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ARTICLE

Protein and Oil Percentages among Several High-Oleic Peanut Genotypes.

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ABSTRACT

Peanut (*Arachis hypogaea* L.) seed are a rich source of protein and oil. The objective of this study was to address the continuing need for increasing percentage of protein and oil. Several different high-oleic peanut genotypes were planted both early in April and later in May during three-years (2016-18). Significant differences were found among these peanut genotypes for protein and oil percentages during each planting date for all three-years. As in the past, an inverse relationship between protein and oil was found. 'Georgia-19HP' was consistently high in percentages of protein and lower in oil percent among these runner and virginia-types, high-oleic cultivars and advanced Georgia breeding lines. Georgia-19HP is a new high-oleic, RKN-resistant, leafspot-resistant, TSWV-resistant, virginia-type peanut cultivar that has many desirable traits for growers, shellers, manufacturers, and consumers of peanut and peanut products. Several other high-oleic cultivars and advanced Georgia breeding lines were also identified with high oil percentage for the currently growing interest in oil production. 'Georgia-20VHO' was among the highest in oil percent for both planting dates over each of the three-years of this study.

INTRODUCTION

In general, peanut (*Arachis hypogaea* L.) seed consist of approximately 52% oil, 28% protein 13% carbohydrates, 6% moisture, 2% fiber, and 2% ash (Cobb and Johnson, 1973). These authors reported a range in crude protein percentage of whole raw seed from 25-34% and a range of oil from 44-56% depending upon genotypes, year, maturity, and several other environmental factors. More recently, Davis and Dean (2016) reported that raw peanut seed contained 49.2% oil, 25.8% protein, 16.1% carbohydrate, 8.5% fiber, 6.5% moisture, 4.7% sugar, and 2.3% ash.

St. Angelo and Mann (1973) stated that most of the nitrogen in peanut seed is in the form of storage proteins and that purification of these protein has been difficult. Previous conversion factors for percent nitrogen to peanut protein has been based upon peanut protein containing approximately 16% nitrogen (100/16 = 6.25), and it is still widely used, especially in feed stock. (St. Angelo and Mann, 1973).

Jones and Horn (1930) found that the peanut protein consists almost entirely of two globulins, arachin and conarachin, and both contain approximately 18.3% nitrogen. These authors also reported about 25% arachin and 8% conarachin in an unidentified virginia-type peanut oil-free meal (Jones and Horn ,1930). Jones (1931) was also among the first to suggest a 5.46 nitrogen to protein conversion factor in peanut (100/18.3 = 5.46).

Unfortunately, these early studies did not consider possible genetic differences among peanut genotypes (landraces, genetic stock, breeding lines, and cultivars) and environmental effects across years and locations. Nearly a two-fold variation in five essential amino acids of oil-free peanut meal were found among 16 peanut genotypes (Young *et al.,* 1973). Young *et al.*, (1974) also reported significant location effects, irrigated vs nonirrigated effects, and genotypic differences for eight amino

acids and total amino acids. In an eight-year study (1957-1964), protein and oil percentages were shown to vary significantly from year to year among 26 different peanut strains (Holley and Hammons, 1968). In this same study, significant genotypic differences were also found for protein (25.65 to 28.48%) and oil (51.40 to 55.18%), respectively.

Likewise, nitrogen percentages in peanut seed has been shown to vary significantly over three-years (1979-81) among 26 diverse germplasm lines (Branch and Gaines, 1983). In this study, the previously popular runner-type cultivar 'Florunner' (Norden *et al.*, 1969) had a three-year average of 4.46% N; whereas, the highest % N was found with the large-seeded, virginia-type peanut, Jenkins Jumbo (4.98%), and the lowest % N was obtained with two non-nodulating mutants (T-2289 and T-2378). It is interesting to note that Florunner was near the overall average (4.42% N) which agrees with the previous study by Holley and Hammons (1968) regarding 'Dixie Spanish' and 'Argentine', two long-term established older spanish-type cultivars which were also near the mean.

Dwivedi *et al.*, (1996) found that late-season drought stress also caused an increase in total protein and reduced total oil percentages. There is an inverse relationship between protein and oil percentages (Holley and Hammons, 1968; Tai and Young, 1975), however no association between 100 seed weight (mass) and oil or protein percent was found by Dwivedi, *et al.,* (1990).

Ahmed and Young (1982) emphasized the growing demand and importance for increased percent protein throughout the world. Peanut seed are a rich source of protein and oil. So, the objective of the study was to address this continuing need for increasing protein and oil percent by screening desirable high-oleic cultivars and advanced breeding lines for potential genetic differences. Since protein and oil percent in peanut has been shown to be highly influenced by drought and other environmental factors, multiple years with maximum-input production practices and irrigation were used to uniformly screen different pod and seed size genotypes across two planting dates (April and May) each year.

MATERIALS AND METHODS

During three-years (2016-18), several different high-oleic peanut genotypes with varying seed size were grown under irrigation with maximum-input production practices at the University of Georgia, Coastal Plain Experiment Station in Tifton, GA. The same set of genotypes were planted both early in April and later in May each year for comparison. The number of genotypes varied each year from 30 in 2016 to 24 in 2017 and 2018.

A randomized complete block field design with four replications was used each year. All plots in each test consisted of two-rows, 6.1 m long x 1.8 m wide on a Tifton loamy soil-type (fine-loamy, siliceous, thermic Plinthic Kandidult). UGA extension service recommended production practices of herbicides, fungicides, and insecticides were applied as needed for control of weeds, diseases, and insects, respectively.

Each genotype was individually dug near optimum maturity based upon the hull-scrape method from adjacent border plots (Williams and Drexler, 1981). After harvest, peanut pods from each plot were dried with forced warm air to approximately 6% seed moisture. Pods were presized and shelled on Federal-State Inspection Service equipment. Samples were then screened to remove splits and immature seed. Only sound mature seed were used for protein and oil content evaluations.

One hundred sound mature kernels (SMK) riding >8.53 x 25.40 mm slotted screen were used to further reduce the influence of any maturity effects. Seed samples were sent to Waters Agricultural Laboratories in Camilla, GA for peanut protein and oil determinations. Protein percent was determined from ground samples of peanut seed by a LECO Model 828 combustion instrument to estimate percentages of nitrogen (LECO Corporation, St. Joseph, MI). The percent protein was obtained by multiplying %N x 6.25 and 5.46 (Misra, 2001). Oil percent (crude fat) was determined from these same peanut seed samples using an ANKOM^{XT15} extractor (ANKOM Technology, Macedon, NY). This process is a fully automated system for Soxhlet-type extractions.

Data from each test was statistically analyzed by analysis of variance (ANOVA) using the PROC GLM procedure in SAS version 9.4 (SAS Institute, Inc., Cary, NC). Waller-Duncan's Bayesian T-test (k-ratio = 100) was used for mean separation at $P \leq 0.05$.

RESULTS

Percentage of protein was determined by two nitrogen-to-protein conversion factors (NPCF). The first NPCF equaled previously used standard of 6.25. However, Misra (2001) suggested the use of a smaller 5.46 NPCF. Unfortunately, this later NPCF results in a much lower percent protein compared to the previous 6.25 NPCF. In this study, the amino acid profile of these genotypes are unknown and since Young *et al.,* (1973) previously found highly significant differences among five essential amino acids, it is only logical to consider both 5.46 and 6.25 for the NPCF. Consequently, both are presented for literature comparisons. However for results and discussion, the 5.46 NPCF was used throughout this study.

Significant differences ($P \leq 0.05$) were found among the peanut genotypes for protein and oil percentages during each planting date for all three-years (Tables 1-6). Overall protein averages were 19.70%, 21.12%, and 23.37% during 2016, 2017, and 2018, respectively. Likewise, overall averages for percent oil were 52.66%, 52.44%, and 50.57% during 2016, 2017, and 2018, respectively. In this study, there was also an inverse relationship between protein and oil percentages as previously reported by Tai and Young (1975).

Percent Protein

During 2016, 'Georgia-19HP' (Branch and Brenneman, 2020) had the highest percent protein for both the April and May planting dates (Table 1). However, it was not significantly higher than GA 942009 in the April planting and GA 122707 in the May planting date.

Table 1. Average percent protein across two planting dates and 30 high-oleic peanut genotypes at the Coastal Plain Experiment Station, Tifton, GA, 2016.†

	Planting Date		
Genotype	April	May	Mean
Georgia-19HP	21.94 (25.12) a*	23.85 (27.30) a	22.91 (26.22) a
GA 942009	22.11 (25.31) a	22.15 (25.36) bcd	22.14 (25.34) ab
GA 122707	21.04 (24.08) b	22.98 (26.31) ab	22.01 (25.20) ab
GA 142726	20.33 (23.27) bcd	22.45 (25.70) bc	21.39 (24.48) bc
GA 142721	20.49 (23.46) bc	21.05 (24.10) efg	20.77 (23.78) cd
GA 122706	19.83 (22.70) c-f	21.67 (24.80) cde	20.75 (23.75) cd
GA 132713	19.32 (22.11) f-i	21.32 (24.40) def	20.31 (23.25) de
GA 142711	19.52 (22.34) e-h	20.70 (23.70) e-i	20.11 (23.02) def
Georgia-14N	19.78 (22.64) c-g	20.29 (23.23) g-j	20.04 (22.94) d-g
GA 142722	19.46 (22.28) fgh	20.56 (23.53) f-i	20.01 (22.90) d-h
GA 142723	19.32 (22.12) f-i	20.51 (23.48) f-i	19.92 (22.80) d-h
GA 132705	19.60 (22.44) d-g	20.21 (23.13) g-j	19.91 (22.79) d-h
GA 132712	18.70 (21.41) i-m	20.88 (23.90) h	19.80 (22.66) e-i
GA 142712	19.11 (21.88) g-k	20.21 (23.13) g-j	19.66 (22.50) e-j
GA 132711	19.49 (22.31) e-h	19.33 (22.13) j-m	19.41 (22.22) e-k
Georgia-13M	19.29 (22.08) f-i	19.40 (22.21) jkl	19.35 (22.15) f-k
GA 132707	18.70 (21.40) i-m	19.97 (22.86) hij	19.33 (22.13) f-k
GA 132708	18.53 (21.21) j-m	20.07 (22.97) hij	19.30 (22.09) f-k
Florida-07	20.18 (23.10) cde	18.37 (21.03) m-p	19.28 (22.07) f-k
GA 132704	18.86 (21.59) h-l	19.36 (22.16) jkl	19.11 (21.88) g-l
GA 142725	18.36 (21.02) lm	19.80 (22.67) ijk	19.09 (21.85) h-m
GA 132706	18.85 (21.58) h-l	18.99 (21.74) k-n	18.92 (21.66) i-m
TUFRunner '297'	19.18 (21.96) f-j	18.49 (21.16) l-p	18.83 (21.56) j-m
TUFRunner '511'	19.40 (22.21) f-i	18.16 (20.79) n-q	18.78 (21.50) j-m
GA 122708	17.58 (20.12) n	19.76 (22.62) ijk	18.67 (21.37) k-n
GA 142713	18.29 (20.94) lmn	18.75 (21.46) l-o	18.52 (21.20) k-n
Georgia-09B	19.44 (22.25) fgh	17.59 (20.13) pq	18.51 (21.19) k-n
Georgia-16HO	18.09 (20.71) mn	18.53 (21.21) l-p	18.31 (20.96) lmn
Georgia-20VHO	18.50 (21.18) j-m	17.81 (20.39) opq	18.15 (20.78) mn
TUFRunner '727'	18.39 (21.05) klm	17.28 (19.78) q	17.83 (20.41) n
Mean	19.39 (22.20)	20.01 (22.91)	19.70 (22.55)
% CV	2.89	3.79	5.23

*Means within columns followed by the same letter are not significantly different at P≤0.05.

†% protein values equal nitrogen-to-protein conversion factor (NPCF) of 5.46 (Misra, 2001); whereas, % protein values in parentheses equal 6.25 NPCF.

In 2017, GA 152704 had the highest percent protein for both April and May planting dates (Table 2). However, it was not significantly higher than GA 942009, Georgia-19HP, and GA 122703-10 in April planting date and GA 942009, Georgia-19HP, and 'Georgia-09B' (Branch, 2010) in the May planting date.

Likewise in 2018, Georgia-19HP again had the highest protein percentage in both April and May planting dates (Table 3). However, Georgia-19HP was not significantly higher than 'TifNV-High O/L' (Holbrook *et al.*, 2017) in percent protein during the May planting date.

During all three years, Georgia-19HP had a consistently high percentage of protein across both April and May planting dates. Even though the actual protein percentages varied during these three years, the protein ranking for Georgia-19HP remained high compared to these other peanut cultivars and advanced Georgia breeding lines. The percent coefficient of variation (2-5%) was also low for both planting dates and across each of the three years (2016-18) which suggest good stability and consistency throughout these tests for percent protein.

Percent Oil

During 2016, GA 142721 and TUFRunner '727' had the highest percentage of oil averaged over April and May planting dates (Table 4). However, these two genotypes were not significantly higher than several other genotypes in the April planting date and GA 132706, GA 142722, 'Georgia-20VHO' (Branch, 2021), GA 142712, GA 132712, and GA 142725 in the May planting date. Conversely, Georgia-19HP had the lowest percentage of oil averaged across both planting dates, but it was not significantly lower than Georgia-09B in the April planting date and GA 122706, GA 942009, GA 122707, and GA 142726 in the May planting date.

In 2017, Georgia-20VHO had the highest percentage of oil in the April planting date (Table 5). However, it was not significantly higher in oil percent than TUFRunner '727', GA 132705, TUFRunner '511' (Tillman and Gorbet, 2017), 'Georgia-16HO' (Branch, 2017), 'Georgia-11J' (Branch, 2012), and GA 132712 at the May planting date.

In 2018, FloRun '331' (Tillman, 2021) had the highest percentage of oil at both April and May planting dates (Table 6). However, it was not significantly higher than 'AU-NPL 17' and Georgia-20VHO and several advanced Georgia breeding lines in both planting dates.

Overall, oil percentages were consistent with coefficients of variation ranging from 1.36% and 1.87% in April 2017 and 2018, respectively to 4.28% in April 2016. Averaged across both planting dates and genotypes, coefficient of variation were also low with 4.26%, 2.50%, and 2.60% in 2016, 2017, and 2018, respectively. These results also suggest good stability and consistency throughout these tests for oil similar to protein percentages.

Table 2. Average percent protein across two planting dates and 24 high-oleic peanut genotypes at the Coastal Plain Experiment Station, Tifton, GA, 2017. †

	Planting Date		
Genotype	April	May	Mean
GA 152704	24.16 (27.65) a*	23.01 (26.34) a	23.58 (26.99) a
GA 942009	23.99 (27.46) a	22.50 (25.76) ab	23.25 (26.61) ab
Georgia-19HP	23.93 (27.39) a	22.18 (25.39) abc	23.05 (26.39) ab
GA 122703-10	23.48 (26.88) ab	22.15 (25.35) bc	22.81 (26.11) abc
Georgia-09B	23.01 (26.34) bc	22.34 (25.57) abc	22.68 (25.96) abc
Georgia-11J	22.97 (26.29) bcd	21.56 (24.68) cd	22.26 (25.48) bcd
FloRun '331'	22.15 (25.35) def	21.60 (24.72) cd	21.87 (25.04) cde
GA 122706	22.45 (25.70) cde	20.81 (23.82) de	21.63 (24.76) def
GA 142528	22.23 (25.45) c-f	20.86 (23.88) de	21.55 (24.67) def
GA 152711	21.70 (24.84) efg	21.01 (24.05) de	21.36 (24.45) d-g
GA 152710	21.56 (24.68) f-i	20.82 (23.83) de	21.19 (24.26) e-h
Florida-07	21.68 (24.82) efg	20.53 (23.50) ef	21.11 (24.16) e-h
GA 152701	21.11 (24.17) g-j	21.05 (24.10) de	21.09 (24.14) e-h
Georgia-13M	21.14 (24.20) g-j	20.55 (23.52) ef	20.84 (23.86) f-i
Georgia-14N	22.64 (25.92) bcd	18.63 (21.32) hi	20.63 (23.62) f-j
TUFRunner '297'	21.62 (24.75) e-h	19.18 (21.96) gh	20.40 (23.35) g-k
GA 132712	21.62 (24.75) e-h	19.06 (21.82) gh	20.43 (23.39) h-k
GA 132705	21.23 (24.30) g-j	19.39 (22.20) gh	20.31 (23.25) h-k
GA 112720-9	20.81 (23.82) h-k	19.06 (21.82) gh	19.94 (22.82) i-l
TUFRunner '511'	20.67 (23.66) jk	18.73 (21.44) hi	19.70 (22.55) jkl
Georgia-16HO	20.71 (23.71) ijk	18.61 (21.30) hi	19.66 (22.51) jkl
GA 112720-6	19.32 (22.12) l	19.72 (22.57) fg	19.52 (22.35) kl
TUFRunner '727'	20.18 (23.10) kl	18.21 (20.84) i	19.19 (21.97) l
Georgia-20VHO	19.52 (22.34) l	18.68 (21.38) hi	19.10 (21.86) l
Mean	21.83 (24.99)	20.42 (23.38)	21.12 (24.18)
% CV	3.04	3.23	5.26

*Means within columns followed by the same letter are not significantly different at P≤0.05.

†% protein values equal nitrogen-to-protein conversion factor (NPCF) of 5.46 (Misra, 2001); whereas, % protein values in parentheses equal 6.25 NPCF.

Table 3. Average percent protein across two planting dates and 24 high-oleic peanut genotypes at the Coastal Plain Experiment Station, Tifton, GA, 2018. †

	Planting Date		
Genotype	April	May	Mean
Georgia-19HP	25.68 (29.40) a*	25.57 (29.27) a	25.62 (29.33) a
TifNV-High O/L	24.64 (28.21) b	24.90 (28.50) ab	24.77 (28.35) b
GA 162714	24.15 (27.64) bcd	24.27 (27.78) bc	24.21 (27.71) c
GA 162706	24.04 (27.52) bcd	24.26 (27.77) bc	24.16 (27.65) c
Georgia-11J	24.24 (27.75) bc	24.00 (27.47) cde	24.12 (27.61) cd
Georgia-14N	23.73 (27.16) c-f	24.14 (27.63) cd	23.93 (27.39) cde
GA 122706	23.60 (27.02) d-g	23.77 (27.21) c-f	23.69 (27.12) def
GA 142528	23.81 (27.26) cde	23.40 (26.79) e-h	23.60 (27.02) efg
Florida-07	23.60 (27.02) d-g	23.43 (26.82) efg	23.52 (26.92) e-h
TUFRunner '511'	23.40 (26.79) e-h	23.29 (26.66) f-i	23.34 (26.72) f-i
AU-NPL 17	23.05 (26.38) ghi	23.48 (26.88) d-g	23.26 (26.63) f-j
FloRun '331'	23.43 (26.82) e-h	23.08 (26.42) f-j	23.26 (26.62) f-j
Georgia-09B	23.05 (26.39) ghi	23.26 (26.62) f-i	23.15 (26.50) g-k
GA 162519	23.24 (26.60) e-i	23.05 (26.39) g-k	23.15 (26.50) g-k
Georgia-13M	23.20 (26.56) f-i	23.09 (26.43) f-j	23.14 (26.49) g-k
GA 162725	23.76 (27.20) c-f	22.48 (25.73) jkl	23.12 (26.46) h-l
TUFRunner '297'	22.97 (26.29) hij	22.84 (26.15) g-l	22.91 (26.22) i-m
GA 132705	23.04 (26.37) ghi	22.63 (25.90) i-l	22.83 (26.13) j-m
GA 162507	22.85 (26.16) hij	22.71 (26.00) h-l	22.78 (26.08) klm
Georgia-20VHO	22.96 (26.28) hij	22.36 (25.60) kl	22.66 (25.94) lm
GA 132712	22.41 (25.65) jk	22.69 (25.97) i-l	22.55 (25.81) mn
GA 162722	22.79 (26.09) ij	22.27 (25.49) l	22.53 (25.79) mn
GA 162724	22.65 (25.93) ij	22.30 (25.53) l	22.48 (25.73) mn
Georgia-16HO	21.82 (24.98) k	22.54 (25.80) jkl	22.18 (25.39) n
Mean	23.42 (26.81)	23.33 (26.70)	23.37 (26.75)
% CV	1.98	2.28	2.22

*Means within columns followed by the same letter are not significantly different at P≤0.05.

†% protein values equal nitrogen-to-protein conversion factor (NPCF) of 5.46 (Misra, 2001); whereas, % protein values in parentheses equal 6.25 NPCF.

DISCUSSION

As previously mentioned, significant differences were found among several peanut cultivars and advanced Georgia breeding lines for percent protein and oil in this study. During each of the three years and averaged over two planting dates, Georgia-19HP was consistently high in percentage of protein. It was also found to be higher than 'Bailey' (Isleib *et al.*, 2011) and 'Georgia-06G' (Branch, 2007) across each of three southeast states (GA, FL, and AL) during 2017 (Branch and Brenneman, 2020).

In addition to having high protein and high-oleic fatty acid percentages, Georgia-19HP has a very high level of root-knot nematode (RKN) resistance caused by *Meloidogyne arenaria* (Neal) Chitwood; resistance to early and late leafspot caused by *Passalora arachidicola* (Hori). U. Braun. syn. *Cercospora arachidicola* Hori and *Nothopassalora personata* (Berk & M. A. Curtis) U. Braun, C. Nakash., Videira & Craus syn. *Cercosporidium personatum* (Berk and Curt.) Deighton, respectively; and resistance to tomato spotted wilt disease caused by *Tomato spotted wilt virus*. Georgia-19HP is a new virginia-type peanut cultivar that has many desirable traits for growers, shellers, manufacturers, and consumers of peanut and peanut products.

High oil percentage is also currently in demand in the U. S. (Ledbetter, 2022; Parker, 2022). Some in the peanut industry are considering expanding oil production for use in the domestic and export markets. Thus, the combination of high-oleic and high percent oil peanut genotypes would be desirable for such utilization, especially when combined with yield, grade, and dollar value return. Georgia-20VHO was among the highest in oil percent for both planting dates over each of the three-years of this study. It is a new high-yielding, TSWV-resistant, high-grading, very high-oleic (O) to linoleic (L) fatty acid ratio, runner-type peanut cultivar that would be a good option for this potential new market.

Table 4. Average percent oil across two planting dates and 30 high-oleic peanut genotypes at the Coastal Plain Experiment Station, Tifton, GA, 2016.

	Planting Date		
Genotype	April	May	Mean
GA 142721	54.44 abc*	56.54 a	55.49 a
TUFRunner '727'	54.72 ab	55.89 ab	55.31 a
GA 142713	55.25 a	53.67 b-f	54.46 ab
GA 132706	53.82 a-d	54.58 a-d	54.20 abc
GA 142722	53.76 a-d	54.58 a-d	54.17 abc
GA 132711	55.12 a	52.74 c-g	53.93 abc
Georgia-20VHO	53.08 a-e	54.69 abc	53.89 abc
GA 132705	53.42 a-d	53.78 b-e	53.60 a-d
GA 142712	52.82 a-e	54.23 a-e	53.53 a-d
GA 132712	52.61 a-e	54.38 a-d	53.50 a-e
GA 142725	52.46 a-e	54.47 a-d	53.46 a-e
GA 142723	53.52 a-d	53.34 b-f	53.43 a-e
GA 132713	53.46 a-d	53.36 b-f	53.41 a-e
Georgia-16HO	53.20 a-e	52.92 c-g	53.06 b-f
GA 122708	54.08 abc	52.03 d-h	53.05 b-g
GA 132707	53.41 a-d	52.69 c-g	53.05 b-g
GA 132708	53.55 a-d	52.13 c-h	52.84 b-g
TUFRunner '511'	52.26 a-e	53.32 b-f	52.79 b-g
GA 142726	54.86 a	49.94 hi	52.40 b-h
TUFRunner '297'	51.45 b-f	52.80 c-g	52.13 c-h
GA 132704	51.08 c-g	52.92 c-g	52.00 c-h
Florida-07	50.55 d-h	52.58 c-g	51.57 d-h
GA 122707	52.97 a-e	49.77 hi	51.37 d-h
Georgia-14N	51.45 b-f	51.10 fgh	51.28 e-h
Georgia-09B	48.02 hi	53.83 b-e	50.93 fgh
Georgia-13M	48.70 fgh	53.04 c-g	50.87 fgh
GA 942009	51.16 c-g	50.58 ghi	50.86 fgh
GA 142711	50.00 e-h	51.65 e-h	50.82 gh
GA 122706	51.19 c-g	49.86 hi	50.52 h
Georgia-19HP	47.62 i	47.99 i	47.80 i
Mean	52.47	52.85	52.66
% CV	4.28	3.46	4.26

*Means within columns followed by the same letter are not significantly different at P≤0.05.

Table 5. Average percent oil across two planting dates and 24 high-oleic peanut genotypes at the Coastal Plain Experiment Station, Tifton, GA, 2017.

	Planting Date		
Genotype	April	May	Mean
Georgia-20VHO	56.41 a*	53.76 ab	55.09 a
TUFRunner '727'	54.54 bc	54.76 a	54.65 ab
GA 132705	54.77 b	53.66 ab	54.22 abc
TUFRunner '511'	53.75 cd	53.59 abc	53.67 bcd
Georgia-16HO	53.07 def	53.03 a-e	53.05 cde
Georgia-11J	52.75 efg	53.26 a-d	53.00 c-f
GA 132712	52.72 efg	53.18 a-d	52.95 def
GA 152711	53.86 bcd	51.73 e-h	52.80 d-g
FloRun '331'	53.84 bcd	51.56 d-i	52.70 d-g
GA 142528	53.61 cde	51.66 d-h	52.64 d-g
TUFRunner '297'	52.68 fg	52.56 b-f	52.62 d-g
Georgia-13M	52.58 fgh	52.42 b-g	52.50 d-g
GA 122706	52.18 f-i	52.58 b-f	52.38 efg
Florida-07	52.18 f-i	52.34 b-g	52.26 efg
GA 112720-06	53.72 cd	50.21 hij	51.96 e-h
GA 112720-09	52.69 efg	51.13 e-i	51.91 e-h
GA 152701	52.68 efg	50.92 f-j	51.80 fgh
GA 152704	51.70 hij	51.88 b-h	51.79 fgh
Georgia-14N	50.91 jk	52.66 b-f	51.78 fgh
GA 152710	52.11 ghi	51.13 e-i	51.65 gh
Georgia-09B	50.72 k	51.24 e-i	50.98 hi
Georgia-19HP	51.30 ijk	50.58 g-j	50.94 hi
GA 942009	52.51 fgh	49.04 j	50.78 hi
GA 122703-10	51.04 jk	49.70 ij	50.37 i
Mean	52.85	52.03	52.44
% CV	1.36	2.56	2.50

*Means within columns followed by the same letter are not significantly different at P≤0.05.

Table 6. Average percent oil across two planting dates and 24 high-oleic peanut genotypes at the Coastal Plain Experiment Station, Tifton, GA, 2018.

	Planting Date		
Genotype	April	May	Mean
FloRun '331'	52.85 a*	52.20 a	52.53 a
AU-NPL 17	52.49 a-d	52.02 ab	52.26 ab
GA 142528	52.59 abc	51.52 abc	52.06 abc
Georgia-20VHO	52.35 a-e	51.58 abc	51.96 abc
GA 162507	52.37 a-d	51.30 a-d	51.83 abc
GA 122706	51.71 a-f	51.38 a-d	51.54 a-d
GA 132705	51.83 a-f	50.77 a-f	51.30 a-e
TUFRunner '511'	51.32 c-g	51.25 a-d	51.28 a-e
Georgia-16HO	52.69 ab	49.61 d-i	51.15 b-f
GA 942009	51.26 d-g	50.96 a-e	51.11 b-g
TUFRunner '297'	51.44 b-f	50.55 a-g	51.00 c-g
Georgia-11J	51.08 efg	50.10 c-i	50.59 d-h
GA 132712	52.59 abc	48.53 hij	50.56 d-h
GA 162519	51.04 fg	49.35 e-i	50.19 e-i
GA 162725	50.13 g-j	50.07 c-i	50.10 e-i
Georgia-13M	50.88 fgh	49.17 e-j	50.02 f-i
GA 162722	49.73 hij	50.31 b-h	50.02 f-i
Florida-07	50.73 f-i	49.12 e-j	49.92 f-j
Georgia-09B	51.04 fg	48.75 g-j	49.89 g-j
Georgia-14N	50.56 f-i	48.60 hij	49.58 hij
GA 162724	49.55 ij	48.97 f-j	49.26 ij
GA 162714	49.52 ij	48.79 g-j	49.15 ij
GA 162706	49.16 jk	48.39 ij	48.77 jk
Georgia-19HP	47.97 k	47.35 j	47.66 k
Mean	51.12	50.02	50.57
% CV	1.87	2.61	2.60

*Means within columns followed by the same letter are not significantly different at P≤0.05.

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