2021 Northeast

Ag Expo - Peanut Stop

DAVID JORDAN

VARIETY

Table 2-2. Percentage of Acres of Varieties Certified in North Carolina, 2015 – 2020

Variety	2015	2016	2017	2018	2019	2020
Bailey	64.7	47.4	40.5	36.6	32.1	13.0
Gregory	2.1	0	0.4	2.7	0	0
Sugg	9.7	1.9	0.1	0	0	0
Sullivan	4.8	28.7	40.2	46.1	49.9	28.9
Wynne	5.3	13.5	7.5	5.2	3.6	3.9
Emery	0	0	0.1	0.2	2.4	5.9
Bailey II	0	0	0	0.3	3.8	43.6
Georgia 09B	9.9	6.2	10.5	5.0	1.1	0
TUFRunner 511					2.9	0.1
TUFRunner 297					4.6	3.6

Timely digging to ensure expression of high oleic trait.

MAINTAINING PURITY OF HIGH OLEIC VARIETIES

Releases of Virginia market types from the Virginia-Carolina region will possess the high oleic trait. This trait has been shown to improve shelf life of peanuts in general but specifically for in-shell products. Maintaining uniform expression of this trait can be influenced by management both in the field and following harvest. Digging peanuts at optimum maturity will help ensure adequate expression of the trait in commercial products. Handling and storing peanuts in a manner that prevents commingling with peanuts that do not express the high oleic fatty acid profile is essential and needs to be a focus of both seed producers and shellers. All Virginia market types grown in the Virginia-Carolina region eventually will express the high oleic trait. In most cases, runner market types grown in North Carolina and Virginia currently express this trait.

Seeding Rates

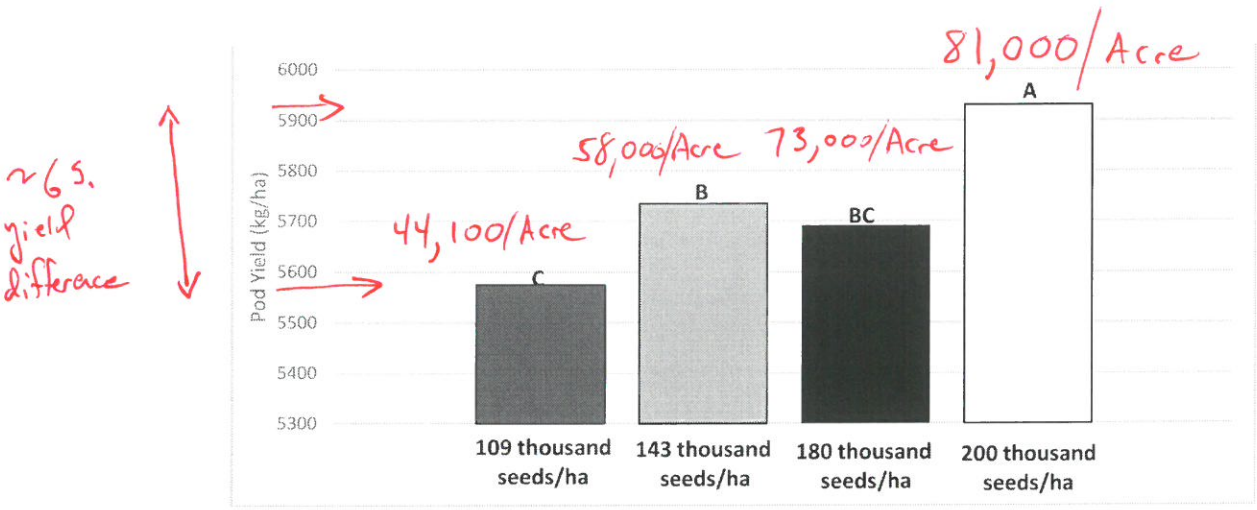

Fig. 1. Peanut pod yield response to seeding density across all site-years, cultivars and digging dates. Means with the same letter are not significantly different from each other according to Fisher's protected LSD test at $P \leq 0.05$.

2500 GDD needed by cultivars developed prior to that (Balota and Phipps, 2013; Caliskan *et al.*, 2008; Jordan *et al.*, 2018). The cultivars included in this work included Bailey, released in 2008, (Isleib *et al.*, 2011); and Sullivan and Wynne released in 2013 (North Carolina Crop Improvement Association, 2020). They are among the most recent cultivars currently in production in the VC region and have optimum maturity at around 140 DAP (Balota *et al.*, 2018; Jordan *et al.*, 2018). Recorded GDD at 140 DAP was 1578 GDD in average of the two locations in 2016 and 1447 GDD in 2017 (Table 2). Even though more humid than 2017, 2016 was 2 to 3 C warmer in Aug and Sep than same months in 2016. The 30-year GDD average for both locations from 1 May through 30 Oct is 2400 GDD.

Pod Yield

Main effect of site-year, cultivar, seeding density and digging date, and the interaction of site-year × digging date × cultivar were significant for pod yield at $p<0.05$ (Table 3). Because seeding density main effect was significant but none of the interactions of seeding density with the other factors were, the data for seeding density were combined for site-years, cultivars, and digging dates. Unlike in other reports (Sullivan, 1991), the cultivars used in this study responded similarly to the increase of seeding density. The highest seeding density of 200 thousand seeds/ha produced the highest pod yield, 5930 kg/ha (Figure 1). There was no significant difference between the densities of 180 thousand seeds/ha and 143 thousand seeds/ha, as they yielded 5740 kg/ha and 5690 kg/ha, respectively. The 109 thousand seeds/ha density yielded the lowest at 5580 kg/ha. The current seeding density recommendations in Virginia are for 109 thousand to 143 thousand plants/ha (Balota *et al.*, 2018).

At Suffolk in 2016, among the three cultivars, there was no significant difference for pod yield between the 130 and 140 DAP digging dates, i.e. cultivar average was 4900 kg/ha for 130 DAP and 5090 kg/ha for 140 DAP; but the 150 DAP digging date had the lowest pod yield for all cultivars, 3890 kg/ha (Table 4). The cumulative GDD was 1475

Table 3. Analysis of variance for peanut pod yield, economic value, percentage of extra-large kernels (ELK), sound mature kernels (SMK), and fancy pods.

Source	df	Pod Yield	Economic Value	ELK	SMK	Fancy Pods
Site-year	3	<.0001	<.0001	<.0001	<.0001	<.0001
Cultivar	2	<.0001	<.0001	0.0001	<.0001	<.0001
Seeding Density	3	<.0001	<.0001	0.6551	0.2765	0.7127
Digging Date	2	<.0001	<.0001	<.0001	<.0001	<.0001
Cultivar*Seeding Density	6	0.4320	0.6039	0.8344	0.4613	0.9606
Digging Date*Cultivar	4	0.0683	0.0755	0.0148	0.9477	0.0632
Digging Date*Seeding Density	6	0.9860	0.9604	0.9984	0.9428	0.2825
Digging Date*Cultivar*Seeding Density	12	0.8892	0.9354	0.9970	0.0705	0.8179
Site-year*Digging Date*Cultivar	24	<.0001	<.0001	<0.1262	<.0001	<.0001

No difference in return

Table 9. Economic return for seeding density in peanut. Seed cost represents the cost to the grower, and yield price is the selling price after harvest from Jordan et al., 2018.

Seeding Density (seeds ha^{-1})	Seeding Density (kg ha^{-1})	Seed Cost ($ kg^{-1})	Total Cost ($ ha^{-1})	Yield (kg ha^{-1})	Yield Price ($ kg^{-1})	Return ($ ha^{-1})	Seeding Density Economic Return ($ ha^{-1})
109000	95	2.3	218.5	5575c	0.57	3178b	2959a
143000	121	2.3	279.1	5735b	0.57	3269b	2990a
180000	152	2.3	349.6	5691bc	0.57	3244b	2894a
200000	183	2.3	420.1	5931a	0.57	3381a	2961a

* Small plots in a uniform test area. Implications in grower fields?

what is documented in the literature (Mozingo and Coffelt, 1984; Sorenson *et al.*, 2004; Sconyers *et al.*, 2007). In order to determine if the 200 thousand seeds/ha density was also the most economical, a cost analysis was performed. Seed weight (kg/ha) was calculated for each individual seeding density and, because there was no interaction between seeding density and cultivar, data were averaged across the three cultivars. Due to increased cost from seed purchase to achieve the highest seeding density, the 200 thousand seeds/ha density did not produce the highest economic return, even though it produced the highest yield (Figure 1). Instead, there was no statistical difference for economic return among the four seeding rates, even though the yields were significantly different (Table 9). The 143 thousand seeds/ha density had the greatest economic return ($2990/ha) numerically, even though it yielded significantly lower than the 200 thousand seeds/ha seeding density (Table 9). This agrees with the current recommendations for peanut seeding density in Virginia (Balota et al., 2018). In order to determine what combination of selling price and seed cost would have ensured the highest economic returned from seeding 200 thousand seeds/ha, a sensitivity analysis was further used. This analysis indicated that either 40% increase in the selling price; 30% decrease in seed cost; or a combination of 20% increase in selling price with a 20% decrease in seed cost could have resulted in the 200 thousand seeds/ha density to have the highest economic return. As such changes in the seed cost and selling price are less probable, the current recommendations for using less seed per hectare at planting, i.e., 143 thousand seeds/ha, seems to be justified for a balanced farm budget.

Summary and Conclusions

Our results indicated that increasing the seeding density from 109 thousand seeds/ha to 200 thousand seeds/ha increased the pod yield across all site-years, similarly for all cultivars. However, the seeding density producing the highest yield did not result in the highest economic return, as the increase in yield was not enough to compensate for the increased seed cost. Instead, the 143 thousand seeds/ha seeding density ensured the greatest economic return for the farmer; this agrees with the current recommendations for peanut production in Virginia. According to our results, the optimal time to dig the Virginia market type peanut cultivars currently grown in the VC region is at 140 DAP. This is because these cultivars appear to need at least 1400 GDD and no more than 1600 cumulative GDD to reach optimum maturity and, therefore, maximum pod yield. However, the decision on when to dig should be monitored on a field-to-field basis as not just temperature, but other factors may affect yield, such as the amount of precipitation at or right before digging.

Acknowledgements

This work was supported with funding from the National Peanut Board, North Carolina Peanut Growers Association, Virginia Peanut Board, and Virginia Crop Improvement Association. Appreciation is expressed to staff at both research stations for technical assistance with this research.

Literature Cited

Balota, M., P. Phipps. 2013. Comparison of Virginia and runner-type peanut cultivars for development, disease, yield potential, and grade factors in eastern Virginia. Peanut Sci. 40:15–23.

Balota, M., T.G. Isleib, J. Oakes, D. Anco. 2017. Peanut Variety and Quality Evaluation Results. I. Agronomic and Grade Data. Virginia Cooperative Extension.

Balota, M., Cahoon, C., Mehl, H., Shortridge, J., Taylor, S. 2018. Virginia Peanut Production Guide. Virginia Cooperative Extension.

Beuerlein, J.E. 1998. Yield of indeterminate and determinate semi-dwarf soybean for several planting dates, row spacings, and seeding rates. J. Prod. Agric. 1:300–303.

Boote, K. 1982. Growth stages of peanut (*Arachis hypogaea* L.). Peanut Sci. 9: 35–40.

WEED CONTROL

Table 4-14. General Recommendations on Herbicides to Use in a Comprehensive Weed Management Program for Peanuts

Herbicide	Timing	Should these herbicides be used?
Prowl or Sonalan	Preplant incorporated	**Yes.** These herbicides are relatively inexpensive and provide early season control of grasses and small-seeded broadleaf weeds. Although Prowl can be applied preemergence, it is generally more effective incorporated. Sonalan always needs to be incorporated. These herbicides are an important part of a comprehensive weed management strategy and should always be applied.
Dual Magnum (various formulations), Outlook, or Warrant	Preplant incorporated or preemergence	**Yes.** These herbicides are important in suppressing yellow nutsedge, especially Dual Magnum, and provide control of small-seeded broadleaf weeds including pigweeds. While these herbicides do not control weeds for the entire season, they provide good early-season control and are an important foundation of a comprehensive weed management strategy for peanuts.
Valor SX (various formulations) or Strongarm	Preemergence	**Yes.** Under current situations with increased prevalence of Palmer amaranth and traditional broadleaf weeds such as eclipta, common ragweed, and common lambsquarters, one of these two herbicides is needed in a comprehensive weed management strategy for peanuts. Valor SX provides excellent rotation options for crops grown the following season, while Strongarm will carry over to corn and grain sorghum, and there is some concern about carryover to cotton on some soils. Weeds present, especially Palmer amaranth, that express resistance to Strongarm keep this herbicide from being a complete answer in some fields. Although Valor SX is effective early in the season, the rate used in peanut (2 oz/acre) generally does not control morningglories and will not control other weeds season-long every year.
Paraquat plus Basagran plus Anthem Flex, Dual Magnum (various formulations), Outlook, Warrant, or Zidua	At cracking or early postemergence	**Yes.** Given that Palmer amaranth is present in many fields and that preplant incorporated and preemergence herbicides often are incomplete in control due to weather conditions or poor incorporation, this treatment (paraquat, with Gramoxone SL being the most prevalent commercial product) can often clean up fields when applied on time, taking pressure off of other postemergence options. Basagaran reduces injury from paraquat. In fields with known histories of Palmer amaranth and other problematic weeds, applying Anthem Flex, Dual Magnum, Outlook, Warrant, or Zidua with paraquat plus Basagran will improve early-season weed control. Apply paraquat early in the season, no later than 28 days after peanuts emerge, but preferably within the first three weeks. Anthem Flex causes more injury than other residual herbicides, but injury is transient and research data indicate that it does not adversely affect peanut yield.

extremely important

(continued)

Table 4-14. General Recommendations on Herbicides to Use in a Comprehensive Weed Management Program for Peanuts (continued)

Herbicide	Timing	Should these herbicides be used?
Cobra, Ultra Blazer, Storm, Basagran	Postemergence	**Most likely.** These herbicides should be applied as needed. In fact, many if not most peanut fields will need at least one application of these herbicides. Weed size has a major impact on the degree of control obtained with these herbicides. If weeds exceed 3 inches, control is often incomplete. When preplant incorporated or preemergence herbicides are not applied or are marginally effective, growers often have to apply repeat applications of these herbicides (Cobra, Storm, Ultra Blazer). Multiple applications in some cases can negatively affect peanut yield. For this reason growers are encouraged to have a comprehensive program of preplant incorporated and preemergence herbicides and apply paraquat plus Basagran to take the pressure off of Cobra, Storm, and Ultra Blazer. Note that Storm does not contain sufficient Ultra Blazer to control Palmer amaranth and other weeds in most cases, so adding additional Ultra Blazer to Storm is recommended in some circumstances. Residual herbicides can be added to improve control. (see comments under Paraquat plus Basagran)
Postemergence grass herbicides (clethodim and sethoxydim are active ingredients in these herbicides)	Postemergence	**Most likely.** Preplant incorporated and preemergence herbicides often control annual grasses through midseason and sometimes late into the season. However, many fields need a postemergence application of sethoxydim (several formulations) or clethodim (several formulations). These herbicides should be applied as needed because grasses often cause peanut pod loss during the digging process.
Cadre, Pursuit	Postemergence	**In many cases.** Pursuit is used much less often now than in previous years. Cadre (also formulated as Impose) is a very good herbicide that controls yellow and purple nutsedge, annual grasses in many cases, and a range of broadleaf weeds. The challenge with Cadre is presence of resistant Palmer amaranth and carryover potential to cotton and grain sorghum. Cadre continues to be a good option for peanut growers as long as they realize carryover potential and know whether or not resistance to this herbicide is present in certain fields. Residual herbicides can be added to improve control.

Table 4-14. General Recommendations on Herbicides to Use in a Comprehensive Weed Management Program for Peanuts (continued)

Herbicide	Timing	Should these herbicides be used?
2,4-DB	Postemergence	**Yes.** The broadleaf herbicides mentioned above, with the exception of paraquat, benefit from the addition of 2,4-DB. For example, when Palmer amaranth is slightly larger than the size recommended for complete control by Cobra, Ultra Blazer, or Storm, the inclusion of 2,4-DB can help obtain complete control. 2,4-DB is often effective when applied alone, but this is very species dependent. For example, common cocklebur can be controlled completely by 2,4-DB. 2,4-DB is also a viable option for suppression of escapes of sicklepod and Palmer amaranth when applied sequentially.

Yellow Peanuts

Nitrogen Deficency

Percent N deficient	Rows with N deficiency (8 units)	Yield difference based on research	Actual pounds not realized due to N deficiency	Value of peanuts not realized at a price of $0.25/pound	Economic value of broadcast application of AMS at 500 pounds/acre at a cost of $0.29/pound ($145/acre)
0	0	4550	0	0	-145
12	1	4420	122	31	-114
23	2	4306	245	61	-84
38	3	4148	367	92	-53
50	4	4062	490	123	-22
63	5	3940	612	153	8
75	6	3818	734	184	39
88	7	3696	856	214	69
100	8	3574	978	245	100

Prohexadione Calcium

Apply now, these are several days past the optimum timing:

These are at the optimum timing:

- Always use a nitrogen source (UAN or AMS)
- Include crop oil concentrate for consistent results
- Back in the day we saw consistent yield increases in small-plot trials for NC12C, NC-V11, Perry, etc.
- Now, I seldom see a yield or grade increase in small-plot trials (mostly Bailey)
- Bailey is a smaller-seeded VA type with less potential pod shed and it is healthier
- BUT, lack of a difference could be a reflection of small-plots versus farm-scale trials

DUMP CART!

These peanuts are several days away from the optimum timing.

These peanuts may not be ready for the application until the following week, but they are growing quickly.