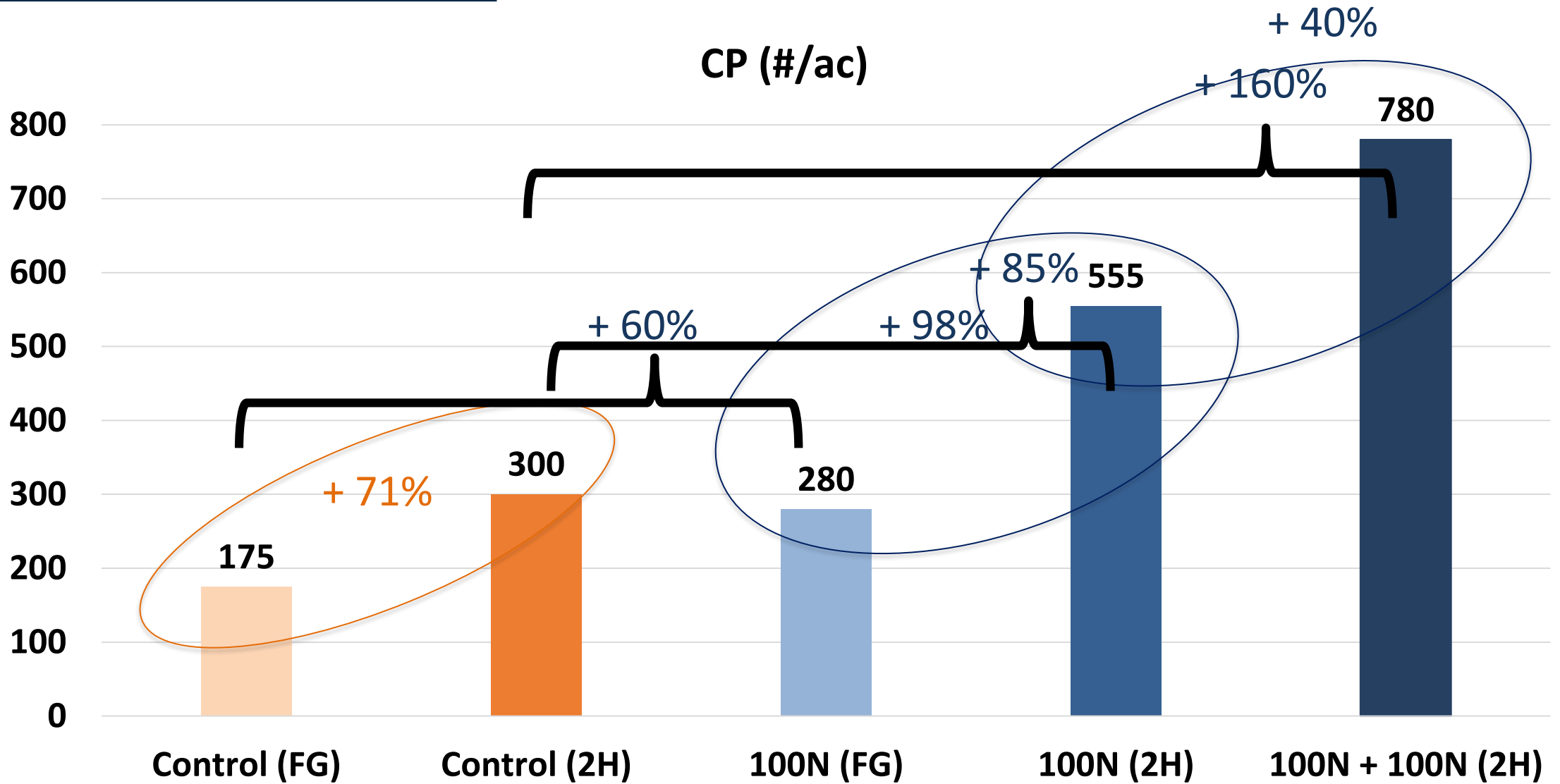
Crabgrass (Mojo)



Crabgrass (Mojo)

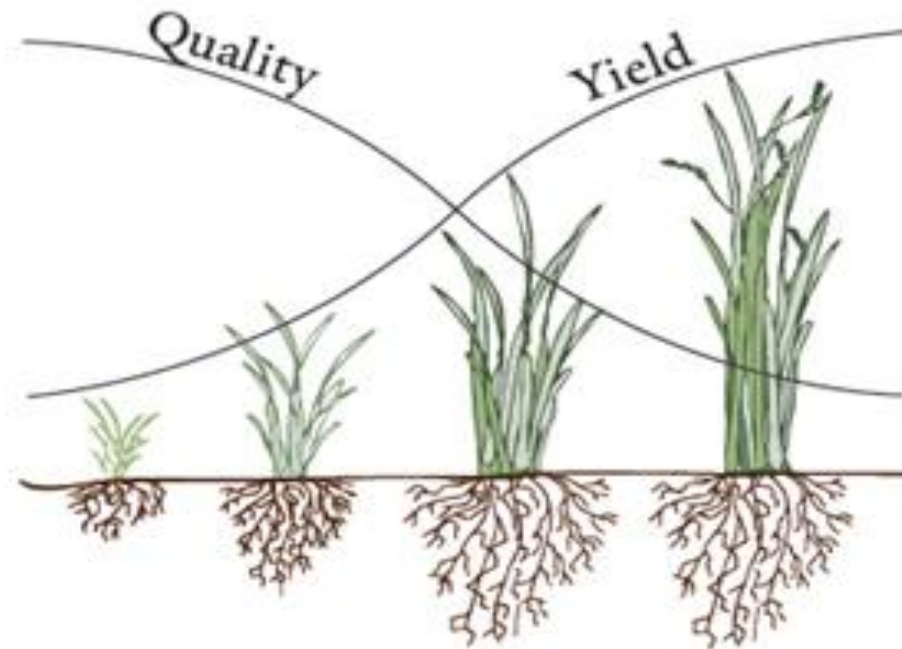


Crabgrass (Mojo)



The manager dilemma

- Quantity can NOT be limiting
- Maximum quantity \neq maximum quality



Take home message

- Several factors affect forage quality and yield, however, some improvements can be reached by management.
- After a soil analysis, a fertility program can improve yield and NV.
- Greater forage quality can reduce the supplementation needs and the herd feed costs.

Thanks!

Bruno C. Pedreira
pedreira@ksu.edu
@pedreirabc

