Peanut Pod Maturity, Digging, Harvesting, and PGR

David Jordan
Department of Crop and Soil Sciences
North Carolina State University
Gary Roberson and Jason Ward
Biological and Agricultural Engineering

919-810-6611
david_jordan@ncsu.edu

General Production Practices

- Apply nutrients based on soil test (pH 5.8 to 6.2)
- Avoid excessive Mg and K
- Avoid fields with zinc
- Establish good rotations (cotton, corn, sorghum)
- Plant a disease-resistant variety in May
- 5 plants per foot of row on 36-inch rows at a 2-inch depth
- Conventional tillage
- Inoculate with *Bradyrhizobia* for BNF
- Apply calcium at pegging
- Apply boron and manganese as needed
- Dig based on pod mesocarp color
- Control pests using IPM practices

Table 10-1. Peanut Growth Stages and Descriptions

Approximate Number of Days After Planting*	Growth Stage	Description
7	Emergence	Seedling "cracking" the ground and cotyledons visible
45	Flower (R1)	One-half of the plants with a bloom
55	Beginning Peg (R2)	First visible peg
70	Beginning Pod (R3)	Peg tip swollen to twice the peg diameter
75	Full Pod (R4)	Fully-expanded pod, to dimensions characteristic of the variety
80	Beginning Pod-Fill (R5)	Pod in which seed is visible in cross-section
90	Full Size Seed (R6)	Seed is filling the pod cavity
130	Beginning Maturity (R7)	Pods having interior hull color and orange to brown mesocarp
150 – 160	Harvest Maturity (R8)	70% of harvestable pods have an orange, brown, or black mesocarp (scrape pod saddle with knife) and interior hull color (crack pod open)
165 – 170	Over-mature (R9)	Kernels in oldest pod develop tan-brown seed coat and pegs may have deteriorated; over-mature pods have coal-black mesocarp color.

*Based on average of 30 Virginia market type peanut varieties planted on May 1 at Tidewater AREC. The numbers of days after planting increase for earlier and decrease for later plantings. If June is dry, these numbers are bigger from R1 through R4 and smaller afterwards.

Photo credits: David Jordan

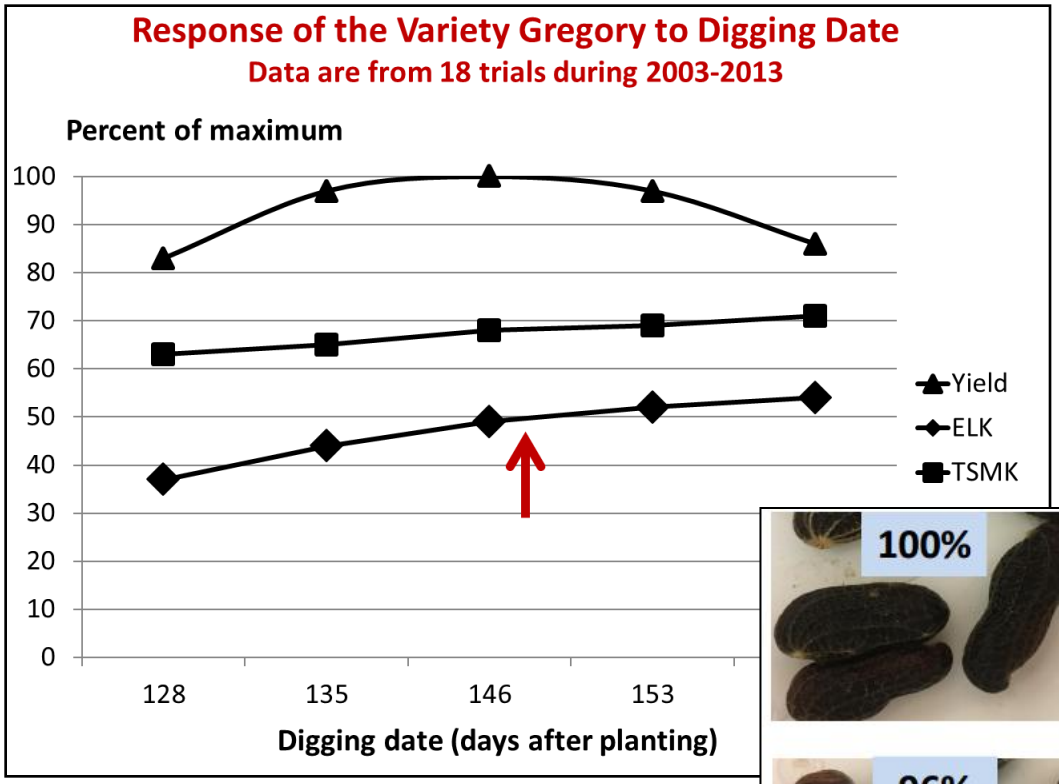
Beginning peg (R2)

Pod fill (R4)

Beginning maturity (R7)

Approximately 70% brown/black mesocarp

Figure caption: peanut pods at various stages (top) and range of pod mesocarp colors (bottom)



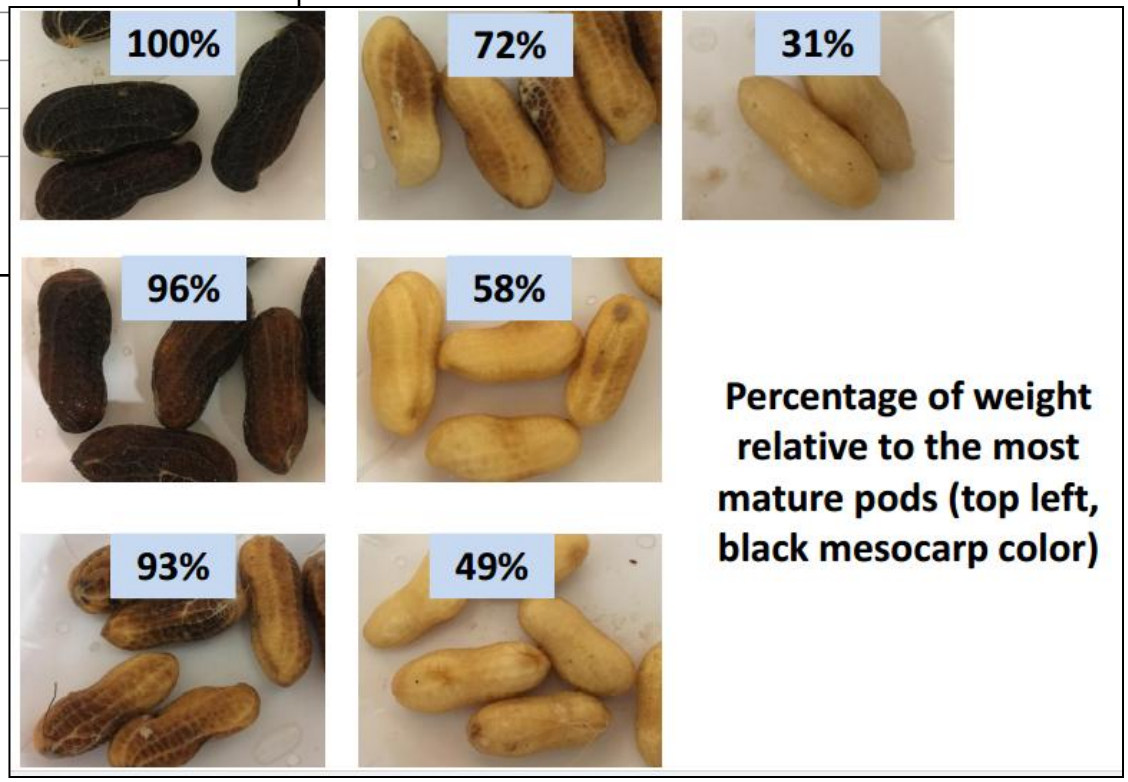


Figure caption: relationship of peanut yield and market grades with digging date (top left) and pod mesocarp color and pod weight (right)

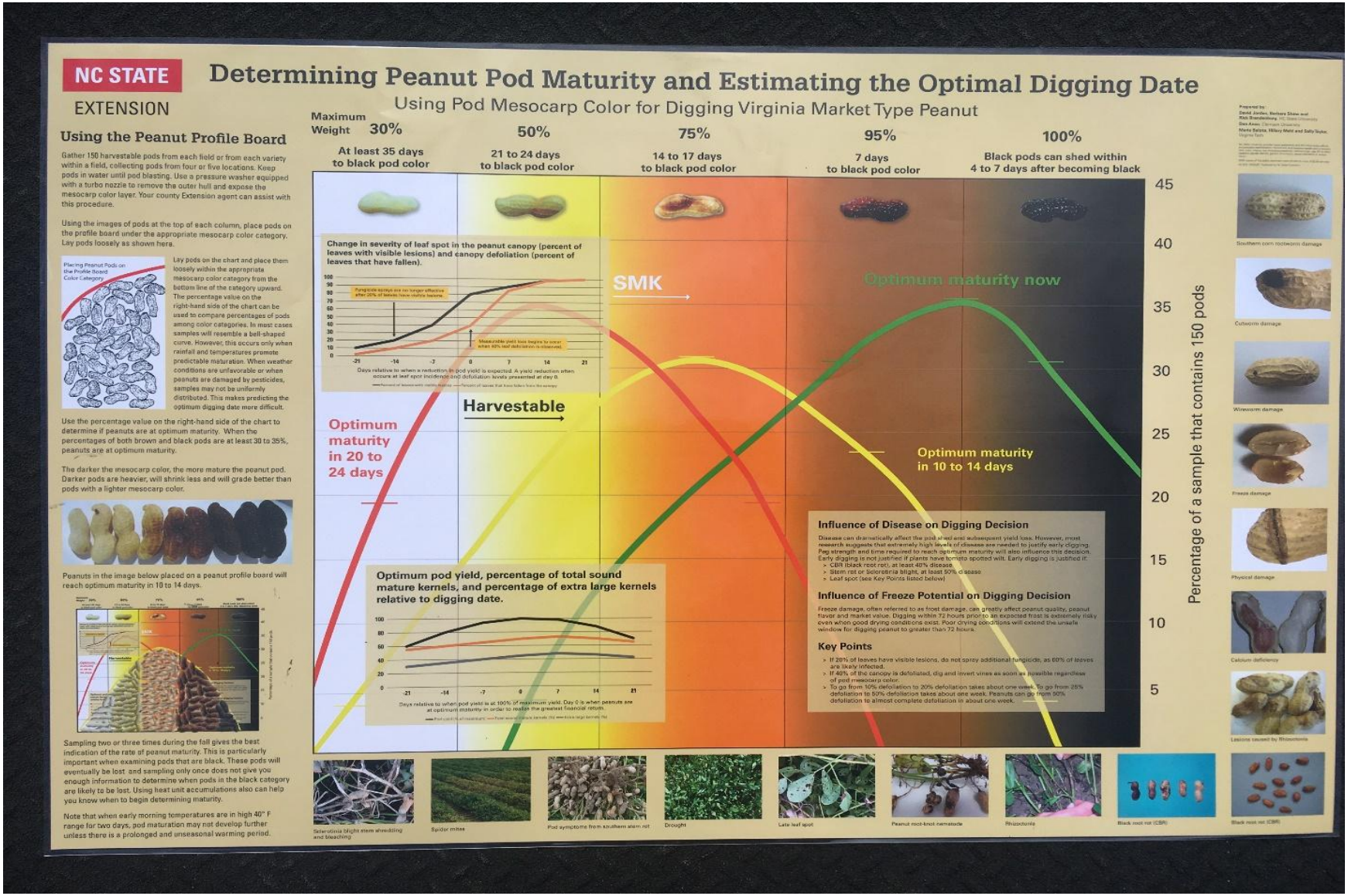


Figure caption: peanut pod maturity profile board used to decide when peanut will reach optimum maturity

Photo credit: David Jordan, Source, NC State Extension Peanut Maturity Chart

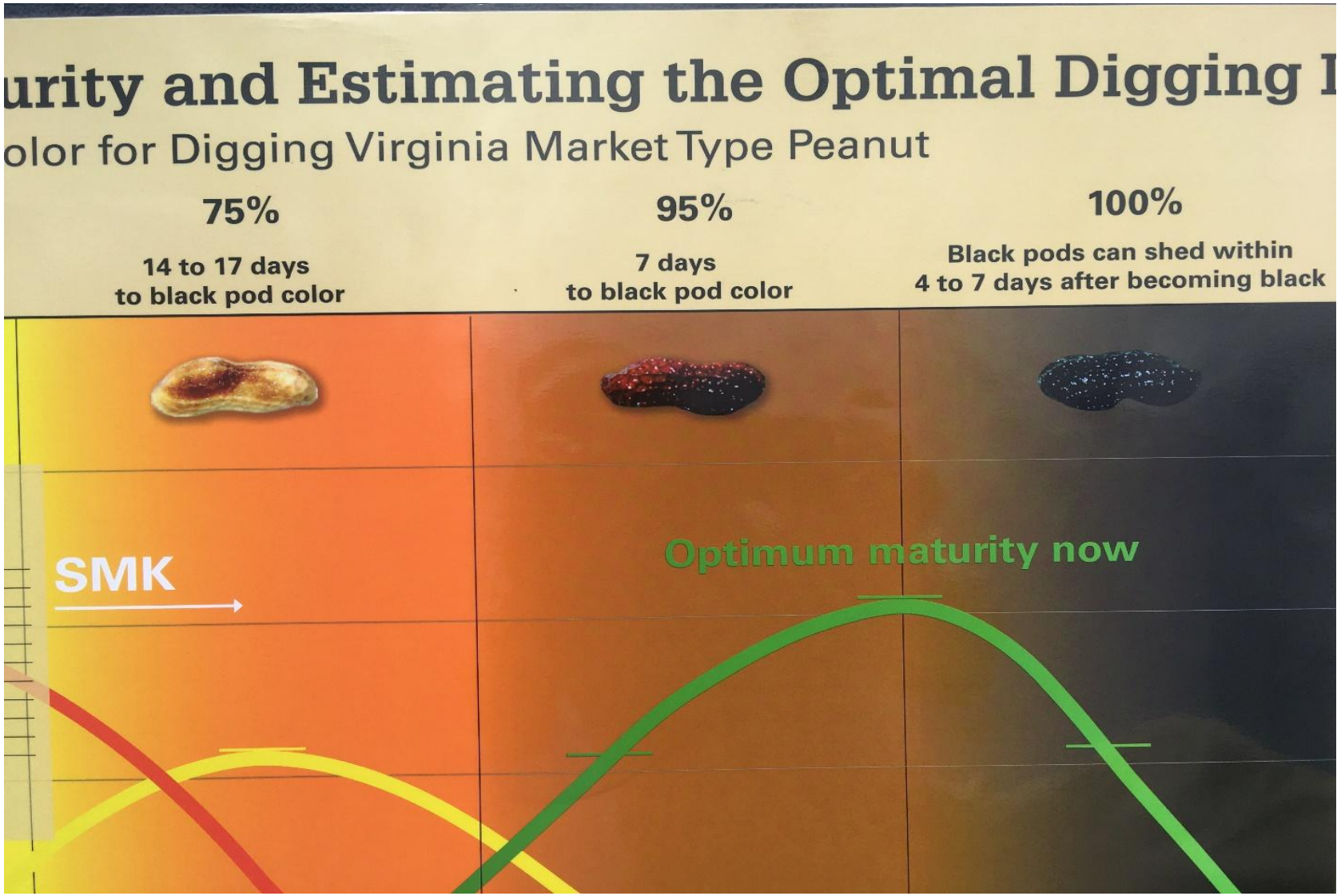


Figure caption: section of maturity profile board showing relative pod weight based on pod mesocarp color

Photo credit: David Jordan, Source, NC State Extension Peanut Maturity Chart

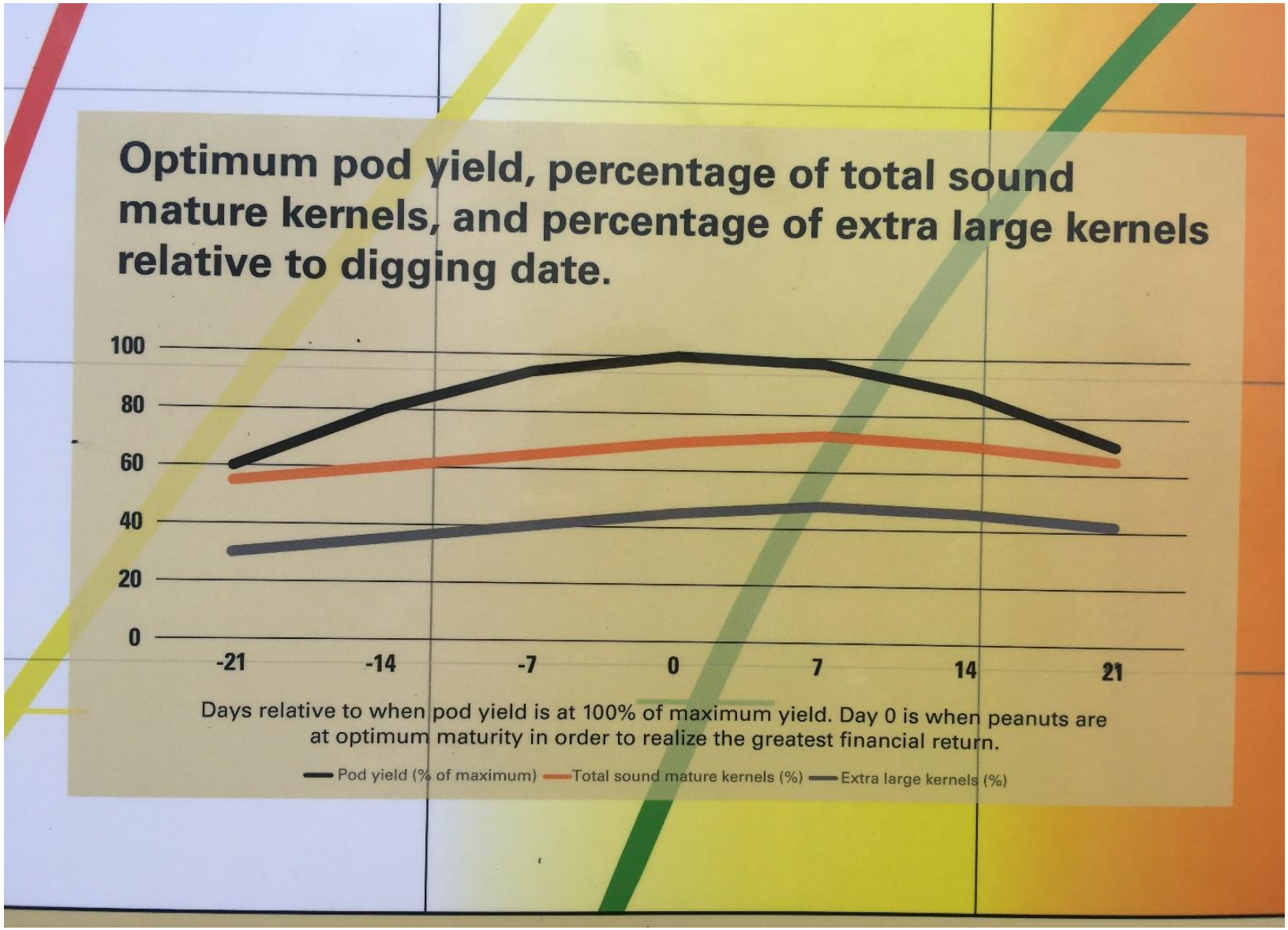


Figure caption: relationship of yield and market grades to digging date

Photo credit: David Jordan, Source, NC State Extension Peanut Maturity Chart

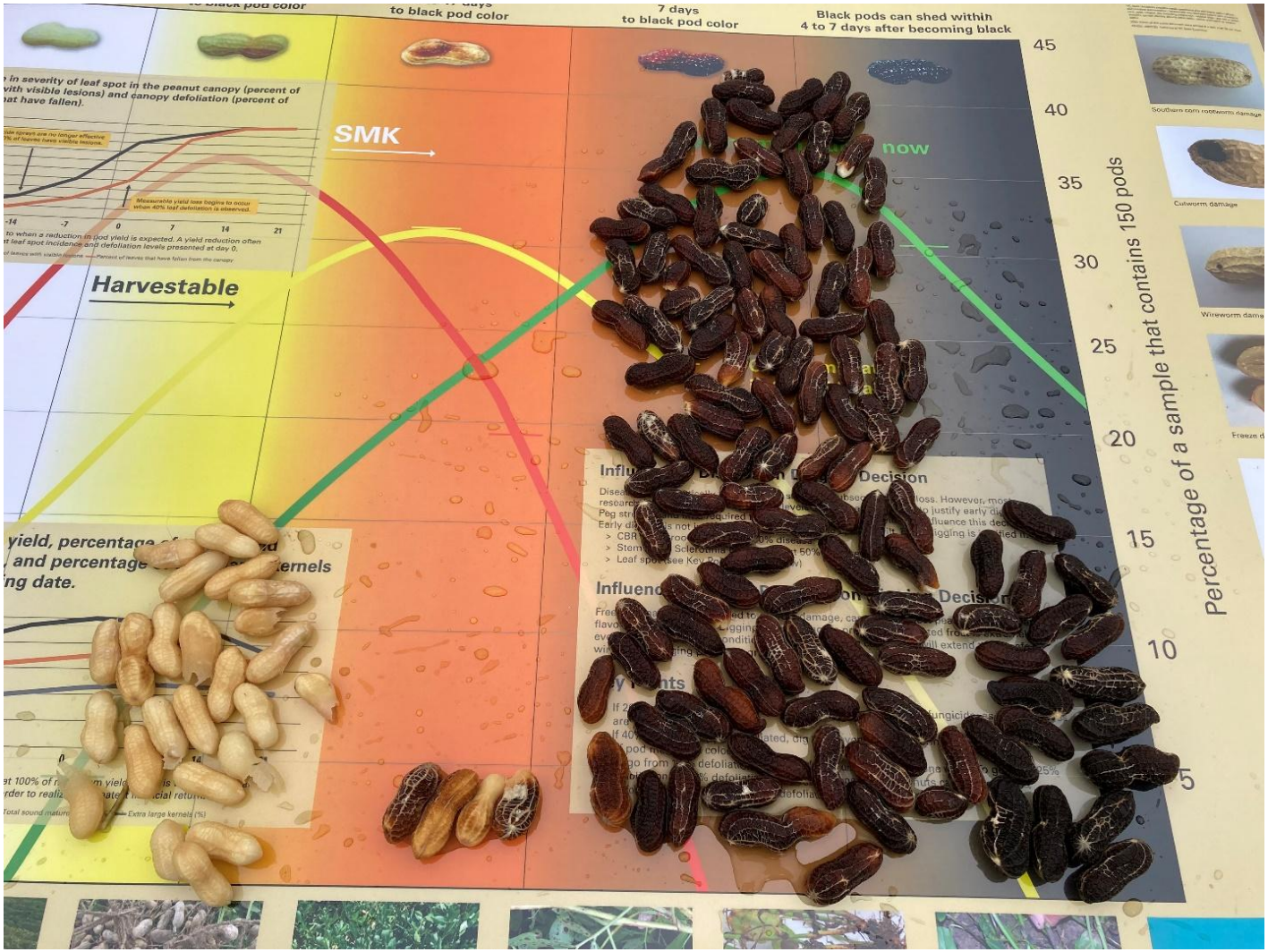
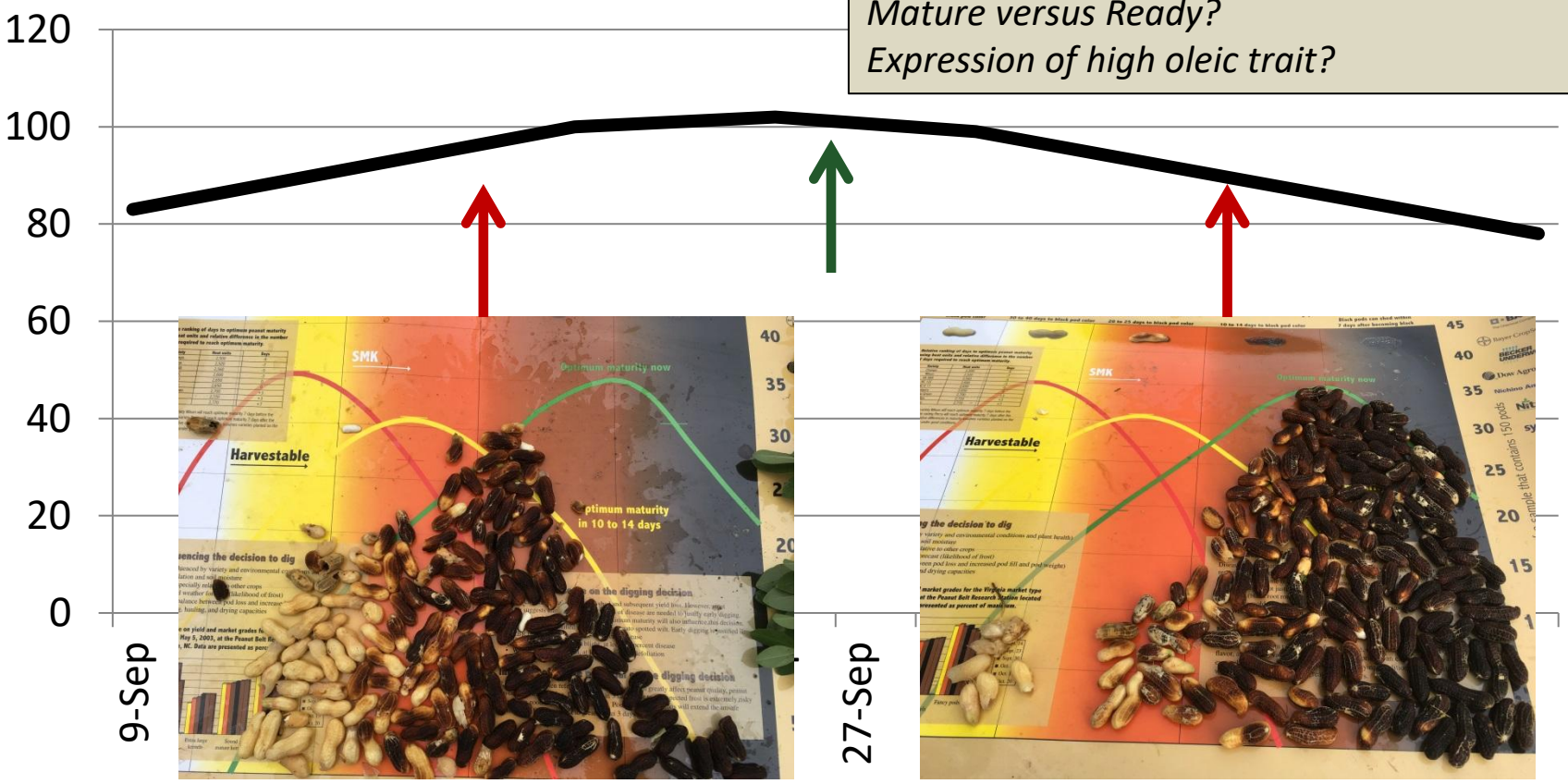


Figure caption: peanut pods expressing pod mesocarp color on maturity profile board

Photo credit: David Jordan, Source, NC State Extension Peanut Maturity Chart

Figure caption. Relationship of peanut pod maturity and pod yield. Peanut was planted May 16.

Maximum economic value per acre?
Maximum economic value for the entire farm?
Mature versus Ready?
Expression of high oleic trait?



Heat Unit Accumulation

Adequate temperatures and moisture influence growth and development

Minor contribution from photoperiod

DD_{56} (Growing Degree Days) – Base 56, Ceiling, 95

Average temperature for the day – 56 = Heat Units for that day

Sum heat unit accumulation from emergence to a given point in time

Heat units will accumulate but if moisture is not adequate, growth and development will not occur or will occur at a rate slower than heat unit accumulation will suggest

Injury from abiotic and biotic stresses can affect growth and development

Heat unit accumulation is a good indicator of when to begin looking closely

Pod mesocarp color on a field-by-field basis is the most accurate estimate of maturity

Approximately 2600 DD_{56} needed for most Virginia market types

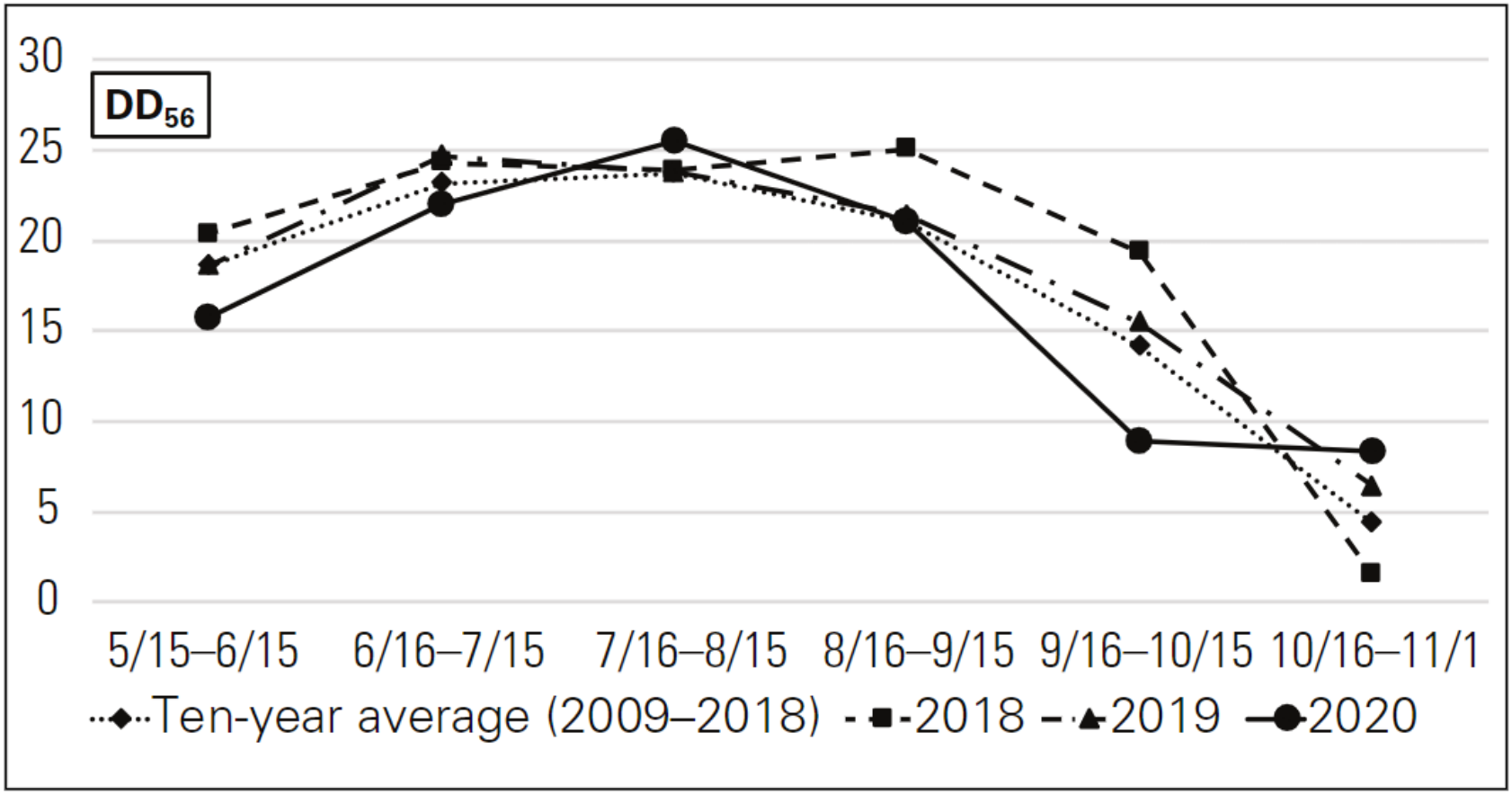


Figure 3-2. Heat Unit Accumulation (DD_{56}) at Lewiston-Woodville.
Source: David Jordan

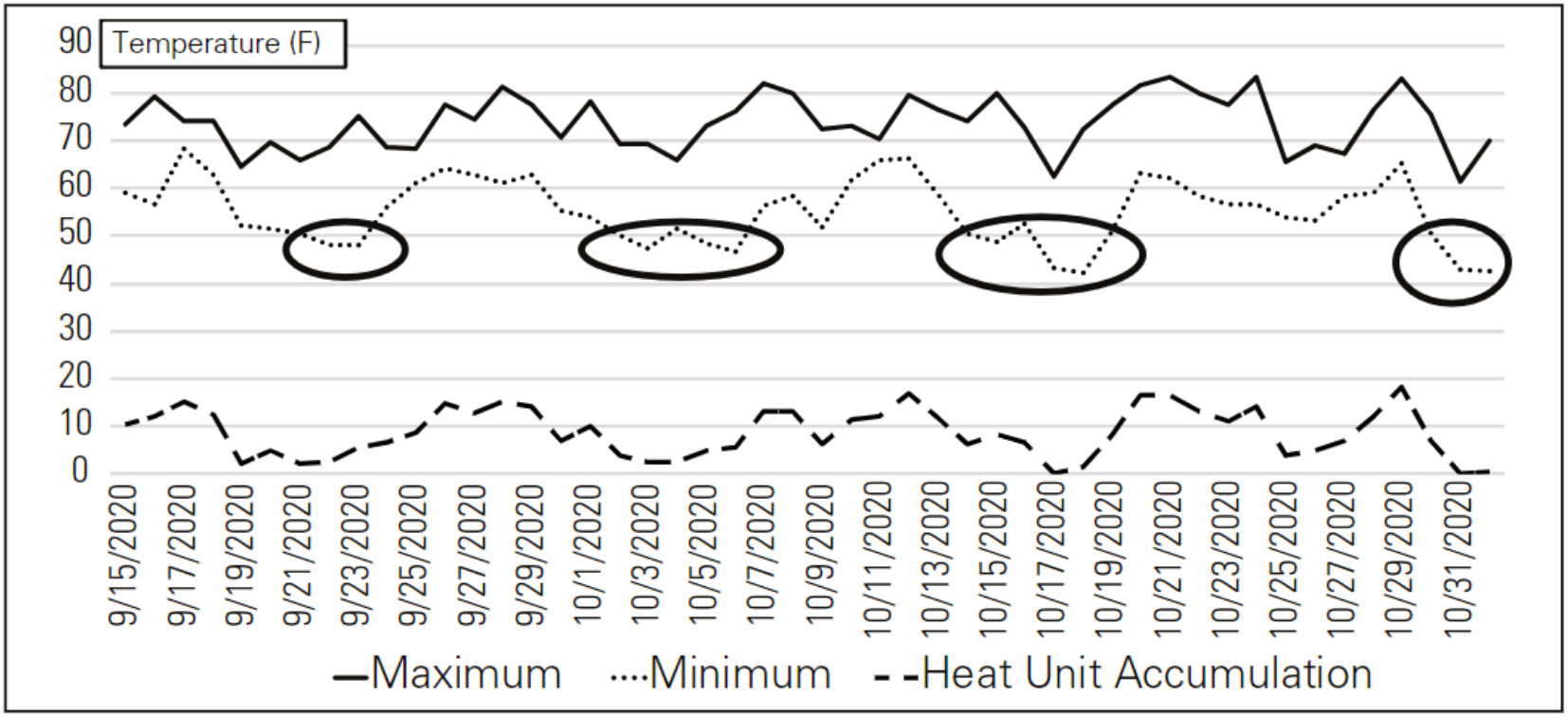
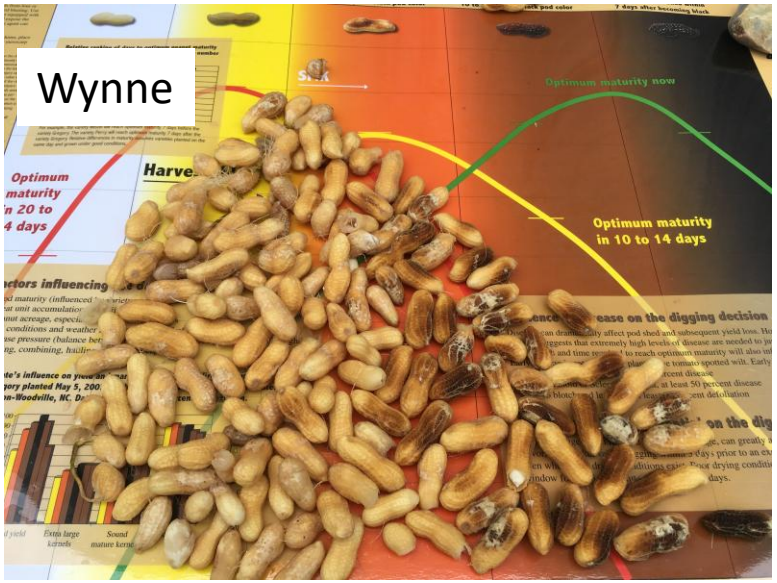
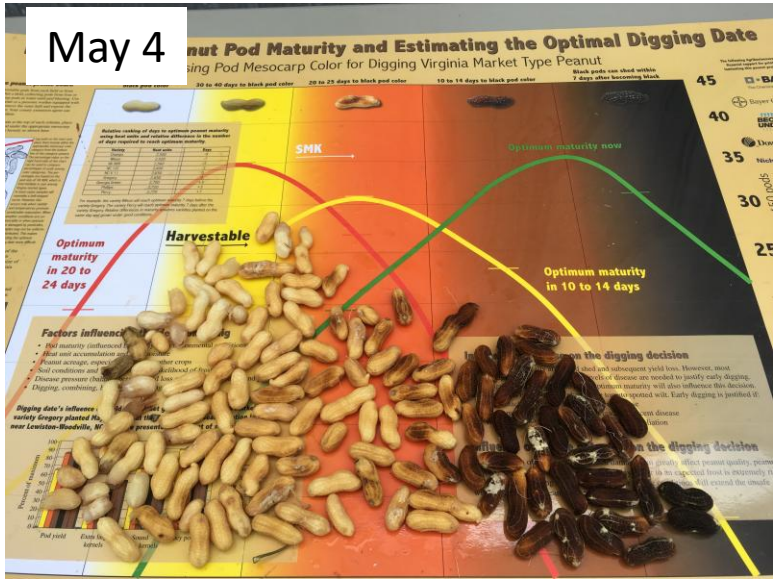


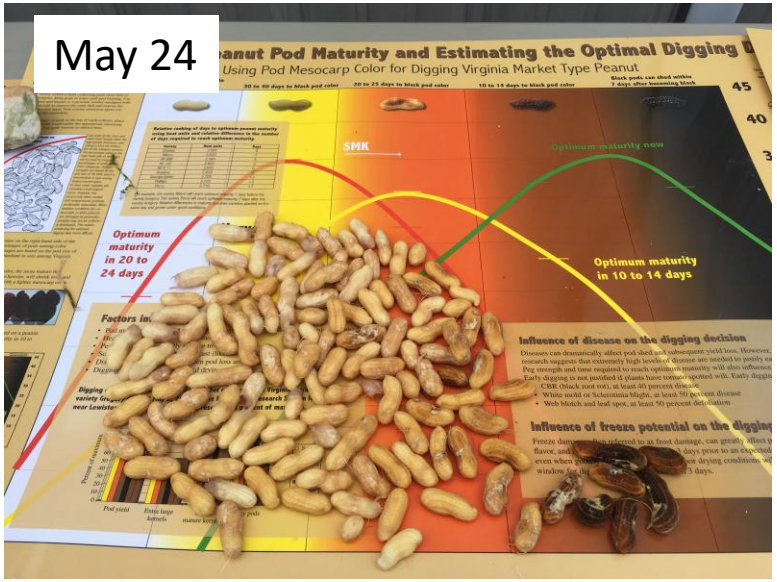
Figure 3-3. Maximum and Minimum Air Temperatures and Heat Unit Accumulation, September 15 to November 1, 2020, Lewiston-Woodville, NC



Planted May 17 at Lewiston-Woodville, image recorded August 30

Figure caption. Pod maturity images for peanut planted May 17 with images recorded August 30. Note that there are only minor differences in pod maturity for these varieties.





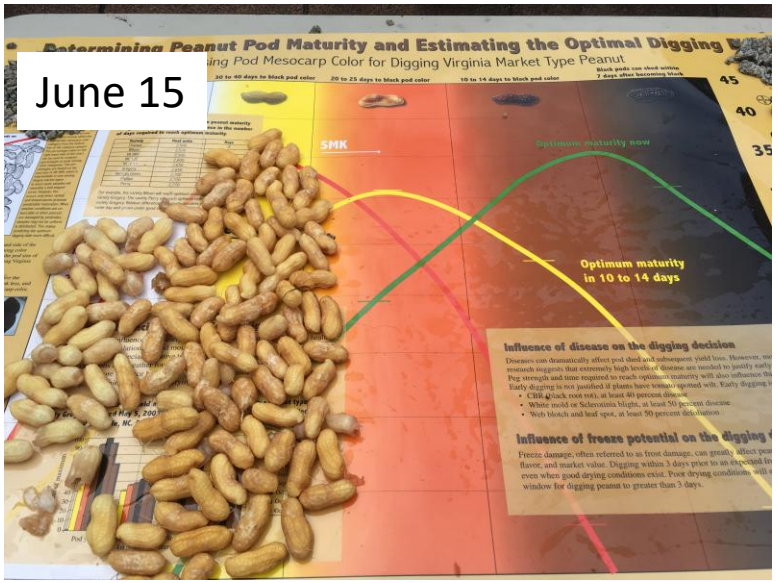
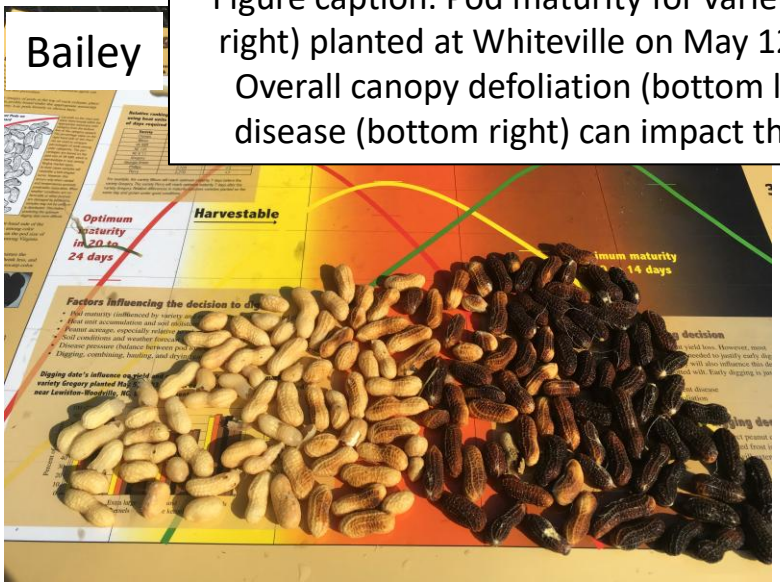


Figure caption. Pod maturity for the variety Bailey planted in strip tillage at Lewiston-Woodville at three planting dates (May 4, May 24, June 15). Image recorded August 30.

Figure caption. Pod maturity for varieties Bailey (top left) and Sullivan (top right) planted at Whiteville on May 12 with image recorded September 1. Overall canopy defoliation (bottom left) and lesions caused by leaf spot disease (bottom right) can impact the decision on when to dig peanuts.



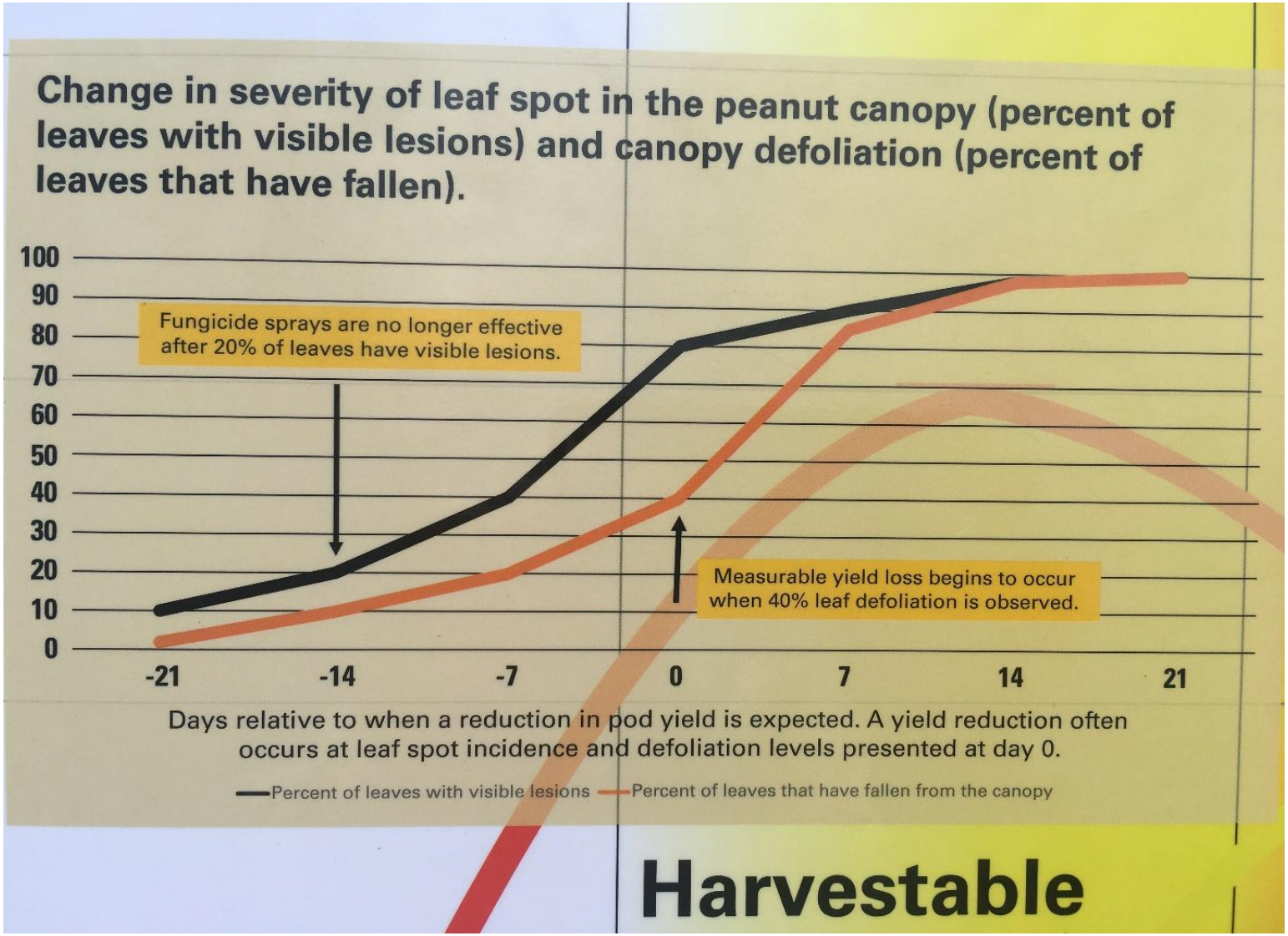
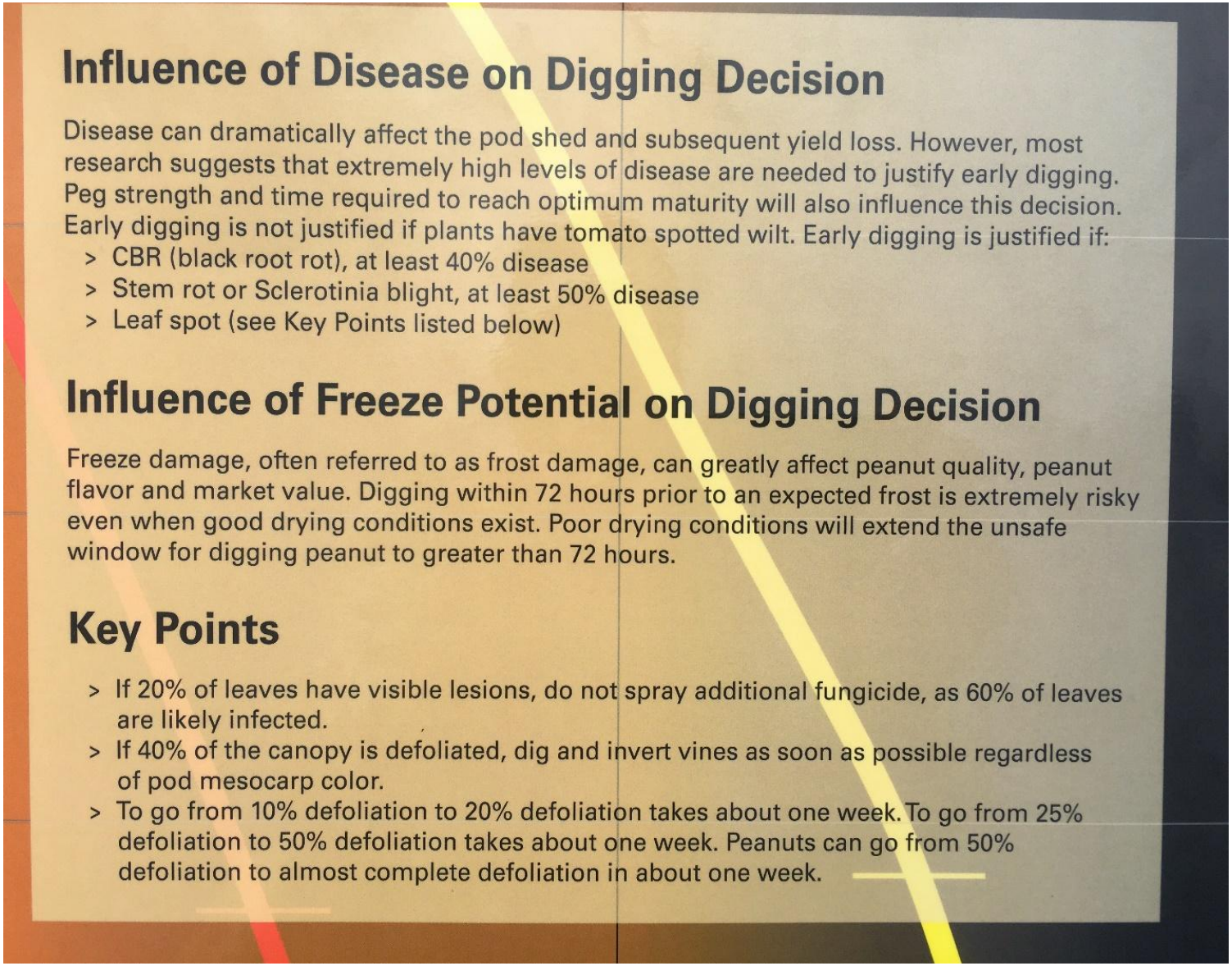


Figure caption: section of peanut profile board showing relationship of diseases incidence, defoliation and peanut yield for leaf spot

Photo credit: David Jordan, Source, NC State Extension Peanut Maturity Chart



Influence of Disease on Digging Decision

Disease can dramatically affect the pod shed and subsequent yield loss. However, most research suggests that extremely high levels of disease are needed to justify early digging. Peg strength and time required to reach optimum maturity will also influence this decision. Early digging is not justified if plants have tomato spotted wilt. Early digging is justified if:

- CBR (black root rot), at least 40% disease
- Stem rot or Sclerotinia blight, at least 50% disease
- Leaf spot (see Key Points listed below)

Influence of Freeze Potential on Digging Decision

Freeze damage, often referred to as frost damage, can greatly affect peanut quality, peanut flavor and market value. Digging within 72 hours prior to an expected frost is extremely risky even when good drying conditions exist. Poor drying conditions will extend the unsafe window for digging peanut to greater than 72 hours.

Key Points

- If 20% of leaves have visible lesions, do not spray additional fungicide, as 60% of leaves are likely infected.
- If 40% of the canopy is defoliated, dig and invert vines as soon as possible regardless of pod mesocarp color.
- To go from 10% defoliation to 20% defoliation takes about one week. To go from 25% defoliation to 50% defoliation takes about one week. Peanuts can go from 50% defoliation to almost complete defoliation in about one week.

Figure caption: section of maturity profile board describing proper decisions

Photo credit: David Jordan, Source, NC State Extension Peanut Maturity Chart

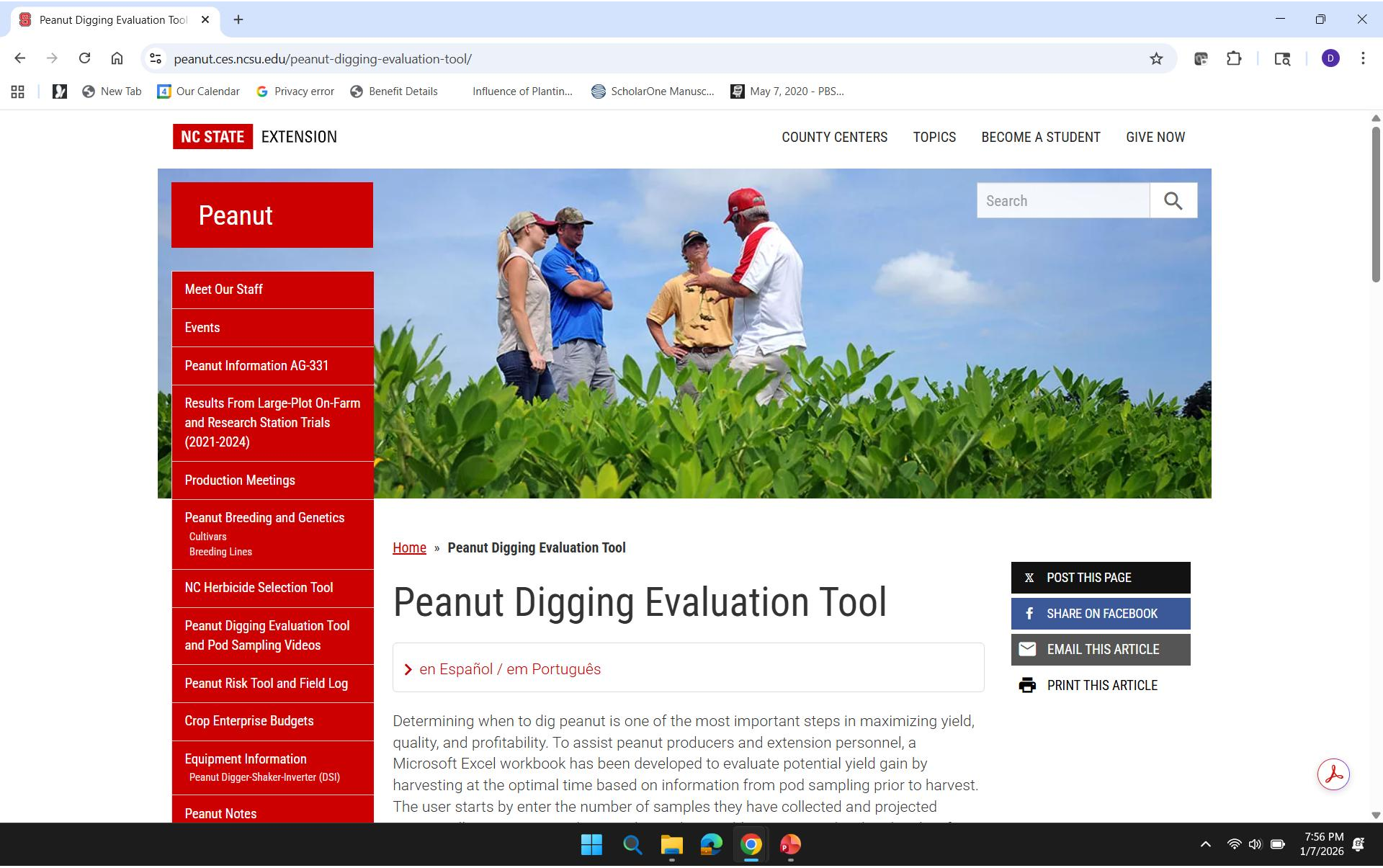
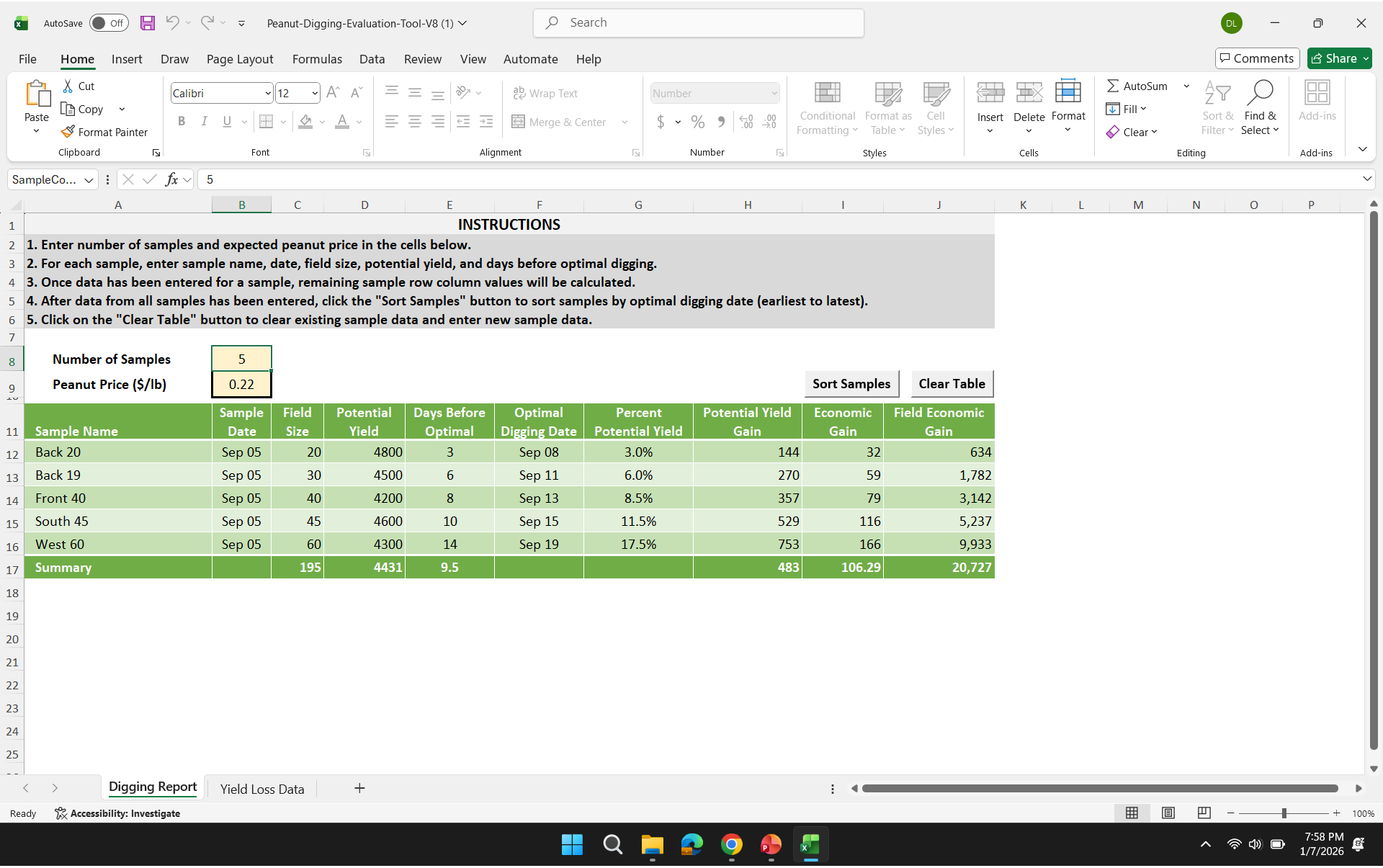


Figure caption. Main page for NC State Extension peanut portal



Sample Name	Sample Date	Field Size	Potential Yield	Days Before Optimal	Optimal Digging Date	Percent Potential Yield	Potential Yield Gain	Economic Gain	Field Economic Gain
Back 20	Sep 05	20	4800	3	Sep 08	3.0%	144	32	634
Back 19	Sep 05	30	4500	6	Sep 11	6.0%	270	59	1,782
Front 40	Sep 05	40	4200	8	Sep 13	8.5%	357	79	3,142
South 45	Sep 05	45	4600	10	Sep 15	11.5%	529	116	5,237
West 60	Sep 05	60	4300	14	Sep 19	17.5%	753	166	9,933
Summary		**195**	**4431**	**9.5**			**483**	**106.29**	**20,727**

Figure caption. Decision tool demonstrating the financial value of digging peanuts at optimum maturity

Days to Optimal Digging Date	Daily Yield Gain (%/Day)	Yield Gain (%)
30	2.0	0.0
29	2.0	2.0
28	2.0	4.0
27	2.0	6.0
26	2.0	8.0
25	2.0	10.0
24	2.0	12.0
23	2.0	14.0
22	2.0	16.0
21	2.0	18.0
20	2.0	20.0
19	2.0	22.0
18	2.0	24.0
17	2.0	26.0
16	2.0	28.0
15	2.0	30.0
14	1.5	32.0
13	1.5	33.5
12	1.5	35.0
11	1.5	36.5
10	1.5	38.0
9	1.5	39.5
8	1.5	41.0
7	1.0	42.5
6	1.0	43.5
5	1.0	44.5
4	1.0	45.5
3	1.0	46.5
2	1.0	47.5

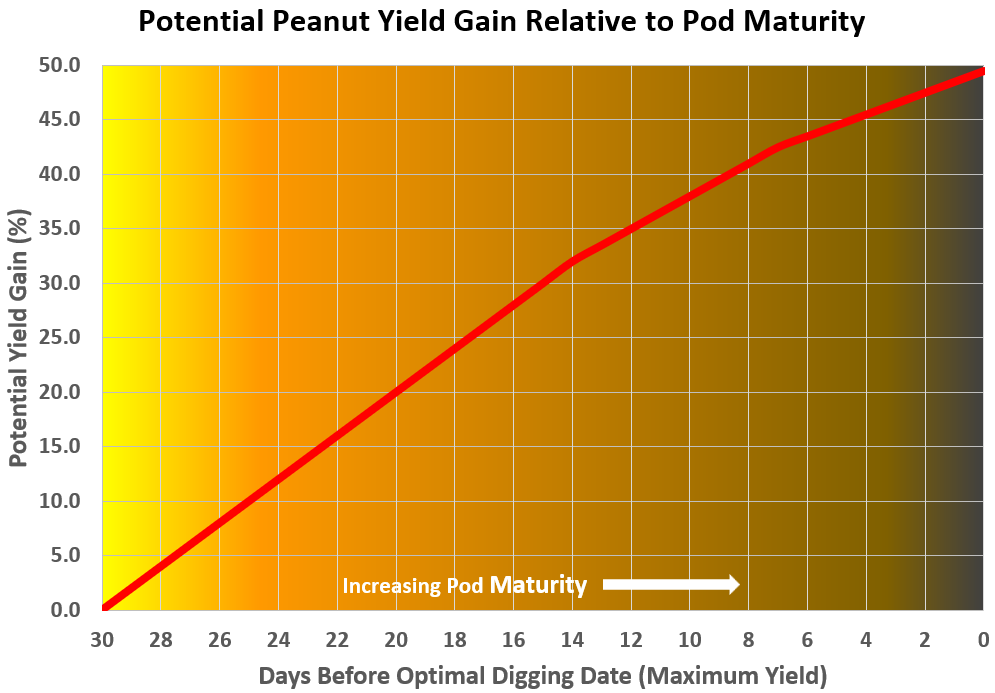


Figure caption. Figure demonstrating yield gain by delaying digging until pods and kernels reach optimum maturity

Peanut Yield in 2023

Pounds per Acre

Full-season Program: CHL, Miravis + Elatus, CHL + TEB, CHL
3 Spray Program: CHL, CHL + TEB, CHL
Provost Silver plus Microthiol Disperss as rescue with 10-15% incidence

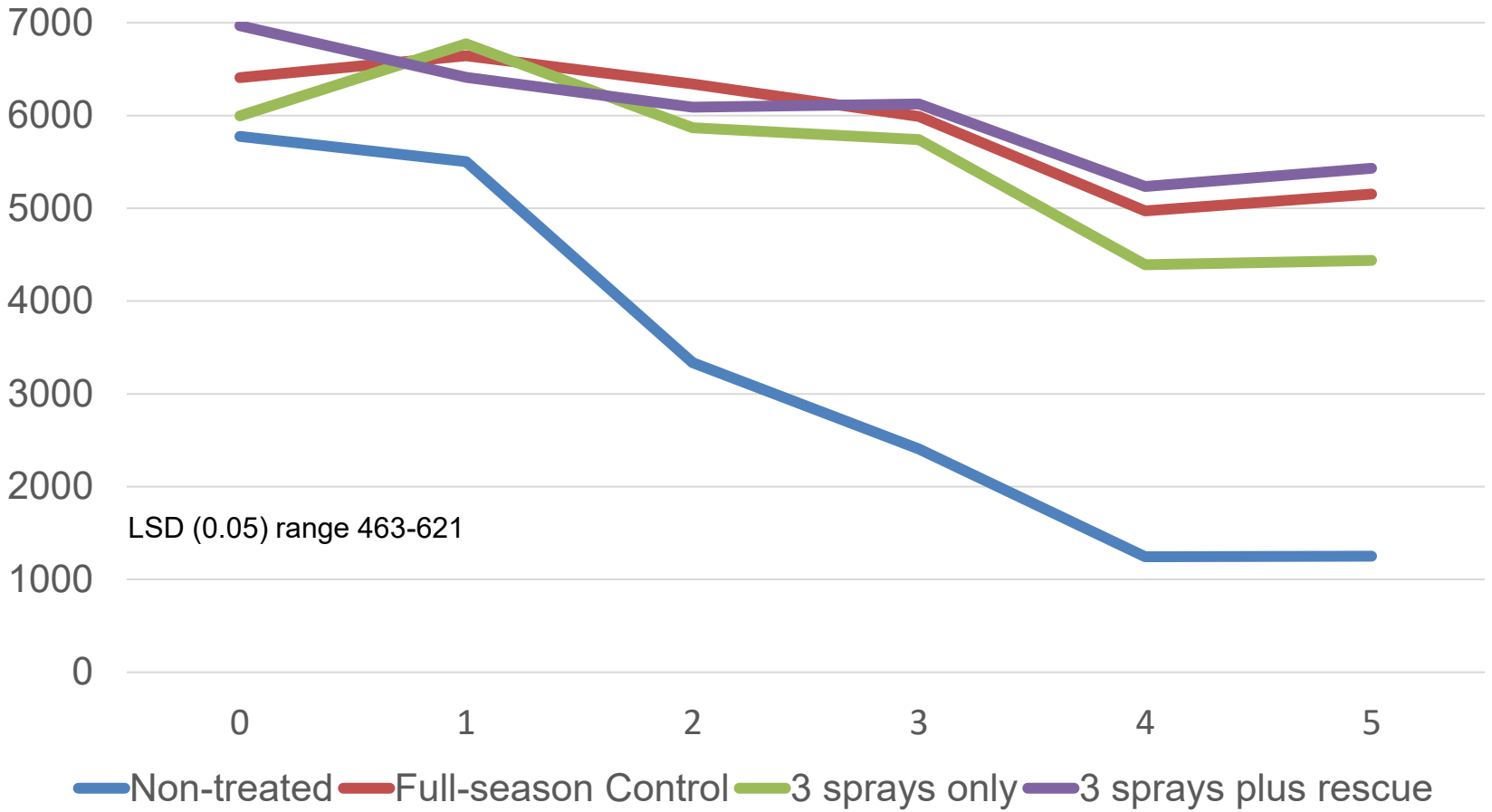


Figure caption. Relationship of peanut yield and fungicide programs when digging is delayed past optimum pod maturity.

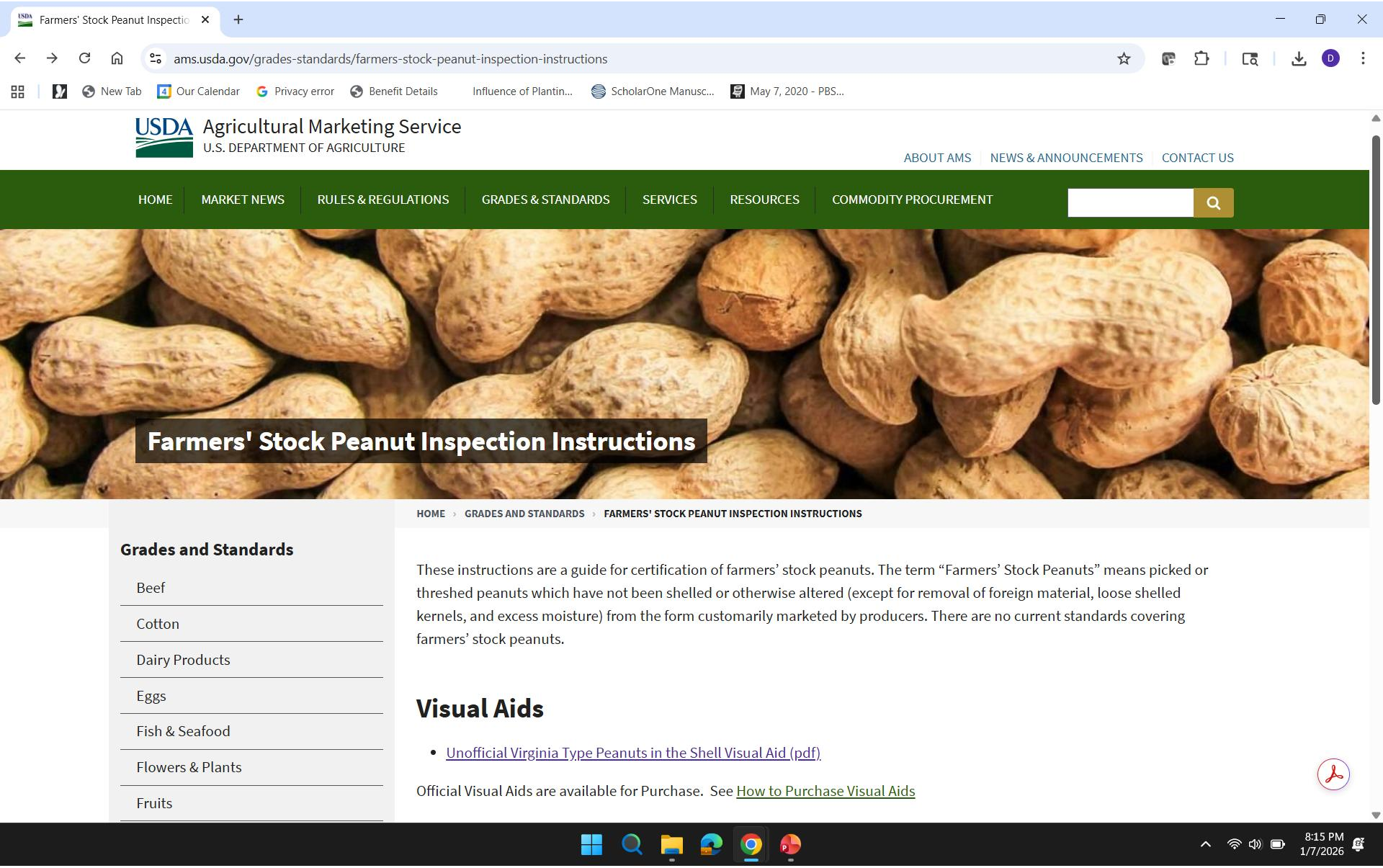
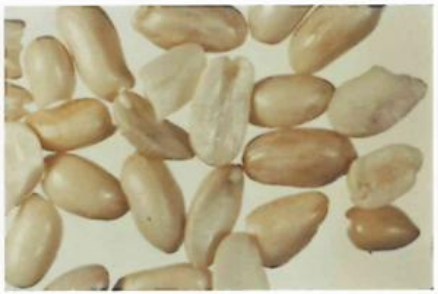


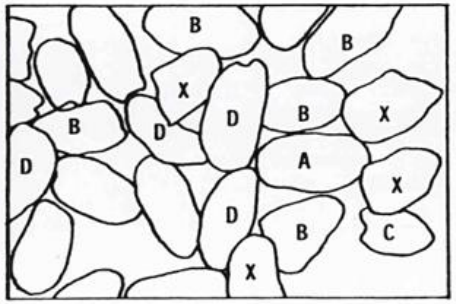
Figure caption. Screenshot of USDA peanut inspection instructions

PEANUT KERNELS SHOWING CHARACTERISTICS OF FREEZE DAMAGE

Freeze damaged peanuts have a slightly dull and faded skin color with the veins often becoming dark and conspicuous. The flesh has a glassy or an abnormal dull appearance and may also show a noticeable yellow, brown or gray discoloration on the oval side of the kernel.

The kernels must be split, the skins removed, and both the flat and round sides examined when determining freeze damage. The flesh of the half kernel must have an indication of freeze damage to be scored. Do not confuse surface discoloration not penetrating the flesh with freeze damage. Any peanut with a definitely rancid flavor is damaged, regardless of skin or flesh color.





PEANUT KERNELS – FREEZE DAMAGE
Pen-CP-6 (Revised 9/89)

X Indicates kernels not having definite characteristics of freeze damage and are not scorable.

Remaining kernels show one or more of the following definite characteristics of freeze damage and are scorable.

A Vein discoloration with glassy appearance.
B Yellow to mustard discoloration accompanied by glassy appearance.
C Yellow to brown discoloration accompanied by glassy appearance.
D & Unmarked kernels -- Kernels which have a glassy appearance but do not have the discoloration as described in A. B & C shall be scored as damage only if hard, brittle and/or have a distinctly objectionable taste.

Figure caption. Images from USDA peanut inspection manual showing freeze damage

NC STATE UNIVERSITY

Frost Advisory Available Peanut

peanut.ces.ncsu.edu/2023/09/frost-advisory-available-peanut-notes-no-234-2023/

New Tab | Our Calendar | Privacy error | Benefit Details | Influence of Plantin... | ScholarOne Manusc... | May 7, 2020 - PBS...

- Meet Our Staff
- Events
- Peanut Information AG-331
- Results From Large-Plot On-Farm and Research Station Trials (2021-2024)
- Production Meetings
- Peanut Breeding and Genetics
  - Cultivars
  - Breeding Lines
- NC Herbicide Selection Tool
- Peanut Digging Evaluation Tool and Pod Sampling Videos
- Peanut Risk Tool and Field Log
- Crop Enterprise Budgets
- Equipment Information
  - Peanut Digger-Shaker-Inverter (DSI)
- Peanut Notes
- Pest Management
- Field Crops
- Resources

Frost Advisory Available Peanut Notes No. 234 2023

— Written By David Jordan

› en Español / em Português

The frost advisory for the region will be available starting on Monday, October 2. There are 3 ways to obtain the information. The 800 number remains the same as in the past (800-795-0700). The frost advisory can be reached directly on the North Carolina State Climate Office website. Finally, the information will be on the cotton-peanut infonet (Virginia Tech.)

For growers in North Carolina, the state website is the best option.

POST THIS PAGE
SHARE ON FACEBOOK
SHARE ON LINKEDIN
EMAIL THIS ARTICLE
PRINT THIS ARTICLE

Article's Short URL:
go.ncsu.edu/readext?961474

More on:
Field Crops
Frost Advisory
Peanut Notes

8:19 PM
1/7/2026

Figure caption. *Peanut Notes* comments and frost advisory tool designed to assist growers in reducing risk for freeze damage to kernels based on digging date

Virginia Carolina Peanut Frost Advisory
Monday, November 3, 2025

Location	Variable	Mon AM 7PM Sun to 9AM Mon 11/3	Tue AM 7PM Mon to 9AM Tue 11/4	Wed AM 7PM Tue to 9AM Wed 11/5	Thu AM 7PM Wed to 9AM Thu 11/6	Fri AM 7PM Thu to 9AM Fri 11/7	Sat AM 7PM Fri to 9AM Sat 11/8	Sun AM 7PM Sat to 9AM Sun 11/9	Mon AM 7PM Sun to 9AM Mon 11/10	Tue AM 7PM Mon to 5AM Tue 11/11
CAPRON VA	Min Temperature	50°F	40°F	36°F FROST	47°F	38°F	53°F	45°F	40°F	31°F FREEZE
Map	Prob. of Precip	100%	-	-	-	-	30%	10%	20%	0%
SKIPPERS VA	Min Temperature	50°F	41°F	37°F FROST	47°F	38°F	52°F	45°F	40°F	31°F FREEZE
Map	Prob. of Precip	100%	-	-	-	-	30%	10%	20%	0%
SUFFOLK VA	Min Temperature	54°F	43°F	40°F	50°F	42°F	56°F	49°F	43°F	35°F FROST
Map	Prob. of Precip	100%	-	-	-	-	20%	10%	20%	0%
WAKEFIELD VA	Min Temperature	51°F	41°F	38°F	48°F	39°F	54°F	46°F	41°F	33°F FROST
Map	Prob. of Precip	100%	-	-	-	-	30%	10%	20%	0%
WAVERLY VA	Min Temperature	50°F	41°F	38°F	48°F	39°F	54°F	45°F	40°F	33°F FROST
Map	Prob. of Precip	100%	-	-	-	-	30%	10%	20%	0%
GREENVILLE NC	Min Temperature	55°F	42°F	38°F	49°F	40°F	57°F	50°F	45°F	35°F FROST
Map	Prob. of Precip	100%	0%	-	-	-	20%	10%	20%	0%
LEWISTON NC	Min Temperature	53°F	42°F	37°F FROST	49°F	40°F	55°F	47°F	42°F	34°F FROST
Map	Prob. of Precip	100%	-	-	-	-	20%	-	20%	0%
LUMBERTON NC	Min Temperature	53°F	43°F	39°F	48°F	44°F	56°F	52°F	45°F	36°F FROST
Map	Prob. of Precip	50%	0%	-	-	-	10%	0%	10%	0%
ORANGEBURG SC	Min Temperature	46°F	44°F	40°F	47°F	48°F	56°F	52°F	45°F	-

Figure caption. Frost prediction for various locations in NC, SC, and VA found in the frost advisory

Percent moisture 14 hours prior to a hard freeze and freeze damage.[a]

	Lewiston and Rocky Mount	
Digging date (hours before freeze)	**Moisture (Wednesday)**	**Freeze damage (highest of the range)**
Monday (60)	30 to 36	1.8 (3.8)
Tuesday (48)	36 to 40	3.1 (5.1)
Wednesday (14)	40 to 46	4.0 (6.0)
Thursday (day after)	-	2.5 (8.8)

[a]Drying conditions on Tuesday and Wednesday were not ideal (rain and clouds) freeze on Thursday and Friday mornings

Recommend stopping digging 96 hours or more prior to a frost or freeze event

Digging Pods and Inverting Vines

Assume 10 hours per day at 3.0 mph

30 acres per day with 4-row digger
40 acres per day with 6-row digger

250 acres with one 6-row digger – 7, 10-hour days
500 acres with one 6-row digger – 14, 10-hour days
750 acres with one 6-row digger – 21, 10-hour days

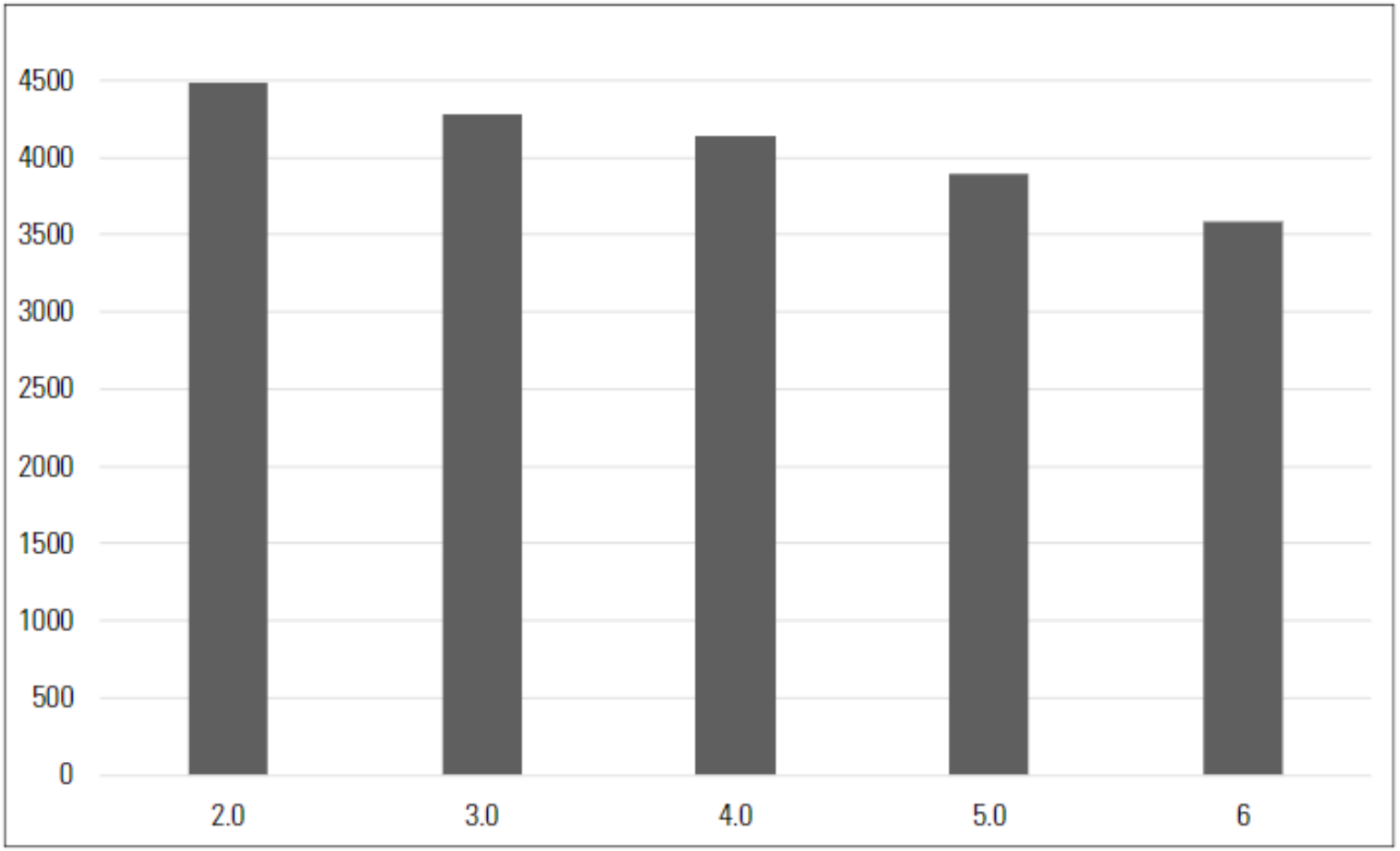


Figure 3-6. Influence of digging speed (mph) on peanut yield (lb/acre) for the variety Bailey at Lewiston-Woodville during 2018.

Harvesting

Eight-row self-propelled (SP) – 25 acres per day
Six-row self-propelled – 20 acres per day
Six-row pull type – 20 acres per day
Four-row pull type – 15 acres per day

250 acres with one 6-row SP – 13, 10-hour days
500 acres with one 6-row SP – 25, 10-hour days
750 acres with one 6-row SP – 38, 10-hour days

Drying and Hauling Capacity?

Buying Point Challenges (trailer turn around)?

Photo credit: David Jordan

Prohexadione Calcium (Apogee, Kudos, Cryova)

Row visibility, Inversion of vines, Pod retention

RTK System for Digging

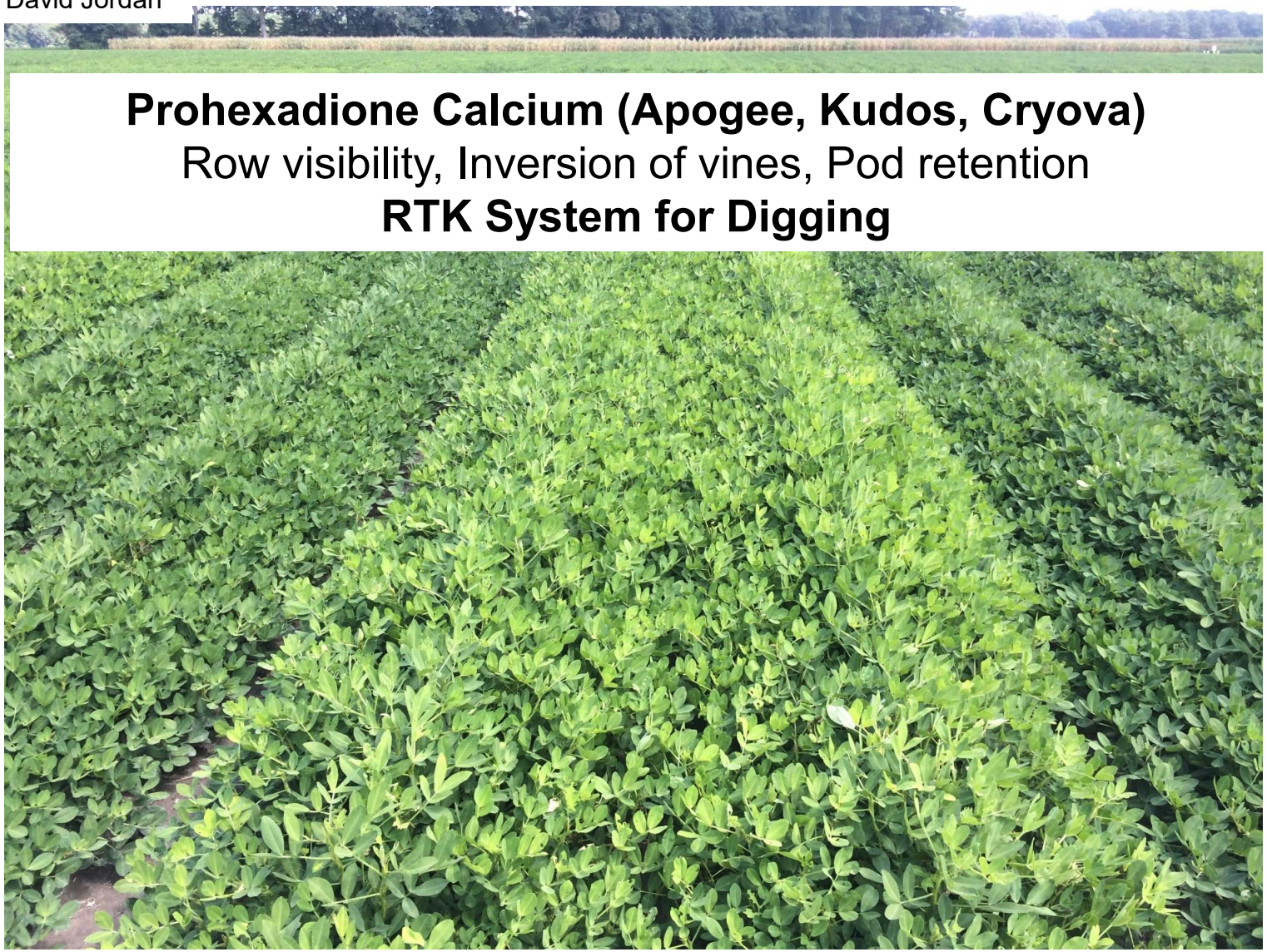


Figure caption. Peanuts with a deep green color and more defined row architecture were treated with prohexadione calcium. Peanuts in the center of the image with a pale green color were not treated.

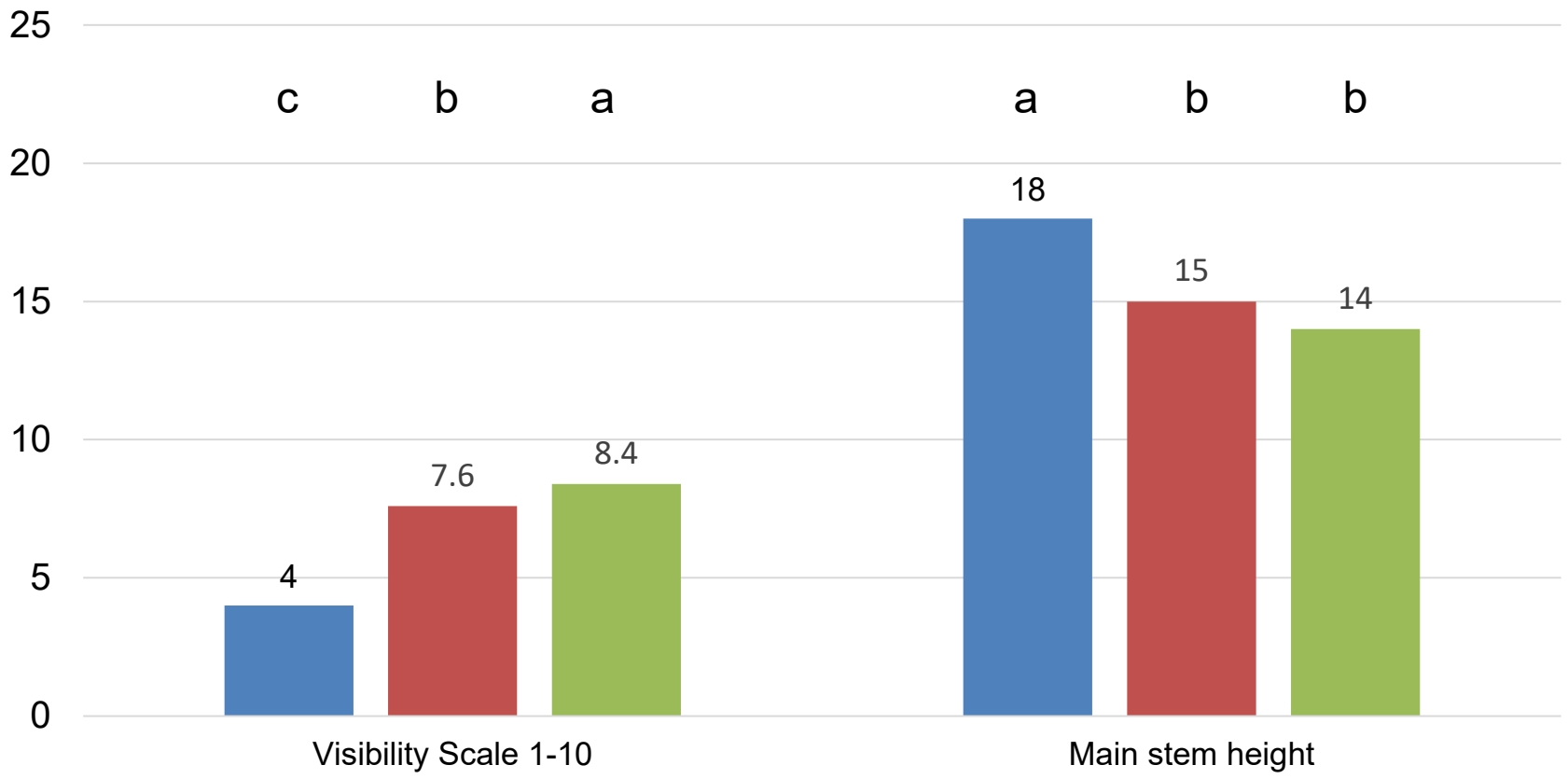
Figure caption. Peanuts on the left of both images were not treated with prohexadione calcium. Peanuts on the right side of the image were treated with prohexadione calcium.

Figure caption. Peanuts in top image were not treated with prohexadione calcium. Peanuts in bottom image were treated with prohexadione calcium.

Peanut Row Visibility (1-10 scale) and Height (inches)

2024 and 2025 Average from 10 Trials in NC and VA

Kudos OD Rates

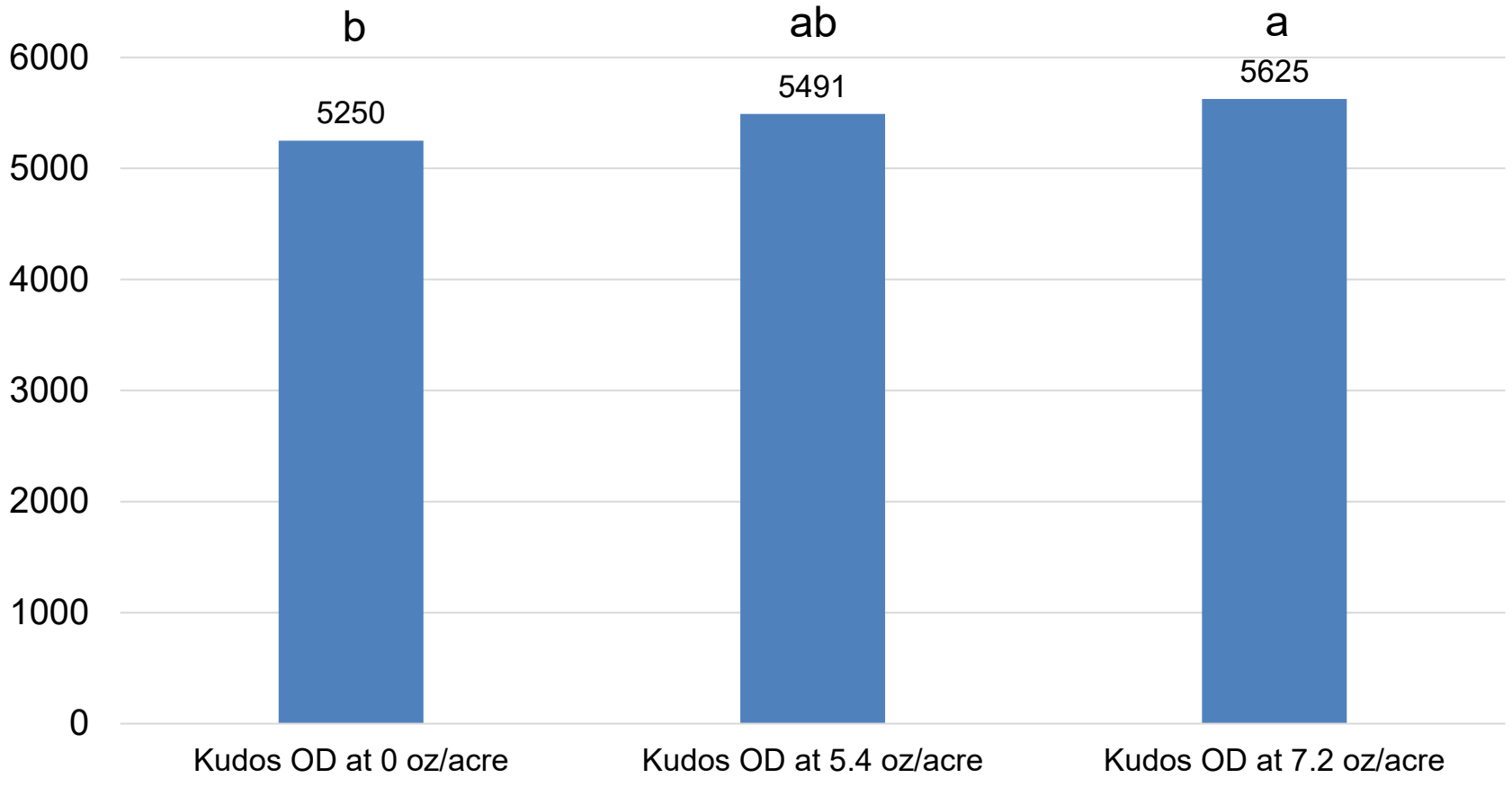


Blue Bar = non-treated, Red Bar = 5.4 oz/acre, Green Bar = 7.2 oz/acre

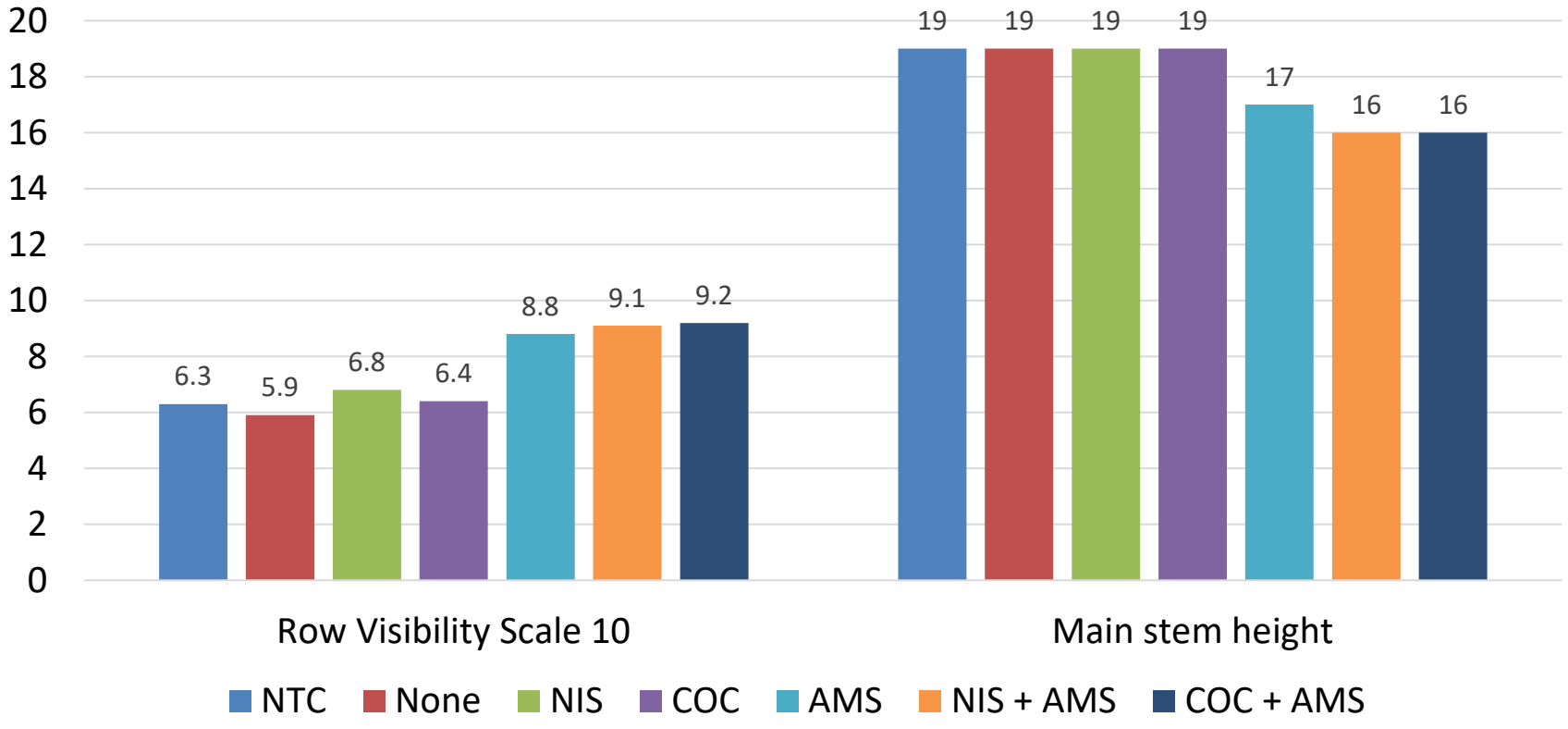
Peanut Yield (pounds per acre) in Large-Plot Trials

2024 and 2025 Average from 10 Trials in NC and VA

Kudos OD Rates



Peanut Row Visibility (1-10 scale) and Height (inches)
2024 and 2025 Average from 3 Trials (NC and VA)
Kudos OD Adjuvants



LSD visibility = 1
LSD height = 1.5

Peanut Yield (pounds per acre) in Small-Plot Trials

2024 and 2025 Average from 3 Trials (NC and VA)

Kudos OD Adjuvants

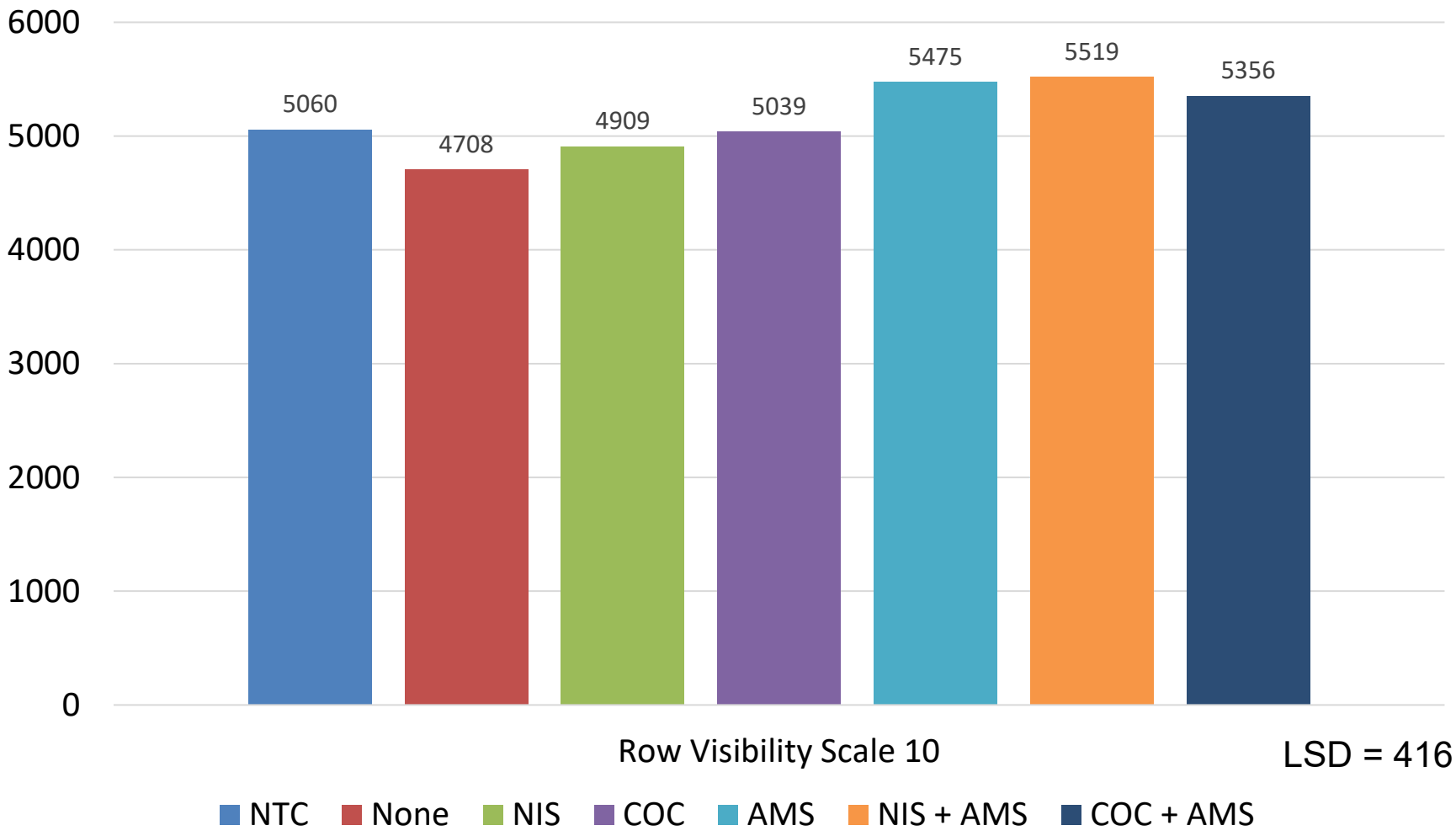


Table 1. Peanut pod yield when one or two applications of prohexadione calcium was made when 50% of vines from adjacent rows were touching followed by the second application 2 to 3 weeks later in small-plot and large-plot research.[a]

Number of prohexadione calcium applications[b]	Row visibility	Peanut yield		
		All experiments	Experiments with small plots	Experiments with large plots
	Scale 0-10	lbs/acre		
No prohexadione calcium	4.3 c	5,220 a	5,590 a	4,680 b
One application of prohexadione calcium	5.5 b	5,400 a	5,660 a	5,020 a
Two applications of prohexadione calcium	7.2 a	5,320 a	5,520 a	5,100 a
P > F	<0.0001	0.1846	0.6091	0.0025
Coefficient of variation (%)	35.4	22.3	23.6	15.9
Number of observations	17	24	15	9

RTK GPS and Automatic Steeringfor Peanut Digging

Published by the American Society of Agricultural and Biological Engineers, St. Joseph, Michigan www.asabe.org

Citation: Applied Engineering in Agriculture. 30(3): 405-409. (doi: 10.13031/aea.30.10432) @2014

Authors: Gary T Roberson, David L Jordan

Keywords: Automatic steering, RTK, Peanut, Guidance.

Peanut harvesting is a two-stage process. In the first stage, a digger-shaker-inverter implement is used to plow peanut from the ground. In the second stage, a combine is used to thresh peanut pods from the vines. Yield loss can be significant, especially during the digging stage where the implement may not be properly aligned over the rows of peanut. In this study, RTK-based automatic steering was compared to manual steering to determine the potential for reduced yield losses. In addition, peanut response to the plant growth regulator prohexadione calcium was compared to a non-treated peanut to determine if reduced yield losses were obtainable. Prohexadione calcium regulator did not improve yield significantly. However, use of RTK based automatic steering was significant, increasing harvested yield by 510 kg/ha or 11%.

Figure caption. Abstract from journal article revealing the value of precision digging using the RTK system.