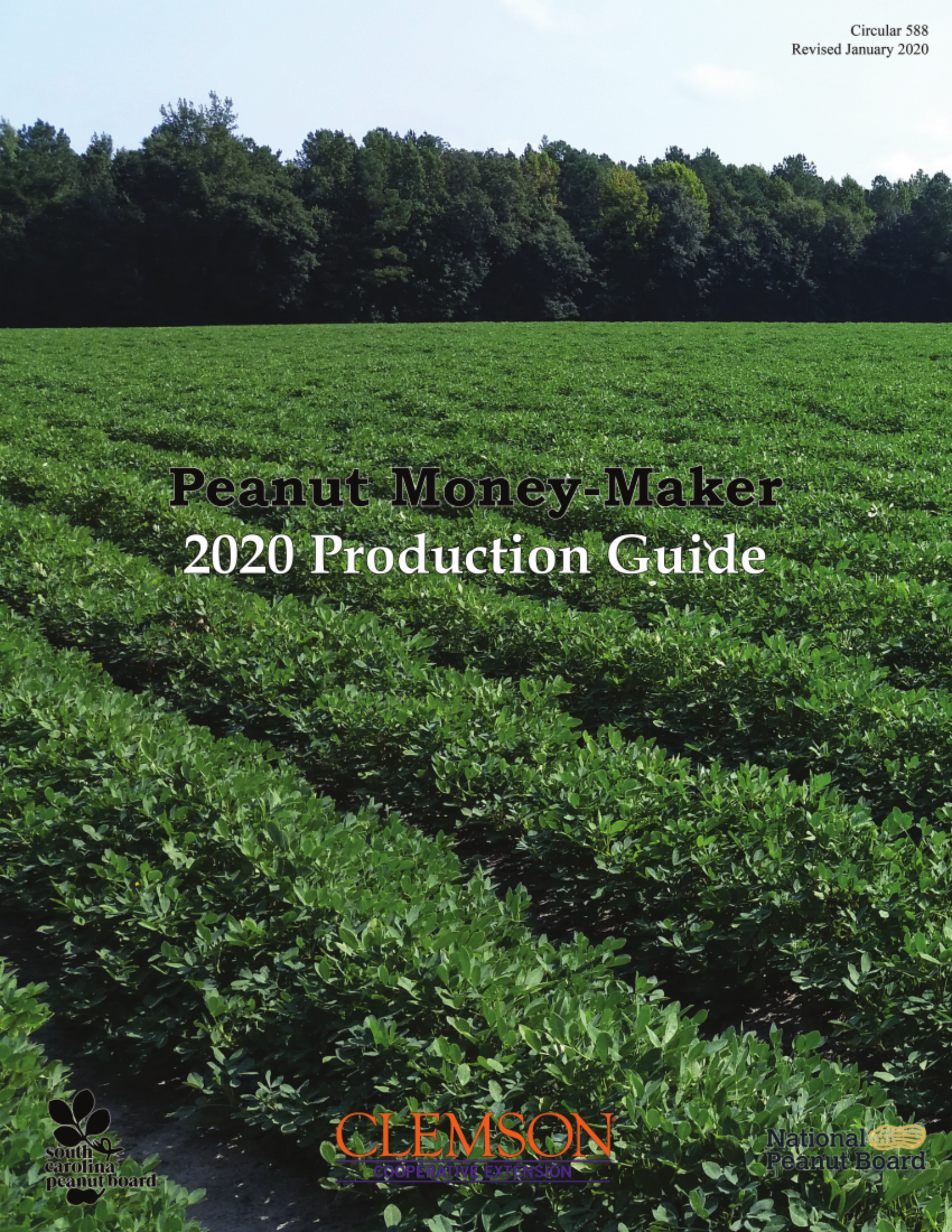
Circular 588
Revised January 2020



Peanut Money-Maker
2020 Production Guide

south carolina peanut board

CLEMSON
COOPERATIVE EXTENSION

National Peanut Board

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COUNTY EXTENSION AGENTS WITH PEANUT RESPONSIBILITIES – JAN 1, 2020

County	Agent	Office	Telephone
Allendale	Joe Varn	Hampton	803-245-2661 x115
Bamberg	Joe Varn	Bamberg	803-245-2661 x115
Barnwell	Joe Varn	Barnwell	803-245-2661 x115
Berkeley	Jonathan Croft	Orangeburg	803-534-6280
Calhoun	Charles Davis	St. Matthews	803-874-2354 x117
Chesterfield	Rich Byrd	Darlington	843-659-6986
Clarendon	Hannah Mikell	Manning	803-553-7244
Colleton	Marion Barnes	Colleton	803-549-2595 x115
Darlington	Rich Byrd	Darlington	843-659-6986
Dillon	William Hardee	Horry	843-365-6715
Dorchester	Jonathan Croft	Orangeburg	803-534-6280
Florence	Heather Benjamin	Florence	843-519-2408
Hampton	Joe Varn	Hampton	803-245-2661 x115
Horry	William Hardee	Horry	843-365-6715
Jasper	Joe Varn	Barnwell	803-245-2661 x115
Lee	David DeWitt	Bishopville	843-229-7994
Marion	William Hardee	Marion	843-365-6715
Marlboro	Rich Byrd	Darlington	843-659-6986
Orangeburg	Jonathan Croft	Orangeburg	803-534-6280
Richland	Charles Davis	St. Matthews	803-874-2354 x117
Sumter	Hannah Mikell	Manning	803-553-7244
Williamsburg	Heather Benjamin	Williamsburg	843-519-2408

Cover: Virginia type peanut field (Bailey or Sullivan).
Back cover: Bailey peanut field ready for combining.

INTRODUCTION

The keys to high quality, two-ton plus peanuts are:

1. Well drained soil
2. Suitable rotation lengths and rotation crops – cotton or corn and other grasses
3. Timely water during pod fill
4. Good harvest weather
5. Timely management – especially when and how they're dug

The factor that growers often have the most control over is #5 – timely management. Peanut is a relatively high-input, high management row crop. But profit is not necessarily determined by spending more money or adding one more product to the spray tank that "might help". It's about doing the fundamentals on time and getting the most out of every dollar invested.

This book is a guide for making timely peanut management decisions. The intention is to lay out a step-by-step game plan for peanut production under South Carolina conditions and to provide growers, county agents, private consultants and industry representatives with a reference that will answer most practical questions about peanut production.

Where possible, information is summarized in table format (Fertility Checklist, Guide to Peanut Fungicides, etc.) to present topics briefly but in sufficient detail. Summaries of the most important steps are also given in the Top Ten List and Peanut Management Calendar on the final pages of this guide.

Comments and suggestions to continually improve this production plan are always welcome.

What's New for the 2020 Edition?

Changes to this year's production guide include updates to the sections on Varieties, Fertility, Weed, Disease (fungicide products and efficacies), and Insect Management. New sections on Soil Moisture Sensors and Evapotranspiration have been added.

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PEANUT VARIETIES

D. Anco and J.S. Thomas

There are four peanut market types: Virginia, runner, valencia, and spanish types. Virginia types and runners (the two main types grown in S. C.) differ from valencias and spanish types in that neither the Virginia or runner types bloom and produce fruit on the upright main stem. The difference between a Virginia and a runner is based on pod size. If at least 40% of pods ride a 34/64-inch roller standard, then that variety has enough fancy pods to qualify as a Virginia type.

Within both the Virginia and runner market categories there are many varieties available and new ones being released every year. **Despite this abundance of released varieties only a relative few are best adapted for production under S. C. climate and disease conditions**. See the following discussion and table for variety characteristics and performance results**. Note that maturity days are measured primarily at Blackville under irrigated conditions. Maturity in the Pee Dee region can be 7 days longer and drought can also significantly delay maturity.**

VIRGINIA TYPES

***Bailey:** Bailey has been the standard for Virginia type production in S. C. due to exceptional disease resistance and consistently high yield. Bailey maturity can range from being as early as Champs (125 days) to typically 135 days or even 140 days at Blackville. Bailey has demonstrated high yield, a very bright hull and excellent resistance to white mold and tomato spotted wilt virus (TSWV). Bailey has also shown resistance to CBR. Late leaf spot activity on Bailey has increased recently. Pod size is slightly larger than NCV-11. Bailey particularly outperforms in fields at high risk for soil disease. Bailey has a very large, rank growing canopy which can be a disadvantage in digging and combining, but Bailey has responded well to Apogee growth regulator under S. C. conditions. Bailey has increased susceptibility to leafhopper injury and is not high oleic.

****Bailey II:** Released in 2017 from Dr. Isleib's breeding program at NCSU, Bailey II is a high-oleic version of Bailey with a slight yield advantage. Disease susceptibility performance, canopy growth pattern and maturity have been similar to that of Bailey. Bailey II pod and seed size are slightly larger than Bailey. Availability has been anticipated to be more available in 2021.

Emery: Emery is a 2015 release from NC State that is high oleic and has large pods with bright hulls. It is resistant to TSWV, susceptible to CBR and late leaf spot and has moderate maturity. This may turn out to be a good option for the fresh market. Availability for 2020 is limited.

***Georgia 08V:** Georgia 08V is a high oleic peanut which has shown high yield potential, exceptional grade (both TSMK and ELK), as well as better late leaf spot and slightly better white mold resistance than the old NCV-11 standard. Georgia 08V does not have disease resistance comparable to Bailey, but exceptional yield and grade make it worth planting if you can get seed.

Georgia 11J: Georgia 11J is high oleic, with very large pods and late maturity (150 days). This variety has resistance to tomato spotted wilt but is susceptible to white mold and late leaf spot. The large pods of this variety make it a candidate for the specialty green peanut market, but later maturity is a disadvantage.

***Gregory:** Gregory has high yield potential, very large pods, and one of the highest ELK scores available. Although Gregory has resistance to spotted wilt, this variety is not immune and will be severely affected under heavy thrips pressure. Gregory is very susceptible to late leaf spot and

white mold. Gregory is particularly susceptible to drought stress and calcium deficiency because of its large pod size, and therefore does best under irrigation. The large pod size makes it most suitable for sandy-surfaced soils to avoid digging loss. Gregory also fits the green peanut market in S. C. because of its size and hull brightness. Recommended for green peanut production, but seed have become limited. Seed size is 470/lb, and maturity is approximately 132 DAP.

Spain: Spain is a late maturing (155 day) high-oleic variety developed by the University of Florida. Spain has large pods and seeds, although mature pod size can vary greatly. Spain is highly susceptible to late leaf spot and white mold, and it is susceptible to tomato spotted wilt. When taken to full maturity, Spain has produced high yields in S. C. but is probably only suitable for irrigated production given the drought risk of large pods and late maturity.

***Sugg:** Sugg is a 2009 NCSU release with resistance to white mold and tomato spotted wilt. Like Bailey, Sugg has been slightly less susceptible to late leaf spot than other large-pod Virginias such as Gregory or Phillips. In multi-year tests at Blackville, Sugg has been close, but not quite as good as Bailey in disease resistance, pod brightness or yield potential. However, disease and yield performance is still excellent. Like Bailey, Sugg has a very large canopy and is highly susceptible to leafhopper injury. Bailey and Sullivan have another advantage over Sugg for dryland production in that their smaller pods reduce drought risk.

*__Sullivan__**:** This is a 2013 release from Dr. Isleib's program (NCSU). Sullivan is high oleic with a pod size similar to Bailey and good resistance to tomato spotted wilt and white mold. Sullivan does not develop as large a canopy as Bailey. Yield has been competitive with Bailey, with slightly lower SMK. Maturity has been similar to Bailey.

Titan: Titan is a 2010 release from Virginia Tech. This variety has exceptionally large pods and is considered a potential specialty peanut for the green or parched in-shell peanut market. Titan is very susceptible to late leaf spot, white mold and hopper burn. Yield potential has been less than Gregory (another large-pod variety) based on limited testing.

__Walton__:** Walton is a 2019 high oleic joint release from Drs. Balota and Tillman. Walton has similar agronomic characteristics to Bailey, Emery, and Bailey II under favorable conditions but has better performance under water limiting conditions. This variety has a wider window of optimal maturity compared to similar varieties. Seed is limited and being increased. Recommended for on-farm trial.

__Wynne__:** Wynne is another 2013 high oleic release from Dr. Isleib's program. Like Sullivan, Wynne has shown resistance to tomato spotted wilt and white mold in S. C. trials. Wynne is essentially a high oleic replacement for Sugg, with slightly larger pod size and later maturity. At this point, Sullivan looks like a better high-oleic alternative than Wynne due to shorter maturity, more modest pod size and a better disease package.

***Recommended variety**
****Recommended for on-farm trial**

PAST VIRGINIA TYPES OUT OF COMMON PRODUCTION

AT-VC2: This variety had outstanding yield and grade performance in S. C. trials, but AT-VC2 has slightly smaller pods for a Virginia type and therefore sheller acceptance and seed supply was

very limited. TSWV resistance is similar to NCV-11. AT-VC2 is a bit more susceptible to late leaf spot than NCV-11, but less susceptible than Gregory, Phillips or Perry.

Brantley: Brantley has a very large pod (even slightly larger than Gregory) and high ELK scores. It does not recover well from drought stress and is susceptible to spotted wilt virus, late leaf spot and white mold. Brantley is high oleic.

Champs: Champs is an early-maturing variety (125 days) that has performed very well under SC conditions. It has shown very high yield, slightly higher SMK and ELK than NCV-11, and virus resistance equivalent to NCV-11. Champs is more susceptible to leaf spot than NCV-11, but less susceptible than Perry, Phillips or Gregory. Champs is highly susceptible to white mold and is particularly susceptible to CBR. Seed have become limited.

Florida Fancy: In tests at Blackville, Florida Fancy has had similar spotted wilt and white mold resistance, but better late leaf spot resistance compared to NCV-11. Maturity can be 7-10 days later than NCV-11. Like many Florida lines, Florida Fancy has a low, flat bush. It is high oleic.

Georgia 05E: Although Georgia 05E qualifies as a Virginia-type, the pods are not as long as traditional Virginia types which limits acceptance for in-shell use. Georgia 05E has later maturity than standard Virginia types and therefore should be planted by 10 May. Georgia 05E has high yield, excellent grade (SMK) and some resistance to spotted wilt, late leaf spot and white mold.

Georgia HI-O/L: This high oleic variety had yield that has been competitive with NCV-11. TSWV resistance is similar to NCV-11. Georgia Hi-O/L is susceptible to late leaf spot. Demand has been limited in the Virginia market due to pod size and shape.

NC 7: NC 7 has large pods and a high ELK percentage. This variety is susceptible to late leaf spot, spotted wilt virus and Diplodia collar rot. Yield is no longer competitive with standards, and therefore NC 7 is not the best choice among large-podded varieties.

NCV-11: Before Bailey, NCV-11 was the long term standard for Virginia types under S. C. conditions. NCV-11 has had consistant yield and grade potential, a bright hull, relatively low susceptibility to late leaf spot and some tolerance to tomato spotted wilt. NCV-11 produces excellent yields under ideal soil moisture conditions and tends to outperform larger seeded varieties under drought stress. NCV-11 is a medium maturity Virginia type and typically matures in about 132-135 days at Blackville.

NC 12C: NC 12C is a large peanut with CBR resistance. However, Bailey and Sugg have better resistance and greater yield potential in CBR problem fields.

Perry: Until Bailey became available this variety was recommended for fields with known severe CBR problems. Perry is a later maturing (145 days), bright-hulled variety with CBR resistance. This variety has a larger pod and higher % ELK than NCV-11. Perry is highly susceptible to both TSWV and late leaf spot.

Phillips: Phillips is a medium maturity variety (132 days) with high yield potential and large, bright pods. Phillips is highly susceptible to late leaf spot, white mold and TSWV. Due to high disease susceptibility, there are better choices than Phillips for S. C. conditions.

Va 92R: This was a consistently high-yielding Virginia type under S. C. conditions. Va 92R has

more ELKs than NCV-11, but its slightly darker hull has limited demand for the in-shell market. Va 92R is susceptible to TSWV. Seed are no longer available.

Va 98R: Va 98R yielded well under S. C. conditions and can be slightly earlier in maturity than NCV-11. Pod size is similar to or slightly smaller than NCV-11. Va 98R is more susceptible to TSWV than NCV-11 and should not be planted early (before about 7 May). Leaf spot susceptibility is similar to NCV-11. Va 98R has been phased out of the seed supply due to smaller pod size.

Wilson: Wilson is an early-maturing variety with a very bright hull. It has about the same ELK as NCV-11, but SMK has been consistently less than other Virginia types. Wilson is considered TSWV susceptible. Wilson is also highly susceptible to white mold and CBR.

RUNNER TYPES

ACI-789: Released from Dr. Moore's breeding program from ACI Seeds, this variety is high oleic and has better peg strength than Georgia 09B. It is moderately susceptible to tomato spotted wilt virus though typically not as susceptible as TUFRunner 511. From available tests, yield has been competitive with FloRun 107 and Georgia 09B. Maturity is ~145 DAP.

ACI-808: This high oleic variety has resistance to TSWV. Maturity is similar to ACI-789.

****ACI-3321:** In limited tests (2 years) at Blackville, this high oleic variety has demonstrated strong TSWV resistance and moderate resistance to late leaf spot. Yields appear to be excellent. Maturity appears to be full season near 150 days. Seed is currently limited.

****AU-NPL 17:** Released in 2017 from Dr. Chen's breeding program at Auburn, AU-NPL 17 appears to have yield performance competitive to Georgia 09B and Florida-07. AU-NPL 17 is high oleic and appears to have moderately strong resistance to late leaf spot, white mold, and TSWV. Maturity appears to be medium. Availability is increasing but currently limited.

Carolina African Runner: This heirloom variety has recently seen renewed production interest from specialized markets due to its enhanced culinary properties. Carolina African Runner has extremely small seed (more than 850 per pound). This variety has demonstrated extreme susceptibility to TSWV. If this variety is grown under standard S. C. production conditions, every effort to reduce TSWV risk should be employed.

***FloRun 331:** FloRun 331 is the newest high-oleic release (2017) from Dr. Tillman's program at UF. It has so far exhibited exceptional yields, strong seedling vigor, moderate resistance to late leaf spot, and moderate susceptibility to TSWV. Maturity appears to be medium with average seed size (650-700/lb). Canopy has a prominent main stem and can be large. Limited seed for 2020.

***Florida-07:** Florida-07 is a large-seeded, high-oleic runner which matures 7-10 days later than the mid-maturity runner standard (Ga 06G). Florida-07 has demonstrated high yield potential and some late leaf spot resistance. The bush of Florida-07 is low growing like many Florida lines. The wide range of pod sizes in this variety has caused some increase in sound splits and other kernels during grader shelling. Florida-07 grades are consistently 2-4 percent less than Georgia 06G or Georgia 09B, but Florida-07 is less susceptible to pod loss at digging than Georgia 09B and has consistently delivered high yields if allowed to mature. Later maturity can be an advantage in spreading harvest without interrupting planting.

***Georgia 06G:** Georgia 06G is a medium maturity runner with large pods. This variety has shown excellent yield potential, high TSMK and good virus resistance throughout the Southeast. While not high oleic, Georgia 06G currently has the largest industry share of runner production. Like all large seeded runners, Georgia 06G is susceptible to white mold and drought stress but has demonstrated better drought performance than Georgia 09B.

***Georgia 07W:** Georgia 07W is a large-pod runner with some white mold resistance and good virus resistance. Seed size is similar to Georgia 06G. This variety has also shown good yield potential in the absence of white mold pressure. Georgia 07W is the replacement for Georgia 03L with improved grade. Maturity is near 145 DAP. It is not high oleic.

***Georgia 09B:** Georgia 09B is a high oleic runner with medium maturity and virus resistance. Yield and grade performance has been slightly less than Georgia Greener or Georgia 06G. Georgia 09B is more susceptible to late leaf spot than Florida-07 (high oleic alternative) but has shorter maturity (about 135-140 days), better grade and equivalent or better yield potential. Georgia 09B is more susceptible to harvest loss than Florida-07 or Georgia 06G if not dug on time.

***Georgia 12Y:** Georgia 12Y is a late maturity runner with exceptional yield potential, excellent resistance to white mold and tomato spotted wilt, and good resistance against late leaf spot. It is not high oleic and SMK values are consistently at least 2-3% below Georgia 06G. Even with its later maturity (150+ days) and grade disadvantage, this variety has excellent potential in S. C. due to yield potential and the **best white mold resistance available in a runner type**. Seed for 2020 should be limited but greater than 2019. Georgia 12Y is more susceptible to Rhizoctonia limb rot.

Georgia 14N: Georgia 14N is a high oleic, late maturity, small-seeded, high-yield potential runner with **excellent resistance to root knot nematode** and tomato spotted wilt. Georgia 14N has better late leaf spot resistance and equivalent or better grade than Georgia 06G, and it has smaller seed size than Tifguard. White mold resistance of Georgia 14N is generally better than Georgia 06G but not as good as Georgia 12Y. Yield potential not as consistent as TifNV-High O/L. Seed is currently limited.

****Georgia 16HO:** This large-seeded (625/lb) moderate maturity variety is a newer, high oleic improvement of Georgia 06G with better yield potential. Disease performance regarding TSWV, late leaf spot and white mold susceptibility appears to be similar to Georgia 06G. Recommended for on-farm trial. Seed may be limited for 2020.

Georgia 18RU: This smaller-seeded (675/lb) variety is a normal oleic and has high TSMK potential. Georgia 18RU has resistance to TSW and leaf scorch. Seed is currently limited.

***Tifguard:** Tifguard has **excellent nematode resistance**. Even in the absence of nematode pressure, this variety has shown consistently competitive yield potential at Blackville. TifGuard is a large pod runner with a distinctive low growing, dark green bush and a very prominent main stem which should help digging. Tifguard has also demonstrated good TSWV resistance. Seed size is 650/lb, with maturity running approximately 140 DAP.

****TifNV-High O/L:** This high oleic variety has **excellent nematode resistance**, strong TSWV resistance, partial resistance to late leaf spot and white mold, and moderate to late maturity. TifNV-High O/L foliage appears to develop elevated amounts of "physiological leaf spot" blemishes (this does not cause defoliation). Seed is currently limited. Yield potential has been competitive.

***TUFRunner™ 297:** TUFRunner 297 is a high oleic, extra-large seeded runner released by Dr. Tillman's program at UF in 2014. TUFRunner 297 has excellent yield and grade and some resistance to TSWV and white mold. TUFRunner 297 is moderately susceptible to leaf spot. It has a prominent center stem with semi-prostrate growth. Seed is increasing but may be limited.

TUFRunner™ 511: TUFRunner 511 is a high oleic runner released by UF in 2013. It has medium maturity, large pods and high yield potential. TUFRunner 511 is particularly susceptible to late leaf spot (similar to Georgia 13M) and benefits from earlier planting (first two weeks of May) and aggressive leaf spot management. TUFRunner 511 is more susceptible to TSWV than many current runner varieties but not as susceptible as the Carolina African Runner. Use of Thimet is recommended for this variety.

***Recommended Variety**
****Recommended for on-farm trial**

PAST RUNNER TYPES OUT OF COMMON PRODUCTION

AP-3: AP-3 has medium maturity and resistance to TSWV and white mold. AP-3 did not yield as well on-farm as Georgia Green or Georgia 03L under drought stress. AP-3 is highly susceptible to CBR. AP-3 has a low, flat bush which is characteristic of some of the Florida lines.

AP-4: AP-4 has a low, flat bush like AP-3 and has yield potential similar to Georgia Green.

AT-201: Similar to Georgia Green in maturity, AT-201 has more vigorous growth and larger kernels, but less virus resistance.

AT-215: AT-215 is an early maturity high oleic replacement for ViruGard with similar pod size (a large runner). AT-215 has demonstrated higher yield potential than ViruGard, but somewhat greater leaf spot susceptibility compared to other runners. The main stem of AT-215 forms a distinct spike that may help digging.

AT-3081R: This is a medium maturity runner. AT 3081R has spotted wilt resistance but is susceptible to late leaf spot. AT 3085 has outperformed AT 3081R at Blackville.

AT-3085RO: Under high-yield irrigated conditions, AT 3085 has produced yield equivalent to the Ga. Green standard. AT 3085 has a large bush for a runner.

Carver: A medium maturity (140 day) runner variety with TSWV and white mold resistance. Carver has lower grades (SMK) than Georgia Green and is not considered to be yield competitive in most areas of the Southeast.

C99R: C99R has large pods and tomato spotted wilt resistance, but requires 150 days to mature and therefore must be planted during the first week of May. C99R had inconsistent stands.

DP-1: This is a late-maturing (150+ days) variety. DP-1 has excellent resistance to TSWV, white mold and late leaf spot. Yield performance has not measured up to current runner standards.

FloRun 107: FloRun 107 is a high oleic, medium maturity runner which has been yield competitive with Georgia 06G. It is resistant to tomato spotted wilt.

FloRun 157: FloRun 157 is a high oleic, medium seed size (~675/lb) variety that is susceptible to TSWV and late leaf spot. FloRun 157 has medium maturity (~140 DAP).

Georgia Green: Released in 1995, this medium maturity runner (about 140 days) had a long history of outstanding yield and grade performance over a wide variety of soil moisture conditions. However, Georgia Green is now susceptible to TSW virus stunting and has lower yield potential than Georgia 06G and other alternatives. Seed is no longer available.

Georgia Greener: Georgia Greener is a medium maturity variety with pod size similar to Georgia Green. Georgia Greener has excellent yield potential, high grade (TSMK), improved virus resistance, and some CBR resistance. Bush size is similar to Georgia Green. Georgia Greener was an ideal replacement for Ga. Green on non-irrigated land because Ga. Greener has smaller pods than Georgia 06G, but inconsistent stands / seed quality issues have limited availability and made Georgia 06G a better choice. Ga. Greener is a recommended runner type for proven high risk CBR fields, but Bailey would be a much better CBR choice if a Virginia type can be used.

Georgia 03L: Georgia 03L is a medium maturity runner with large, bright pods. Ga. 03L has good resistance to TSWV, late leaf spot, excellent white mold resistance, and some CBR resistance. Grade performance (TSMK) is about 2 points below Ga. Green. Seed are no longer available.

Georgia 10T: Georgia 10T is a late maturing, large seeded runner type variety that has shown superior resistance to tomato spotted wilt disease. Georgia 10T has not demonstrated equivalent yield to Georgia Greener or Georgia 06G in the absence of severe virus pressure.

Georgia 13M: Georgia 13M is a high oleic, late maturity (150+ DAP), small-seeded runner with resistance to tomato spotted wilt and strong yield potential. Georgia 13M is particularly susceptible to late leaf spot and consequently benefits from earlier planting (before May 15) and aggressive leaf spot management. Significantly smaller pods (800+ seed/lb) and high yield potential make this a promising variety for dryland production. When checking maturity with pod blasting/hull scraping, Georgia 13M does not appear to become dark brown or black as characteristically as other varieties under S. C. production conditions. Seed will be limited in 2018.

McCloud: McCloud is a mid-maturity runner with spotted wilt virus resistance. McCloud yield has been competitive with the Georgia Green. This is another high oleic runner. McCloud has a relatively short bush like many Florida lines.

Tifrunner: Tifrunner is a late maturing runner that is vulnerable to leaf spot and white mold. It is not recommended for S. C. conditions.

TUFRunner™ 727: This is a high oleic release from UF. TUFRunner 727 has shown some late leaf spot resistance in Florida. SMK values are 1 – 2% below Georgia 06G. Maturity ~150 days.

Virginia-Type Peanuts: Selected Variety and Performance Characteristics

Variety	Yield (lb/A) 2015	2016	2017	2018	2019	Yield index[a]	Grade (%)[b] TSMK (2019)	TSMK index	ELK (2019)	ELK index	Seed size (#/lb)[c]	Maturity (days)[d]	High oleic[e]	Disease resistance[f] Tomato spotted wilt virus	Cylindrocladium black rot	White mold	Rhizoctonia limb rot	Late leaf spot
Bailey	5339	5381	5337	3784	4312	**1.9**[23]	63.9	**1.7**[11]	36.9	**-2.6**[12]	510	132	no	R	R	R	R?	S
Bailey II	--	--	5408	--	--	**5.0**[8]	--	**1.0**[1]	--	**13.2**[1]	500?	138?	yes	R	R?	R	R?	S
Champs	4683	3746	--	--	--	**-10.0**[7]	--	**1.9**[11]	--	**3.9**[11]	500	125	no	MR	S	S	S	VS
Emery	--	--	5088	3862	3469	**-2.3**[12]	63.1	**0.6**[3]	40.3	**5.4**[3]	490	135	yes	R	VS	R	--	S
Sugg	4606	4029	--	--	--	**-9.4**[6]	--	**1.4**[9]	--	**4.0**[9]	480	135	no	R	R	R	R?	S
Sullivan	5241	4911	5410	4197	3611	**1.2**[18]	60.7	**0.0**[7]	33.8	**1.2**[7]	510	135	yes	R	R?	R	--	S
Walton	--	--	--		4628	**16.4**[5]	58.2	**-5.3**[1]	30.5	**-1.4**[1]	510	135-145	yes	R				MR?
Wynne	5043	4845	5102	3671	--	**3.2**[12]	--	**-1.8**[6]	--	**-1.1**[6]	450	142	yes	R	R?	R	--	S

[a]Yield index shows the percent above or below average yield over the number of tests indicated by the superscript number (minimum of two years or four trials of data required, based on meta-analysis; yield values given per year are from one Variety Test) and does not reflect performance under all conditions.

[b]TSMK = % total sound mature kernels; ELK = % extra large kernels; TSMK or ELK Index shows the percent above or below test average over the period of years indicated by the superscript number.

[c]Seed sizes listed are relative. Actual size will vary significantly by seed lot; always go by the lot seed count if available.

[d]Maturity comparisons are relative. Actual harvest date is dependent on growing season, plant health, and weather conditions. At Blackville 132-135 day Virginia-type and 140-145 day runner-type peanut are considered medium maturity. A 150-day runner is considered late. Maturities can easily run 7 days longer in northern counties (e.g., Dillon, Horry, Marlboro).

[e]A high oleic to linoleic fatty acid ratio increases shelf life.

[f]**Disease resistance is a relative scale and does not imply immunity.** R = resistant; MR = moderately resistant; S = susceptible; VS = very susceptible.

Runner-Type Peanuts: Selected Variety and Performance Characteristics

Variety	Yield (lb/A) 2015	2016	2017	2018	2019	Yield index[a]	Grade (%)[b] TSMK (2019)	TSMK index	Seed size (#/lb)[c]	Maturity (days)[d]	High oleic[e]	Disease resistance[f] Tomato spotted wilt virus	Cylindrocladium black rot	White mold	Rhizoctonia limb rot	Late leaf spot
ACI-789	4574	--	5246	--	--	**-8.3**[4]	--	**-4.0**[2]	700	145	Y	R	--	S	S	S
ACI-3321	--	--	6281	5692	4981	**2.1**[7]	66.2	**-4.0**[3]	650	150	Y	R	--	MR?	--	MR
AU-NPL 17	--	--	--	--	5770	**-0.1**[9]	69.3	**-2.0**[3]	675	145-150	Y	R	--	MR	--	R
Florida-07	4916	4966	--	--	--	**-5.8**[4]	--	**-2.0**[9]	640	150	Y	R	S	S	S	S
FloRun 107	4788	4202	5215	--	--	**-11.7**[4]	--	**-2.0**[7]	725	145	Y	R	--	S	S	S
FloRun 331	--	--	6292	7640	6327	**13.4**[11]	70.0	**0.0**[3]	675	145?	Y	R	--	MR	--	MR
Georgia-06G	5217	4203	4435	4972	5284	**-3.9**[19]	72.6	**2.0**[13]	650	140	N	R	S	S	S	MR
Georgia-09B	5182	4062	5627	4326	5351	**-5.0**[9]	71.4	**1.0**[10]	700	135	Y	R	S	S	S	S
Georgia-12Y	5173	5203	6329	5999	5407	**7.0**[10]	68.3	**-3.0**[7]	700	150	N	R	--	R	VS	R
Georgia-13M	4903	5249	5483	5221	--	**-1.2**[11]	--	**-3.0**[5]	830	150	Y	R	--	S	S	VS
Georgia-14N	4559	4725	5011	5220	4370	**-10.9**[6]	71.6	**1.0**[5]	800	150	Y	R	MR?	MR	S	MR
Georgia-16HO	--	--	6665	5625	6316	**10.8**[12]	74.0	**5.0**[3]	625	145-150	Y	R	--	S	S	S
Georgia-18RU	--	--	--	--	5798	**1.0**[5]	72.4	**2.0**[1]	675	150?	N	Y	--	S	--	S
TifNV-High O/L	--	5076	5902	5222	5415	**4.0**[5]	71.2	**1.0**[4]	620	150?	Y	R	S	MR	S	R
TUFRunner 297	5478	5583	6426	5037	6541	**10.0**[11]	71.9	**3.0**[5]	600	145-150	Y	R	--	MR	S	S
TUFRunner 511	5420	5054	5850	5523	--	**3.9**[12]	--	**2.0**[5]	615	145-150	Y	S	--	MR	S	VS

[a]Yield index shows the percent above or below average yield over the number of tests indicated by the superscript number (minimum of two years or four trials of data required, based on meta-analysis; yield values given per year are from one Variety Test) and does not reflect performance under all conditions.

[b]TSMK = % total sound mature kernels; TSMK Index shows the percent above or below test average over the period of years indicated by the superscript number.

[c]Seed sizes are relative. Actual size varys significantly by seed lot; always go by the seed count on the lot if available.

[d]Maturity comparisons are relative. Actual harvest date is dependent on growing season, plant health, and weather conditions. At Blackville 132-135 day Virginia-type and 140-145 day runner-type peanut are considered medium maturity. A 150-day runner is considered late. Maturities can run 5-7 days longer in northern counties (e.g., Dillon, Horry, Marlboro).

[e]A high oleic to linoleic fatty acid ratio increases shelf life.

[f]**Disease resistance is a relative scale and does not imply immunity.** R = resistant; MR = moderately resistant; S = susceptible; VS = very susceptible.

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CROP ROTATION

Rotation into non-legumes (cotton, corn, sorghum, other grasses, or sweet potato) is absolutely essential to sustainable, long-term peanut production. Cylindrocladium black rot (CBR) is increasing in SC and rotation is the most important factor in suppressing this and other diseases. An absolute **minimum of 2 years (3 or 4 years better)** out of legumes is recommended for sustainable peanut production. **Soybeans should be avoided** in a peanut rotation due to increased CBR and white mold problems. **Tobacco, tomato, or pepper** rotations also increase white mold pressure. Tomato rotations can also increase nematode pressure.

Volunteer peanuts must be controlled in the following crop to prevent losing a year's rotation. Peanuts are tough "weeds" and often require a two-step treatment program. If not adequately controlled, volunteer peanuts can greatly increase disease pressure (for example, late leaf spot), even from nearby fields.

Volunteer Peanut Response to Preemergence (PRE) and Postemergence (POST) Cotton and Corn Herbicide Programs[1]

Cotton				**Corn**			
PRE		**POST/POST-Directed**		**PRE**		**POST/POST-Directed**	
Command	F	Caparol + MSMA	F	Acuron	G-E	Accent	G
		Cotoran + MSMA	F	Atrazine	G	Acuron	G
		Diuron + MSMA	G	Bicep II Magnum	G	Atrazine	G
		Glyphosate[3]	F-G	Corvus	E	Balance Flexx	G-E
		Glyphosate[3] + Caparol	G			Clarity	E
		Glyphosate[3]+ Diuron	G			Capreno	G-E
		Glyphosate[3] + Valor	F-G			Corvus	G-E
		Liberty[2]	E			Evik	G-E
		Valor + MSMA	G			Halex GT	G-E
		Suprend + MSMA	G			Laudis	G-E
		Layby Pro + MSMA	G			Liberty[2]	E
		Diuron + MSMA	G			Lorox, Linex	G
						Marksman	E
						Glyphosate[c]	G

[1]***Key to Response Ratings***: E = excellent control, 90% or better; G = good control, 80 to 90%; F = fair control, 70 to 80%; P = poor control, less than 70%; --- = Insufficient Data.
[2]Liberty for use only on Liberty-Link varieties / hybrids.
[3]Glyphosate for use only on glyphosate resistant hybrids or varieties.

TILLAGE

Peanuts can be produced successfully with many different tillage systems, but in any system, they do better on a slight bed. If subsoiled and bedded, knock the bed down so that at least a 16" wide flat bed is available (lower than typical cotton bed). If land is disked flat, throw up a bed with coulters on the planter. Bottom plowing is not recommended unless necessary to bury residue and reduce disease and burrower bug risk on non-rotated fields. Bottom plowing can also reduce pigweed pressure.

Strip-tillage has given equivalent yields on lighter soils and we have been able to control weeds without preplant incorporated (PPI) herbicides under irrigated strip-tillage conditions. Strip-tillage into a cover crop or other crop residue reduces tomato spotted wilt. Use coulters on the strip-till planter to establish a slight planting bed. Planting between the previous rows is recommended to minimize roots and stalks in the pegging zone. In general, there are fewer worm problems in strip-till, but burrower bug injury risk is greatest in stip-tillage under severe late season drought stress.

PLANTING

Planting Date: The best planting window for peanuts in S. C. has been from about 5 – 25 May. Large acreages (≥ 300) should be spread out over a 2-week planting interval to spread harvest maturity. Peanuts do well planted the first week of May, but tomato spotted wilt, white mold and CBR risk increase with early May or late April planting (see disease management below). **The availability of improved disease resistance has increased early planting.** Fields with high CBR risk should be planted last to maximize early season soil temperatures. Late leaf spot risk, however, generally increases with later planting dates. We have enough growing season to finish planting during the first week of June if absolutely necessary, but **harvest conditions usually deteriorate rapidly after 1 Nov.** Lower temperatures and shorter days severely limit drying time and combining hours. See the discussion on cold injury.

Soil Temperature: Should be at least 65° F at 4" depth, but soil temperature is seldom a concern for May planting in S. C.

Seeding Rate and Plant Population: Our goal is to get a uniformly emerged stand of 4 plants per row ft. to help control tomato spotted wilt virus. A **seeding rate of 6 per row ft is recommended for runners (or ≥ 5 per row ft for Virginia types or large seeded runners due to greater seed cost).**

Peanut seeding rates (lb of seed/A)*

Seed size (seed/lb)	Seed/row ft		
	4	5	6
450	122	153	183
500	110	138	165
550	100	125	150
600	92	115	138
650	85	106	127
700	79	98	118
750	73	92	110
800	69	86	103
850	65	81	97
900	61	76	92
Seed/A	55,024	68,780	82,536

*Based on 38" rows. For 36" or 30" rows, multiply seed per ft by 0.95 or 0.789 respectively to get the seed spacing for the same seed population per acre. Conversely, to maintain the same seed population per row ft on 36" or 30" rows, you would have to multiply the poundage by 1.05 or 1.27, respectively.

Seed Quality: Low germination peanut seed not only require more seed to achieve adequate stands, but they also produce plants with reduced vigor and lower yield potential. CBR and Diplodia collar rot are seed-transmitted – know your seed source. Use caution with saved seed.

Seeding Depth: Plant into consistent moisture up to a maximum depth of 3" assuming good seed quality. Under good moisture conditions, 1.5" depth is ideal and there is no need to plant shallower unless the seed have very poor vigor. Planting shallower than 1.5" will increase the risk of Valor injury and also increase risk of inoculant failure in marginal soil moisture.

Row Spacing: Conventional row spacing is 36 – 38", but twin-rows (7" on 36 – 38" centers) help reduce tomato spotted wilt virus by covering the ground more quickly. **Twin rows** can increase yield even in the absence of TSWV, but a GPS guidance system is recommended to allow digging of twin-row Virginia types. Increased insecticide and inoculant costs can offset up to 40% of the yield increase from twin rows. On each twin row plant 3 seed per row ft.

FERTILITY

Bhupinder Farmaha, Nutrient Management Specialist
J.J. Camberato, and D. Anco

The information provided in this chapter is to help producers make decisions related to fertilizer applications for peanut production based on regular soil testing and plant tissue analysis. For complete detail, readers are referred to Clemson University Extension Circular EC 476, Nutrient Management for South Carolina
https://www.clemson.edu/extension/camm/manuals/publications/nutrient_management_for_south_carolina_ec476e.pdf

Soil Testing: The first step in soil testing is to obtain a representative soil sample from the field. A field can be divided into several sections and get representative soil sample from each section if the field has different soil and landscape characteristics, cropping history, or known yield variations within the field. Soil samples can be sent to Clemson University's Agricultural Services Lab for analyses or to a private lab. The County Extension office can help provide soil sample bags, submission forms, and advice on taking soil samples. The County Extension office will also mail your samples to Clemson University's Agricultural Services Lab on a fee basis. Detailed information on how to collect soil samples is provided online at https://www.clemson.edu/public/regulatory/ag-srvc-lab/soil-testing/collecting-samples.html

Once each sampling area is identified, remove the surface residue and take 10 to 20 soil cores to a 4- to 6-inch depth in a zigzag pattern throughout the area to ensure good representation. The soil cores should be placed in a clean plastic bucket and mixed thoroughly, and a subsample should be taken to fill the soil sampling bag. In subsequent years, ensure to take soil samples from the same areas and possibly same time, preferably in the fall after harvest, to make relevant annual comparisons.

Clemson University lab's standard soil test report consist of a test for soil pH (active acidity), buffer pH (to estimate total exchangeable acidity), phosphorus, potassium, secondary nutrients (calcium and magnesium), and micronutrients (zinc, manganese, copper, boron, and sodium).

pH: Optimum soil pH for peanut production is between 5.8 and 6.5 for most soils in South Carolina.However, given the critical need for Ca in Virginia type peanuts we recommend a bias toward 6.5. A pH of 6.5 increases the probability of Mn or B deficiency but decreases potential Zn toxicity problems. Mn or B needs can be met with foliar application where needed. If soil tests show a low pH, lime can be applied to enhance yield potential by reducing the toxicity of soil aluminum and/or manganese, improving the availability of phosphorus and potassium, and increasing the supply of calcium and magnesium (with dolomitic lime). Readers are referred to

Clemson University Land Grant Press Article 1023, Basis of Selecting a Lime Material for selecting a lime source and making economical comparisons among different sources. Lime should be applied as many weeks prior to planting as possible. Thorough mixing of the lime into the plow layer maximizes its rate of reaction and distribution in the root zone.

N and Inoculants: Peanut is a legume and as such can get most of its N needs from nitrogen-fixing bacteria (Bradyrhizobium) colonizing the plant's roots. To provide these needed bacteria all "new" peanut land must be inoculated, and strip-tillage fields and land that has been out of peanut production for 3 years should also be inoculated. **Use only a liquid in-furrow inoculant**. In-furrow granular inoculants are less effective than liquids and can get clogged in the delivery tube. Seed treatment inoculants are not recommended due to having much lower bacterial counts. Seed treatment inoculants have been much less effective and consistent than in-furrow liquids. Inoculants are living organisms; treat them with care. Make sure the inoculant is not out-of-date.

Inoculant Rules:

- Use only liquid in-furrow inoculants particularly on "new" land. Granulars & seed treatments are less reliable.
- Do not expose to heat.
- If inoculant sits in the tank overnight, treat it as plain water and add a fresh batch.
- Use a minimum of 5 gal water/A; 8 gal is probably better.
- Make sure the inoculant stream hits exactly in the center of the open furrow, not the dry furrow walls. Tips knocked out of alignment cause yellow peanuts and reduced yields. Trash caught in strip tillage rigs can deflect the inoculant stream.
- Don't plant too shallow (< 1.5"). Inoculant must hit moist soil or it will die.
- Do not use chlorinated water.
- Apply with a steady stream, not a pulsing pump.
- Twin rows require a full inoculant rate in each row (on new land).
- On "new" peanut land, consider using a backup plan – add a half rate of a different brand liquid inoculant, or add a granular in-furrow inoculant.

Poorly inoculated fields usually will not show any yellowing until about 45 DAP. Inoculation can be checked by using a shovel to uproot plants. Simply pulling up plants will cause the lower taproot to break off and result in a low count. The presence of large (1/8" or larger) nodules on the taproot indicates successful inoculation. An average of 15 large nodules per taproot at 45 DAP is considered good; less than 10 per taproot is marginal and less than 5 indicates poor inoculation. If only small (1/16") nodules are present and are mostly on the lateral roots rather than on the taproot, the plant has probably only been colonized by native Bradyrhizobium bacteria, not the applied inoculant. While generally not common, properly inoculated peanuts can become nitrogen deficient if the soil is too acidic (pH < 5.5) due to molybdenum deficiency in the nodules (rather than the peanut plant itself). Healthy and active nodules are red or pink inside. Inactive nodules (including due to Mo deficiency) are white inside.

Broadcast ammonium sulfate (500 lb/ac of 21% = 105 N units) must be applied if the inoculant totally fails, but yield will probably not equal a properly inoculated crop. Ammonium sulfate typically provides better results than ammonium nitrate. **On new land, inoculant failure can reduce profit by $200/A even when 120 lb topdress N is applied!** If the canopy has not closed, liquid N can be dripped in the row middle of affected rows. Foliar N applications are not cost effective and often cause unacceptable leaf burn.

SEE THE FOLLOWING FERTILITY CHECK LIST FOR FERTILITY GUIDELINES

P and K: The application rate for phosphorus and potassium are determined by a soil test (see Table below). Phosphorus and potash should generally be applied to the previous crop. Peanuts respond best to residual fertilizer, and typically no additional fertilizer is needed when the previous crop has been properly managed. The recommended rate of phosphorus and potassium should be broadcasted and incorporated into the top 6 to 8 inches of soil prior to planting. Make sure not to over apply potash to peanut as excess potash in the pegging zone can potentially interfere with Ca uptake and can cause pod rot.

Phosphorus and potassium recommendations for peanut based on soil test rating.

Soil Phosphorus lb/A & Rating		Soil Potassium lb/A & Rating			
		0-28 Low	29-40 Medium	41-100 High	>100 Very High
		Pounds of N-P_2O_5-K_2O per Acre			
0-4	Very Low	0-100-80	0-100-40	0-100-0	0-100-0
5-10	Low	0-80-80	0-80-40	0-80-0	0-80-0
11-19	Medium	0-40-80	0-40-40	0-40-0	0-40-0
20-50	High	0-0-80	0-0-40	0-0-0	0-0-0
>50	Very High	0-0-80	0-0-40	0-0-0	0-0-0

Calcium: Calcium is critical for pod development and high quality peanuts. Adequate Ca uptake increases peanut yield and grade by reducing pod rot (Pythium) and preventing unfilled pods or "pops". Calcium also reduces the risk of aflatoxin. On seed peanuts, calcium is important to improve germination and seedling vigor. **Peanuts will not respond to foliar calcium application.**

Calcium can only enter the kernel by direct diffusion through the pod wall. It can not move downward into the pod through the peg phloem tissue. Also, no matter how high the soil Ca level, pods can not absorb Ca in dry soil. Irrigation is a hedge against Ca deficiency because moist soil keeps Ca available to the pods. If adequate calcium is not available in solution in the top 3" of soil when needed, we lose yield and grade. Virginia type peanuts require higher levels of soil calcium. The larger pod of a Virginia type has a lower surface to volume ratio, so the calcium concentration surrounding the pod must be higher to compensate. Small runner type peanuts usually do not respond to gypsum application when soil test calcium is over 600 lb/A. In contrast, Virginia types have often shown a significant yield response to gypsum even at soil calcium levels of 1,000 lb/A. Large runner varieties such as Ga 06G, Ga 09B, Fl-07, TifNV-High O/L and TUFRunner 297, 511 and 727 have an intermediate need for calcium compared to Virginias and small runners.

The critical period for calcium absorption begins about 20 days after pegs first enter the soil and extends for at least 40 days after that. The first 10 days of this interval are particularly critical. Peanuts first peg at about 45 DAP, so before 60 DAP we want calcium already available in soil solution. **Better early than late with land plaster.**

Apply 300 – 400 lb/A of Ca (1500 – 2000 lb land plaster) at first bloom to all Virginia type varieties. Half this amount can be used if it is applied in a band over the pegging zone. Fall liming is beneficial in maintaining at least 600 lb Ca/A and a 3:1 Ca to K ratio in the pegging zone. This Ca to K ratio is important since too much K will interfere with Ca absorption. Ideally we would

like to have an 800 lb Ca/A soil test for Virginia types if it can be obtained without driving pH over 6.4. On small-seeded runners, use 200 lb/A Ca (1000 lb land plaster) if soil Ca is less than 600 lb/ac, or if Ca to K ratio is less than 3:1. **Apply 1,000 – 1,500 lb land plaster per A on all large seeded runners and small runners grown for seed.**

Boron: Boron deficiency causes "hollow heart" – a condition where the internal surfaces of kernel halves are dark and sunken. Boron deficiency is more likely on deep sands with high pH. A soil test B level below 0.4 lb/A (0.2 ppm) indicates a potential need for boron. Apply 0.3 - 0.5 lb B/A (1.5-2.5 lb/A Solubor or 2.0-3.0 lb boric acid) in the first herbicide (PPI, PRE, or POST) or fungicide application. **Avoid boron toxicity – never exceed a seasonal total of 0.5 lb boron.**

Liquid boron applications are more convenient but not any more available to the plant than dry formulations. Make sure liquid formulation rates are adequate to meet the nutrient requirement. See table below for equivalent liquid rates.

Amounts needed to supply 0.3 – 0.5 lb elemental boron/A.

Source	Rate/A
Boric acid	1.8 – 3.0 lb
Solubor	1.5 – 2.5 lb
*Liquid 10% B	38 oz – 58 fl oz
*Liquid 5% B	2.4 quarts – 1 gal
*Liquid 1% B	3 – 5 gal

***Assumes weight of approximately 10 lb/gal.**
Excessive foliar boron is toxic to peanuts. Never exceed a seasonal total of 0.5 lb B/ac.

Manganese: Mn deficiency shows up as yellowing between leaf veins in the top of the plant. Mn deficiency is most prevalent on soils limed to 6.4 or higher. Prevent or correct with two foliar applications of 0.5 lb elemental manganese per acre (2 lb/A manganese sulfate 25% or 1.5 lb/A Tecmangam 32%, or 1.5 lb/A ManGro DF 31%). Only foliar treatment is effective and new growth will remain deficient, so repeated applications of 0.5 lb elemental manganese are recommended.

Liquid manganese applications are more convenient but not any more available to the plant than dry formulations. Make sure liquid formulation use rates are adequate to meet the nutrient requirement. See table below for equivalent liquid rates.

Amounts needed to supply 0.5 lb elemental manganese/A.

Source	Rate/A
Manganese sulfate 25%	2 lb
Tecmangam 32%	1.5 lb
ManGro DF 31%	1.6 lb
Liquid 10%	2 quarts
Liquid 5%	1 gal
Liquid 1%	5 gal

***Assumes weight of approximately 10 lb/gal.**

If planning to apply boron and manganese at the same time, make sure the products are compatible via a jar test. Some formulations can cause problems when B and Mn are mixed.

Magnesium: Peanuts have a low soil test requirement for Mg, but keep an eye on soil test Mg levels following peanut production. Use of layer-house poultry litter or excessive Ca application to peanuts from land plaster can cause Mg to leach out of the rooting zone and lead to potential deficiencies on rotational crops (corn and cotton) which have much higher soil test Mg requirements. If Mg becomes deficient on soils with pH levels which are too high to lime, you get "boxed-in" because the only affordable way to supply Mg is in dolomitic lime. Peanuts only require a 20 lb/A Mg soil test. But rotational crops require 60 lb/A Mg with at least 10% of cation exchange capacity being from Mg. At Mg levels of 120 lb/A there is no 10% CEC requirement. If the subsoil is within 15" of the surface, Mg leaching should not be a problem.

Zinc Toxicity: Peanuts are very sensitive to zinc. Beware of recommendations for Zn application in peanut rotations. Stunted, dieing plants with split stems are a sign of zinc toxicity. Check zinc levels on any new land prior to planting, especially old peach orchards, pecan orchards, fields heavily treated with poultry litter or hog lagoon waste, or fields where zinc was repeatedly applied for high yield corn production. Zinc toxicity also occurs on old building sites or around stock pens which had galvanized roofs. Soil test zinc levels of 10 lb/A can cause toxicity when the soil pH is below 6.0. Liming to increase soil pH can reduce zinc toxicity in contaminated soils. Also make sure the lime source is not contaminated with zinc in fields which already have marginal Zn levels. Fields with Zn levels of 6 – 10 lb/A should be limed to at least 6.2 pH; fields with Zn levels of 11 to 20 lb/A should be limed to at least 6.4; and fields with 20 – 30 lb Zn/A should be limed to 6.5. Given the risk of loss on a high value crop, the difficulty of achieving uniform pH and the non-uniform distribution of Zn in soils, the maximum Zn level in peanut fields should probably not exceed 30 lb/A.

Tissue Testing can be useful for diagnosis of potential nutrient deficiencies. To get a representative sample, pick 20 recently mature tetrafoliate leaves from a suspected deficient area and compare to a similar sample from plants without the deficiency symptoms. Leaves should be pulled when dry and placed in a paper bag.

When diagnosing deficiency based on tissue testing always consider soil test evidence and field observations. For example, root stunting from very low pH or herbicide injury causes micronutrient deficiencies in leaves even when the nutrients are sufficient in the soil.

Peanut Tissue Test Sufficiency Levels:

N	P	K	Ca	Mg	S
3.50 – 4.50%	0.20 – 0.50%	1.70 – 3.00%	0.50 – 2.00%	0.30 – 0.80%	0.20 – 0.35%
Fe	Mn	Zn	Cu	B	
50 – 250 ppm	20 – 350 ppm	20 – 60 ppm	5 – 20 ppm	20 – 60 ppm	

Peanut Nutrient Removal Values (lb/A):

Tissue	Weight removed	N	P_2O_5	K_2O	Ca	Mg	S	Cl	B	Cu	Fe	Mn	Zn
Nuts	4,000 lb	140	22	35	6	5	10	1	-	0.04	0.30	0.30	0.25
Vines	3,000 lb	51	11	61	50	12	7	1	0.02	0.02	0.20	0.12	-

Nutrient Removal values are occasionally requested for share crop considerations, but N removal can be misleading since the N removed was fixed by peanut and there remains a net increase in soil N for the following crop after nut harvest.

Nutrient Replacement Cost of Hay Removal: Peanut hay contains approximately 1.7% N, 0.35% P_2O_5, and 2.1% K_2O (Dr. Glen Harris, UGA Extension Fertility Specialist). Therefore, every 1,000 lb of hay removed from a peanut field contains 17 lb N, 3.5 lb P_2O_5, and 21 lb K_2O. Fertilizer prices are very volatile and must be adjusted to the current market, but assuming prices of $0.42, $0.52, and $0.37 per pound for N, P_2O_5, and K_2O respectively, each 1,000 lb of hay would have a nutrient value of $7.14 + $1.82 + $7.77 or **a nutrient replacement cost of about $16.75 per 1,000 lb bale.**

Poultry Litter can be used on rotational crops but should not be used the year peanuts are planted. Peanuts do best when using residual fertility from litter previously applied to rotational crops.

Litter nutrient content can vary widely so have the analysis from your source. Average litter analysis is about 3:3:2, so 1 ton of litter contains about 60 lb N:60 lb P_2SO_4:40 lb K_2O. Using availability coefficients of 0.6, 0.8 and 0.8, the **nutrient value of 1 ton of litter on average is about 36 lb N:48 lb P_2SO_4:32 lb K_2O** (Dr. Glen Harris, UGA Extension Fertility Specialist).

Where poultry litter is used in peanut rotations, keep an eye on soil test Zn levels and the Ca to Mg ratio. Litter from layer houses can increase soil Ca levels to the point of causing Mg leaching and Mg deficiency on rotational crops. Mg should be maintained at a minimum of 10% of CEC (cation exchange capacity) up to 100 lb soil test levels; above 100 lb Mg soil test, Mg levels are sufficient to disregard % CEC. The only affordable way to replenish soil test Mg after leaching is with dolomitic lime, however this option is not available without causing other deficiencies once soils are limed above about 6.4. In other words, very high soil Ca levels from litter are fine for peanuts, but can leave you with no remedy for Mg deficiency on corn or cotton.

PEANUT FERTILITY CHECK LIST

Component	Soil test sufficiency level (Mehlich I)	Recommendations / Comments
pH	5.8 to 6.5	Liming to a pH of 6.5 helps maximize soil Ca levels and reduce Zn toxicity risk where necessary, but Mn deficiency is more likely at high pH (see below).
Nitrogen (N)	--	Use a liquid in-furrow inoculant on all fields that have been out of peanut production for 3 years.
Sulfur (S)	--	Sulfur has not been a limiting factor on peanut on coastal plain soils. Subsoil S and gypsum ($CaSO_4$) applications can provide more than adequate S nutrition.
Phosphorus (P)	20 lb/A	Soil test sufficiency levels for P and K on peanut is much lower than other crops since peanut plants are very efficient at scavenging P and K from the soil. **Peanut P needs can be met by maintaining adequate P levels on the previous crop.** Soil Test P (lb/A) / P_2O_5 (lb/A) recommended: ≤ 4 — 100 5 – 10 — 80 11 – 19 — 40 ≥ 20 — 0
Potassium (K)	40 lb/A	The soil test sufficiency level for both P and K on peanut is much lower than other crops because the peanut plant is very efficient at scavenging these nutrients from the soil. Excessive K levels can interfere with Ca uptake by pods (see Ca comments). Soil Test K (lb/A) / K_2O (lb/A) recommended: ≤ 28 — 80 29 – 40 — 40 > 41 — 0 **Maintaining adequate fertility on rotational crops eliminates the need for K application to peanut**.
Calcium (Ca)	600 lb/A and 3:1 Ca to K ratio	Runner type peanut yields seldom respond to gypsum application when soil test Ca is 600 lb/A. However, Virginia type peanuts have responded to gypsum even when Ca = 1,000 lb/A. Apply 1,500 lb gypsum (300 lb Ca) at bloom to all Virginia type peanuts, all seed production peanuts, and to runners with < 400 lb/A soil test or a Ca to K ratio < 3:1. Apply 1,000 lb/A gypsum to runners with 400 – 600 lb/A soil test. Maintain soil pH with dolomitic lime so both Ca and Mg remain adequate. Always use gypsum on Virginia types.
Magnesium (Mg)	60 lb/A and Mg at least 10% of total CEC for rotational crops	**Soil test Mg levels above 20 lb/A are considered adequate for peanut.** However, rotational crops will require Mg soil test levels > 60 lb/A and Mg at least 10% of CEC. Use dolomitic limestone (contains about 200 lb Mg per ton) to maintain soil Mg levels.
Boron (B)	0.5 lb/A	If soil B is < 0.4 lb, apply 0.3 – 0.5 lb B/A (1.5 – 2.5 lb Solubor) as a foliar spray in the first fungicide application. Avoid toxicity from excessive B application.
Manganese (Mn)	pH / Mn lb/A: 5.8 — 6 5.9 — 7 6.0 — 8 6.1 — 9 6.2 — 10 6.3 — 10.5 6.4 — 11 6.5 — 12	If soil test Mn is below the sufficiency value at the current pH or the target pH when lime is to be applied, apply 0.5 lb Mn (2 lb manganese sulfate 25%, 1.5 lb Tecmangam, or 1.5 lb ManGro DF 31%) with both the 60 and 75 DAP fungicide applications. For pH values above those shown, the Mn sufficiency soil test value is 1 lb higher for each additional 0.1 of a pH unit.
Zinc (Zn)	Toxicity: See comments Deficiency: 1.6 lb/A	Soil test Zn levels of 10 lb/A can cause toxicity when the soil pH is below 6.0. To prevent Zn toxicity, lime to the pH targets listed. Given the risk of loss, the difficulty of achieving uniform pH, and the non-uniform distribution of Zn in soils; fields with Zn levels over 30 lb/A should probably not be planted in peanuts. Zn lb/A / Lime to pH: 6 – 10 — 6.2 11 – 20 — 6.4 21 – 30 — 6.5 > 30 — Not recommended Zn deficiency is more likely at high pH, high soil Ca, and high soil P levels. A Zn soil test level of 1.6 lb should be adequate even under these conditions.
Copper (Cu), Chlorine (Cl), Iron (Fe), Molybdenum (Mo)		There is no evidence for deficiency of these micronutrients in coastal plain peanut production. However, acidic soils can cause Mo deficiency in nodules.

Bhupinder Farmaha, James J. Camberato, and Dan Anco

GROWTH AND DEVELOPMENT

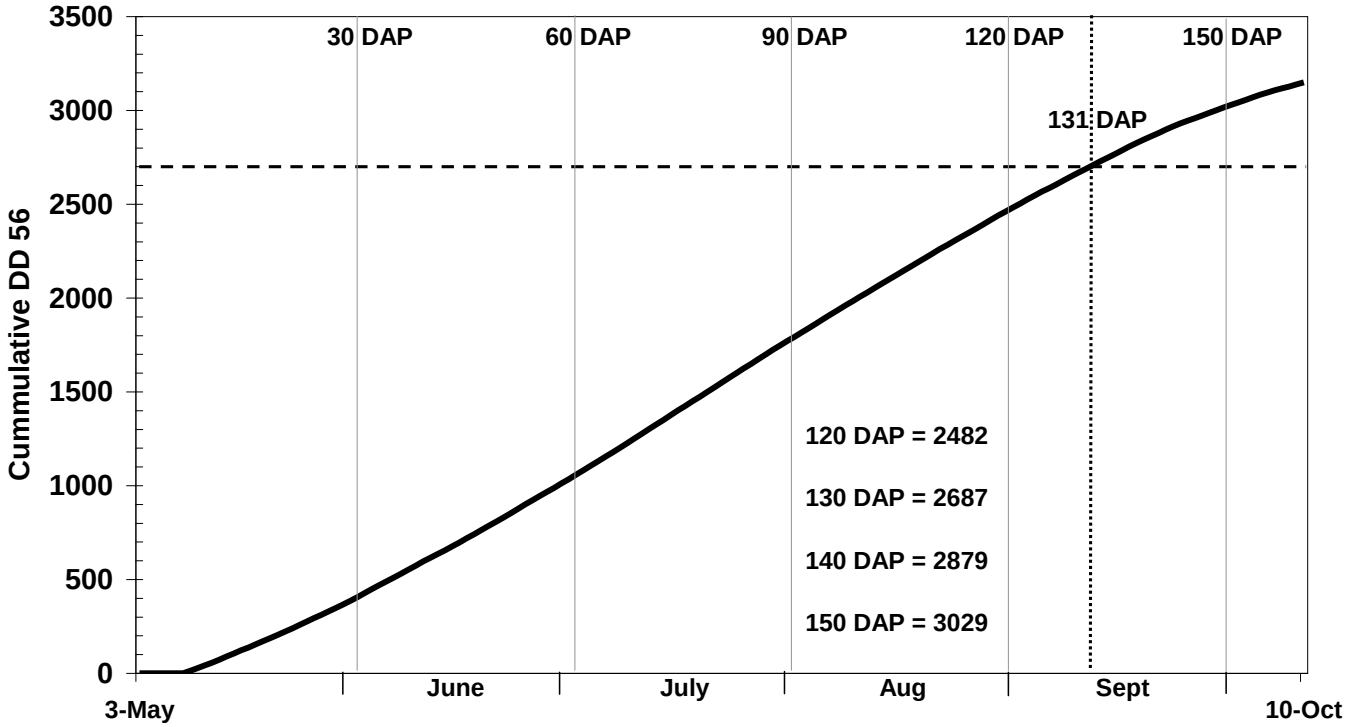
Peanut growth and development is temperature dependent, with 86°F being about optimal. High temperatures (> 95°F) slow plant growth and there is little growth below 60°F. Drought stress reduces flower production and pollination, and extreme soil surface temperatures cause peg abortion.

Peanut is an indeterminate plant capable of recovering from drought stress even during the reproductive period to rebloom and produce another crop of pegs. However optimal yields are produced when drought stress is avoided and extreme temperatures are minimized during the critical 60 – 100 DAP interval.

Temperature requirements can be thought of in degree days where the base developmental temperature (56°F) is subtracted from the average daily temperature and summed over a period of time. For example, medium maturity Virginia type peanuts such as Bailey and Sullivan require about 2,590 and 2,630 degree days (DD), respectively, whereas a somewhat later maturity Virginia type like Wynne requires about 2,700 DD.

Based on the 20-year temperature average shown below for Blackville SC, it takes about 124 days to accumulate 2700 DD if the crop emerges on 10 May. So adding 7 days for emergence, under optimal moisture conditions it should take about 131 DAP to mature a variety like Wynne at Blackville if we plant on 3 May. Many factors influence harvest maturity. Never dig based solely on days after planting. **See the harvest maturity section to determine when to dig**.

Peanut Degree-Day Accumulation
20-year average
Blackville, SC



High Temperature Effect on Pollination and Seed Set:
Peanut pollination and seed set hold up well under hot weather as long as daily maximum temperatures do not exceed 97ºF.

Even under the most ideal conditions, maximum peanut pollen viability is about 90% and maximum seed set is about 75%. Above 97º F maximum temperature there is some decline in both pollination and seed set. If the daily high temperature reaches 104ºF pollen viability can drop to around 70% and seed set to around 50%. Although standard weather station temperatures seldom reach 104ºF, keep in mind that the air temperature within the peanut canopy may be greater than that measured in weather station shelters.

PEANUT GROWTH STAGES

Approx. days after planting*	Growth Stage	Description
7	Emergence	Seedling "cracking" the ground and cotyledons visible
35	Bloom (R1)	Half of the plants with a bloom
45	Peg (R2)	Half of the plants with a visible peg
50	Swollen peg (R3)	Half of the plants with a peg tip swollen to twice the peg diameter
60	Full size pod / begin pod-fill (R4 – R5)	Half of the plants with a full size pod (R4) and a visible seed beginning to form (R5)
75	Full size seed (R6)	Half of the plants with a seed filling the pod cavity
100	Early maturity (R7)	Half of the plants with a pod having interior hull color and orange to brown mesocarp
130 – 140	Harvest maturity (R8)	70% of harvestable pods have an orange, brown, or black mesocarp, with 30% in brown / black category. For runners, 75-80% in orange, brown, black; with 40% brown/black. (based on pod blasting)
150	Over-mature (R9)	Kernels in oldest pods develop tan-brown seed coat and pegs may have deteriorated; over-mature pods have coal-black mesocarp color.

*Based on adequate soil moisture and average temperature conditions for a mid-maturity (130 – 140 day) variety at Blackville.

Peanut Management Calendar: For a brief step-by-step management timing outline based on days after planting and growth stage see the Peanut Management Calendar at the back of this book.

Growth Regulator: If vine growth control is needed for digging, Apogee (7.25 oz/A) can be applied when 50% of the laterals touch in the row middle. A second application is made at 100% row closure. Treating "marker rows" such as the middle two of a 6-row digger pass is more cost-effective than broadcast treatment, but on varieties with very high canopy biomass such as Bailey, broadcast treatment has improved yield above and beyond just the benefits of staying on the row. Effective uptake of Apogee requires addition of nitrogen to the spray solution. Use 1 pt urea/ammonium nitrate (UAN) or 1 lb ammonium sulfate (AMS) per treated acre. 1 qt/A crop oil concentrate is also recommended. Regional on-farm trials have shown 0.75× rates (5.4 oz/A) to be as effective and in cases more profitable than full application rates. SC on-farm data pending.

IRRIGATION

Irrigation is critical in peanut production because it allows us to take advantage of other inputs. Water is needed to move Ca from land plaster into the pegging zone and to keep soil Ca in solution and available to the pods.

Irrigation also improves the effectiveness of herbicides (e.g., Prowl, Sonalan, Dual, Valor, Cadre), soil fungicides and soil insecticide (Lorsban). Without timely rain or irrigation these inputs can be wasted. Irrigation lowers soil and canopy temperatures, which allows for normal peg development and greatly reduces aflatoxin risk. Irrigation also helps fungicides with white mold activity reach and protect tissues at or below the soil line.

Irrigation is also the best insect control available in that it makes the peanut plant much less susceptible to some of the most economically damaging pests: lesser cornstalk borer, burrower bugs, all foliage feeding worms and spider mites.

BASIC IRRIGATION SCHEDULING

The peanut growing season can be divided into five intervals based on the potential need for irrigation.

Timing	Rate	Significance
At-planting	0.5" if needed	Stand establishment. Pre-emergence herbicide infiltration/activity.
Emergence – 45 DAP (pegging)	0.5" if needed	Enhance post-emergence herbicide activity (e.g., Cadre).
45 – 60 DAP (pegging – early pod-fill)	0.75 – 1.0" per week (minus rain)	Land plaster infiltration and solution. Maintain pegging. Prevent lesser cornstalk borer damage.
60 – 110 DAP (pod-fill)	1.0 – 1.5" per week (minus rain)	Fill pods. Peak water use occurs at about 75 DAP. Keep calcium in soil solution. Move fungicides into the soil. Suppress corn earworm, spider mites, and some soil insects (lesser cornstalk borers, burrower bugs).
110 – 125 DAP	0.75 – 1.0" as needed to prevent wilting	Avoid late season drought stress and prevent aflatoxin. Provide adequate soil moisture for digging.

Several better alternatives than the above rule-of-thumb method are available. The **Irrigator Pro** model (http://www.ars.usda.gov/services/software/download.htm?softwareid=204) bases irrigation decisions on soil moisture sensors. The **UGA EASY** (Evaporation-based Accumulator for Sprinkler-enhanced Yield) **Pan** Irrigation Scheduler allows crop water needs to be monitored in the field using a low cost system that can be built on farm after a trip to the hardware store (http://extension.uga.edu/publications/detail.cfm?number=B1201). A third irrigation scheduling option is **UF Peanut Farm**, which uses weather data and adjusted growing degree days to estimate crop canopy cover and daily water use (http://peanutfarm.org/).

SOIL MOISTURE SENSORS

Michael T. Plumblee, Precision Agriculture Extension Specialist

Soil moisture sensors are another alternative to the checkbook type scheduling methods listed above. Some of the benefits from using an irrigation schedule to know when to irrigate are to:

- Meet the crop water demand with supplemental irrigation at appropriate timings throughout the growing season;
- Reduce the likelihood of plant stress – yield is often lost by the time stress symptoms are seen;
- Reduce over-watering crops (includes unnecessary costs); and
- Maximize pod yield, quality, and profits.

Benefits of scheduling irrigation with soil moisture sensors relative to other methods are that they:

- Allow real-time site-specific monitoring of soil moisture,
- They can assist with determining water sensitive periods throughout the growing season by accurately depicting crop water use, and
- Sensors help quantify the actual amount of rainfall that enters the soil and into the rooting zone.

Soil moisture sensors are separarted into main categories based on how they read soil moisture. The first category, **volumetric sensors** (Volumetric water content and Capacitance sensors) measure the amount of water in a given volume of soil providing a soil water content percentage. The second category, **soil water tension** (Gypsum blocks and Watermark senosrs) measure the force that the plant roots must overcome to extract water from the surrounding soil particles. These sensors provide readings in units of kilopascals (kPa) or centibars (cbar). Several differences exist between the two categories of sensors including price, accuracy, recurring subscription costs and telemetry or how data is accessed; however, both categories are suitable for irrigation scheduling in row crops.

The following are recommendations on commonly asked questions with regard to soil moisture sensors.

How many sensors do I need? At least one sensor or set of sensors (if multiple sensors are needed for multiple depths) per irrigation management zone (i.e. under each center pivot) will aid in irrigation decision making. Other scenarios where more than one sensor per irrigation management zone may be warranted include changes in soil texture across the field in areas that can be managed separately or with the use of a variable rate irrigation system. Furthermore, if a particular system takes several days to make one revolution, consider placing sensors at the start and stop of the irrigation cycle to determine if the system needs to continue on to another irrigation cycle at completion of the prior cycle.

Where do I put my sensors within the field? Several factors should be considered when placing sensors in the field to ensure a representative reading will be obtained. Consider soil texture differences; try to manage irrigation based on the soil texture that represents the majority of the field. Avoid putting sensors in areas that are very droughty or hold water during the growing season. If yield data is available, yield maps can be used as another tool to evaluate areas of the field to avoid or try to stay in with placement. Try to place sensors in the field after planting and in areas where a representative stand exists. Avoid traffic rows and minimize damage to plants when installing sensors. Due to the limitations on irrigation sprinkler packages on center pivot systems avoid placing sensors near the center point of the system. It is recommended to try to install sensors a tower or two from the end of system to ensure irrigation uniformity.

Do I install sensors in the row or row middle? Install soil moisture sensors within the planted row of plants. By installing sensors within the row accurate measurements of soil moisture within the crops rooting zone can be achieved. With all soil moisture sensors sensor to soil contact is essential in order to accurately read soil moisture. Therefore, the correct installation of soil moisture sensors is critical to the sensors working correctly.

How do I know when to irrigate based on the soil moisture sensor? Most sensor manufactuerers have generic threshold values associated with the crop and soil texture that the sensor is being placed into. Typically, these threshold values reflect allowing the plant available water of a specific soil texture to deplete 25 to 50% before irrigation is applied to recharge. On-going research at Clemson University is evaluating sensor thresholds in multiple crops to develop sensor threshold recommendations based on South Carolina soil textures and crop.

If soil water tension, Watermark, type soil moisture sensors are being utilized to schedule irrigation, Clemson University has put together a simple web-based application that can be accessed via smartphone or computer to take actual sensor readings and assist with making irrigation decisions based on predefined or manually entered thresholds. The web-based app can be found online at:
https://precisionag.sites.clemson.edu/calculators/irrigation/watermarkcalculator or www.irrometer.com/thresh.html

EVAPOTRANSPIRATION

Jose Payero, Irrigation Specialist

Evapotranspiration is the combination of crop water loss from soil evaporation and water loss from the plant by transpiration. Years of research have shown crop yield tends to be linearly related to crop evapotranspiration (ETc), although the impact depends of crop growth stage. **Figure 1** shows the linear relationships between reduction in relative evapotranspiration and reduction in relative yield for peanuts for different growth stages (from FAO). The slope of the line (ky) indicates the sensitivity to water stress for each growth stage. **Fig. 1** suggests that peanut is less sensitive to water stress during the vegetative and ripening periods (ky=0.2). These two growing periods correspond to the beginning and end of the growing season when weather conditions are usually cooler and evapotranspiration demand is considerably reduced compared to the middle of the growing season. If rain is limited during the growing season, reducing or withholding irrigation during these two periods (early and late) would normally result in the least yield reduction. Sensitivity to water stress increases significantly during the yield formation period (ky=0.6), and stress during this period could normally result in reduced pod weight, depending on severity and duration of the stress period. The highest sensitivity to water stress occurs during the

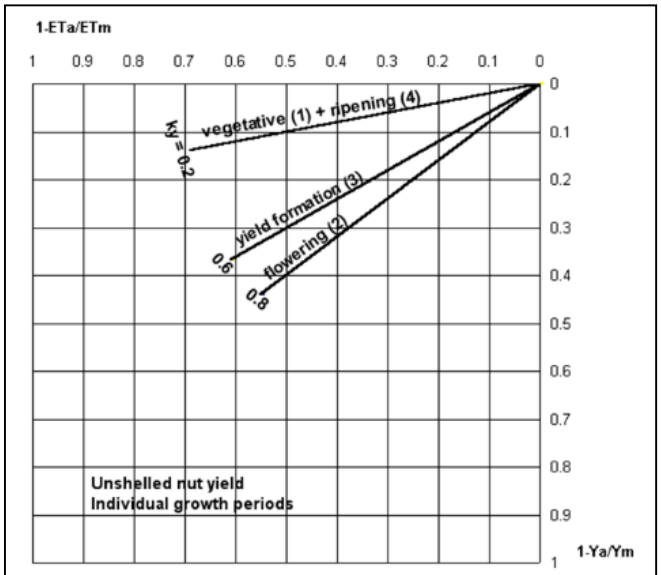


Fig. 1. Relationship between reduction in relative evapotranspiration (1-ETa/ETm) and reduction in relative yield (1-Ya/Ym) for peanut. ETa and ETm are actual and maximum crop evapotranspiration and Ya and Ym are actual and maximum yield.

flowering period (ky=0.8). Stress during flowering should be avoided if possible, since it could cause flower drop and could also reduce pollination, which could significantly reduce yield, depending on the severity and duration of stress. The average sensitivity for peanuts for the whole growing season is ky=0.7. In addition to using these ky values for irrigation timing, they can also be used to estimate crop yields from measured or calculated values of ETc.

To examine how much of an impact short periods of drought actually have on crop yields and how much of an impact could be expected by adopting irrigation, we could examine the impact of weather conditions on crop evapotranspiration, which as indicated above would have a direct impact on crop yield. As an example, we calculated the daily and cumulative evapotranspiration (ETc) under irrigated (Potential) and non-irrigated (Actual) conditions for peanuts in Barnwell County based on daily weather and rain data for the last 10 years (2009 to 2019) (**Figure 2**). This shows that, on average over the last decade, crop evapotranspiration (and therefore yield) for the dryland peanuts crop has been significantly reduced compared to the irrigated crop. The average seasonal peanuts ETc under irrigation at this location was around 22 inches, compared to 14 inches under dryland. This is a reduction in crop ETc of around 8 inches, or 36%.

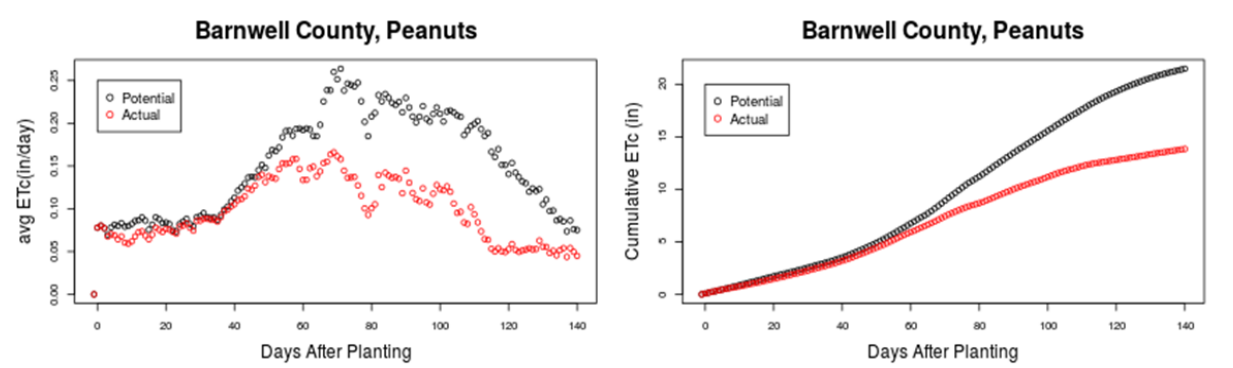


Fig. 2. Daily and cumulative crop evapotranspiration (ETc) for peanuts in Barnwell County under irrigated (Potential) and non-irrigated (Actual) conditions**.**

Similarly, **Figure 3** shows the calculated potential crop evapotranspiration (ET) (irrigated), actual crop ET (non-irrigated), and ET fraction (Actual/Potential) for peanuts in Barnwell County for each year during 2009 to 2019. It shows that during this period, rain was only enough to meet around 64% of the evapotranspiration needs of the crop.

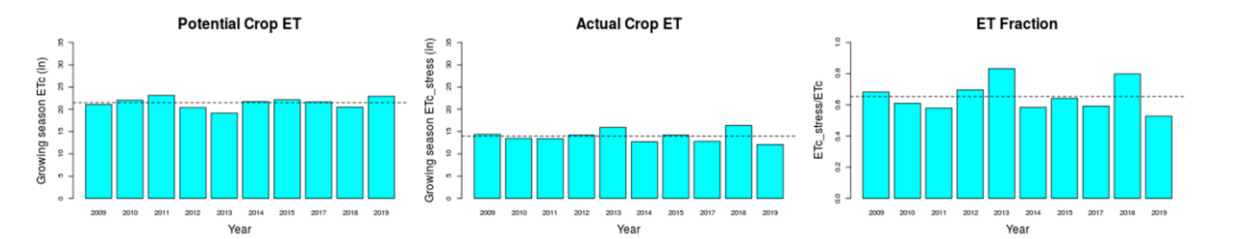


Fig. 3. Calculated potential crop evapotranspiration (ET) (irrigated), actual crop ET (non-irrigated), and ET fraction (Actual/Potential) for peanuts in Barnwell County for each year during 2009 to 2019**.**

A comparison of potential net returns of irrigated and non-irrigated peanuts was reported in the UGA peanut production guide quick reference using a yield gap of 1,300 lbs/acre between irrigated and dryland peanuts (http://gapeanuts.com/growerinfo/2018_ugapeanutguide.pdf). With this yield gap, Dr. Wesley Porter reported a Net Return Above Variable Cost (excluding land and management) of $221/acre and $63/acre for the irrigated and dryland crop, respectively. This is a difference of $158/acre or an increase of 71.5% in net returns with irrigation compared to dryland. They also reported a positive Net Return Above Variable Cost (excluding management) of $17/acre for the irrigated peanuts and a negative return (-$18/acre) for the dryland crop.

NEMATODE MANAGEMENT

John D. Mueller, Extension Plant Pathologist
Dan Anco, Peanut Specialist

Fortunately, nematodes have been a relatively minor problem on peanuts in South Carolina. Peanut root-knot (race 1) nematode is capable of causing severe losses, but economic injury has been very rare. Lesion nematode frequently causes hull injury on green peanuts and can cause yield reduction under extremely high populations. Sting nematode is rarely found in peanut fields in South Carolina, but when observed damage can be severe even at relatively low populations. Hull injury from nematode infection can also lead to increased fungal colonization and disease of pods.

Nematode management is not recommended for peanuts in South Carolina unless injury or damage to peanuts has been documented. Crop rotation and resistance are the most economical and desired management strategies for minimizing nematode problems. A nematode resistant variety (Georgia 14N, Tifguard, TifNV-High O/L) is recommended for fields with a documented history of peanut root-knot nematode injury on peanut. A fumigant like Telone II (field-wide: 6 – 9 gal/A, in-row: 4.5 – 6 gal/A) or Vapam HL (6.61 fl oz/100 linear row ft) applied 2 weeks at a depth of 12" prior to planting can be used to suppress nematodes. Alternatively, Velum Total (18 fl oz/A) can be applied in-furrow or through root-zone chemigation to manage nematodes near the taproot. Propulse (13.6 fl oz/A) can be applied at pegging (~45 DAP) to manage nematodes in the fruiting zone but must be watering in to be effective (0.10 – 0.25 in/A water). AgLogic 15G (aldicarb) (7 lb/A at-planting, with an optional pegging application at 10 lb/A) may also be used for nematode management, though current supply may be limited.

Peanuts are an excellent rotation crop to suppress Reniform, Southern Root-knot and Columbia lance nematodes in cotton.

Field Crop Hosts for Common Nematodes

Crop	**Root-knot**				**Lesion**	**Lance**	**Soybean cyst**	**Sting**	**Ring**	**Reniform**
	Southern	Peanut race 1	Peanut race 2	Northern						
Peanut	-	+	-	+	+	-	-	±	+	-
Cotton	+	-	-	-	+	+	-	+	+	+
Corn	+	+	+	+	+	+	-	+	±	-
Soybean	+	+	+	+	+	+	+	+	±	+
Tobacco	+	+	+	+	+	-	-	-	+	+
Small grain	+	+	+	+ **- (wheat)**	+	+	-	+	+	-
Grain sorghum	+	+	+	**?**	+	**?**	-	+	-	-
Tomato	+	+	+	+	+	-	-	+	+	**?**

+ indicates host; - indicates non-host; ± indicates host reaction can vary based on population.

Adapted by J.D. Mueller from: Powell, W.M. 1990. Plant susceptibility to major nematodes in Georgia. Univ. of Georgia Extension Bulletin 904; and Dickerson, O.J., J.H. Blake, and S.A. Lewis. 2000. Nematode guidelines for South Carolina. Clemson Univ. Extension Circular 703.

WEED MANAGEMENT CONSIDERATIONS

Mike Marshall, Extension Weed Specialist

Introduction

Successful weed management in peanut requires multiple timely, effective herbicide inputs and/or cultivation to reduce weed competition for space, light, water and nutrients. Tillage and seedbed preparation or effective burndown herbicides should eliminate all emerged weeds before planting. Peanuts do not compete well with weeds and should be maintained weed-free for 45 days after planting and monitored for escapes until canopy closure. Late season weeds may not be as competitive, but can interfere with fungicide and insecticide applications as well as increase harvest losses, reduce grade and replenish the weed seed bank for subsequent years.

Cultivation

Cultivation is an economical method for early season weed control in peanut and needs to be performed before canopy closure and/or when peanuts begin to peg. Mechanical cultivation is beneficial when herbicides are not effective or if organic production is required. Care should be exercised to prevent the placement of cultivated soil onto the peanut foliage.

Green Market Production

Herbicide labels typically do not address differences between peanuts grown for fresh consumption (boiling peanut market) and market-type peanuts. There are many variations in weed control programs for the many combinations of weed problems, but an example program would be: Prowl or Sonalan PPI; Dual PRE (watered-in); Gramaxone + Basagran to kill the first flush of small weeds; or Cadre (note 90 day preharvest interval); possibly followed by 2,4-DB (Butyrac) for escape broadleaves or Select for escape grasses. Take care to observe all preharvest application intervals for herbicides used in green-market peanut production.

WEED CONTROL IN PEANUT

Mike Marshall, Extension Weed Specialist

Preplant/Burndown Herbicides for Weed Management in Peanut

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Aim 2EC (*carfentrazone*)	1.0-2.0 oz	0.016-0.032 lb	14	3 days	12 hours
Aim 1.9EW					
Comments: Apply anytime before planting. For best results, apply when weeds are less than 4 inches tall (less than 3 inch rosettes). Use the higher rate for larger weeds. Add a COC (1-2 gal per 100 gals spray solution, NIS (1 qt per 100 gals spray solution), or MSO (1-2 gal per 100 gals of spray solution). Add 2,4-D to improve control of cutleaf eveningprimrose and wild radish. Tank mix partners include GLYPHOSATE or GRAMOXONE. **Rainfast interval = 6-8 hours.**					
ET 0.208EC (*pyraflufen ethyl*)	0.5-2.0 fl oz	0.0008-0.0032 lb	14	7 days	12 hours
Comments: Apply ET anytime before planting. Use a COC at 1-2% v/v (1-2 gal/100 gals). Provides control of small Palmer amaranth (less than 3 inches), annual morningglory, sicklepod, and other small broadleaf weeds. Apply in a minimum of 5 gallons spray solution per acre by air or 10 gallons spray solution per acre by ground. Do not apply more than 2.0 fl oz per acre per growing season.					
Glyphosate acid equivalent (ae)			9	7 days	4 hours
4.5 lb ae/gal	22-32 oz	0.75-1.13 lb ae			
Comments: Apply any time prior to planting to control emerged weeds. Refer to specific label for weeds controlled, application rates, adjuvants, and precautions. GLYPHOSATE alone does not adequately control cutleaf evening primrose, wild radish, or Carolina geranium. GLYPHOSATE can also be tank-mixed with VALOR or AIM to improve the spectrum of control, particularly for annual morningglories. Refer to specific comments for VALOR. Applications to wheat and rye should be made before the boot stage or after the wheat is fully headed.					
Glyphosate acid equivalent (ae)			9	---	48 hours
4.5 lb ae/gal	22-32 oz	0.75-1.13 lb ae			
+	+	+			
2,4-D ester (various)	1.0-2.0 pt	0.48-0.96 lb	4		
Comments: Apply 15 to 30 days, depending on the rate of 2,4-D, before planting to control emerged weeds. 2,4-D is the most cost-effective option available for burndown of cutleaf evening primrose. Consult 2,4-D product label for information regarding waiting intervals prior to planting following application of 2,4-D (15 [1.0 pt/A] to 30 [2.0 pt/A] days preplant interval depending on 2,4-D rate).					

Preplant/Burndown Herbicides for Weed Management in Peanut (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Glyphosate acid equivalent (ae) 4.5 lb ae/gal	22-32 oz	0.75-1.13 lb ae	9	---	12 hours
+ 2,4-D ester (various)	1.0-2.0 pt	0.5-1.0 lb	4		
+ Leadoff 33.4SG (*rimsulfuron*	1.5 oz	0.016 lb	2		
+ *thifensulfuron*)		+ 0.016 lb	2		
Comments: Apply LEADOFF after fall harvest through early spring 45 days or more before planting. A three-way tank mixture of GLYPHOSATE + 2,4-D LVE + LEADOFF provides burndown and/or residual control of Carolina geranium, cutleaf eveningprimrose, marestail, vetches, wild radish, wild mustard, ryegrass, and chickweed. If GLYPHOSATE does not contain a built-in surfactant, then add NIS at 1 qt per 100 gal or COC at 1 gal per 100 gal of spray solution plus an ammonium nitrogen liquid fertilizer (such as urea ammonium nitrate at 2 qt/A or ammonium sulfate at 2 lb/A).					
Gramoxone SL 2E (*paraquat*)	2.5-3.75 pt	0.625-0.94 lb	22	---	12 hours
Paraquat 3.0S	1.7-2.5 pt				
Comments: GRAMOXONE is a RESTRICTED USE PESTICIDE. Apply any time prior to planting to control emerged weeds. Add NIS at 1 qt per 100 gals or COC at 1 gal per 100 gals of spray mixture. GRAMOXONE will not adequately control large horseweed, swinecress, purslane speedwell, curly dock, cutleaf eveningprimrose, and wild radish. Can also be tank-mixed with VALOR (1.0-3.0 oz/A) to improve the spectrum of control and provide residual weed control.					
Valor SX 51WDG (*flumioxazin*)	1.0-3.0 oz	0.032-0.096 lb	14	60 days	12 hours
Comments: Apply up to 14 days prior to planting. Do not apply more than 3 oz/A of VALOR SX during a single growing season. No-till planters (strip-till) that incorporate the soil will result in reduced weed control in the furrow. Can be tank-mixed with other burndown herbicides to enhance speed of burndown (i.e., GLYPHOSATE or PARAQUAT).					
Warrant 3ME (*acetochlor*)	1.25-2.0 qt	1.125-1.5 lb	15	90 days	12 hours
Comments: Apply anytime before planting. WARRANT provides residual control of small seeded broadleaves (including ALS-resistant Palmer amaranth) and grasses. The optimum rate of WARRANT is 3 pt/A. Do not exceed 4.0 qt/A of WARRANT per season. Tank mix with GLYPHOSATE, PARAQUAT, or 2,4-D LVE for improved control of emerged weeds.					

Weed and Cover Crop Response to Burndown/Preplant Herbicides in Peanut[1]

	Aim/ET[2]	Glyphosate[2]	Glyphosate + 2,4-D[2]	Glyphosate + 2,4-D + Leadoff[2]	Glyphosate + Valor SX[2]	Gramoxone[2]	Gramoxone + Valor SX[2]
barley, little	F	E	E	E	E	G	G
bluegrass, annual	G	F	F	E	E	G	G
buttercups	G	E	E	E	E	E	E
chickweed, common	G	F	G	E	E	E	E
clovers	P	PF	F	G	F	G	GE
cudweed	G	E	E	E	E	FG	FG
dandelion	P	P	E	E	G	P	P
dock, curly	P	PF	G	F	G	F	P
eveningprimrose, cutleaf	GE	PF	E	E	FG	F	E
geranium, Carolina	GE	FG	E	E	E	GE	E
henbit/deadnettle	G	F	G	E	E	G	E
horseweed (marestail)	G	E	GE	GE	GE	F	GE
mustard, wild	G	FG	E	G	GE	FG	GE
pansy, field	G	F	F	---	F	G	G
pepperweed, Virginia	G	G	E	E	G	G	G
radish, wild	G	FG	GE	G	GE	G	GE
ryegrass, Italian	F	G	F	E	G	FG	FG
sorrel, red	F	E	E	G	E	E	E
spurry, corn	G	GE	GE	E	G	FG	G
swinecress	G	FG	G	E	FG	PF	PF
vetch	GE	F	E	E	FG	G	GE
wheat/rye cover crop	P	E	E	E	E	FG	G

[1]***Key to Response Ratings***: E = excellent control, 90% or better; G = good control, 80 to 90%; F = fair control 70 to 80%; P = poor control, less than 70%; --- = Insufficient Data.
[2]Herbicide rates: ET at 1.0 oz/A; glyphosate at 0.75 lb ae/A (22 oz/A of 4.5 lb ae/gal or 32 oz/A of 3.0 lb ae/gal); 2,4-D at 1-2 pt/A; Leadoff at 1.5 oz/A; paraquat at 2.0 pt/A; and Valor SX at 3.0 oz/A.

Suggested Herbicide Programs for Peanut (w/o resistant pigweed)

Application Timing	*Conventional Tillage*		*Conservation Tillage*	
	Valor[1] (non-Cadre)	**Valor + Cadre**	**Valor[1]** (non-Cadre)	**Valor + Cadre**
Preplant Burndown	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	Glyphosate+2,4-D	Glyphosate+2,4-D
PPI	Prowl *or* Sonalan	Prowl *or* Sonalan	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx
PRE	Valor + (Prowl, Dual, or Sonalan)	Valor + (Prowl, Dual, or Sonalan)	Valor + (Dual, Prowl, or Sonalan)	Valor + (Prowl, Dual or Sonalan)
Early POST (1st weed flush)	paraquat + Basagran/Storm + Dual or Warrant	paraquat + Basagran/Storm + Dual or Warrant	paraquat + Basagran/Storm) + Dual or Warrant	paraquat + Basagran/Storm + Dual or Warrant
POST	Paraquat + Basagran/Storm[2] + Dual or Warrant	Cadre[3] + Outlook or Warrant + 2,4-DB	Paraquat + Basagran/Storm[2] + Warrant	Cadre[3] + Outlook or Warrant + 2,4-DB
Late weed escapes[4]	2,4-DB	2,4-DB	2,4-DB	2,4-DB
	Ultra Blazer/Cobra	Ultra Blazer/Cobra	Ultra Blazer/Cobra	Ultra Blazer/Cobra
	Select/Poast/Fusilade			

[1]CADRE-FREE herbicide programs for growers who prefer not to use CADRE because of rotational cotton injury concerns.
[2]Apply PARAQUAT + BASAGRAN or PARAQUAT + STORM up to 28 days after peanut emergence.
[3]Apply CADRE up to 30-35 days after peanut emergence.
[4]Please follow preharvest intervals for these treatments; consult respective herbicide labels for more details.

Management Options for ALS-Resistant Palmer Amaranth in Peanut[1]

Palmer amaranth populations exist in South Carolina that are resistant to several herbicide families including acetolactate synthase (ALS) inhibitors (i.e., Cadre, Classic, Strongarm), dinitroaniline (i.e., Prowl and Sonalan), and glyphosate (Roundup). The following table is designed to assist growers in developing an herbicide system to manage and/or prevent ALS-resistant Palmer amaranth populations in peanut.

Tillage	Preplant Burndown	Preemergence	1st Weed Flush	POST2 (by 28d after Planting)
Strip Tillage	Glyphosate or paraquat + 2,4-D	Valor[3]	paraquat + Storm[3] + Dual, Outlook, or Warrant	2,4-DB + Cobra[3] *or* Ultra Blazer[3]
		Valor[3] + Dual, Outlook, Warrant, Prowl	paraquat + Storm[3] + Outlook, or Warrant	2,4-DB + Cobra[3] *or* Ultra Blazer[3]
Tillage	**Preplant Incorporated[4]**	**Preemergence**	**1st Weed Flush**	**POST (by 28d after Planting)**
Conventional Tillage	Prowl or Sonalan	Valor[3]	paraquat + Storm[3] + Dual, Outlook, or Warrant	2,4-DB + Cobra[3] *or* Ultra Blazer[3]
	Prowl or Sonalan	Valor[3] + Dual, Outlook, Warrant	paraquat + Storm[3] + Outlook, or Warrant	2,4-DB + Cobra[3] *or* Ultra Blazer[3]

[1]ALS-resistant (CADRE resistant) Palmer amaranth biotypes have been documented in South Carolina. A program multiple soil residual and postemergence herbicides with differing modes-of-action will be required for optimum control.
[2]CADRE and PURSUIT (ALS-inhibitors) may be tank mixed with COBRA or ULTRA BLAZER if control of other broadleaf weeds is needed. Because CADRE and PURSUIT are ALS-inhibitors, these tank mixtures are preferred over CADRE or PURSUIT alone.
[3]VALOR, STORM, COBRA, and ULTRA BLAZER have the same mode of action (PPO inhibitor). Do not make more than 2 applications of these herbicides per year.
[4]Use DUAL MAGNUM or OUTLOOK instead of SONALAN or PROWL if DNA-resistant Palmer amaranth biotypes are suspected and/or confirmed in your fields.

Weed Response to Soil Applied Herbicides for Peanut Weed Management[1]

	PPI[2]	PRE[3]/PPI						PRE[3]		
	Sonalan	**Dimethamid-p**	**Dual Magnum**	**Prowl**	**Pursuit**	**Strongarm**	**Solicam**	**Valor SX**	**Spartan Charge**	**Warrant**
anoda, spurred	P	P	P	P	G	FG	GE	F	G	---
barnyardgrass	E	E	E	E	F	P	E	E	F	E
beggarweed, Florida	G	F	PF	P	P	FG	G	GE	G	F
bermudagrass	P	P	P	P	P	P	P	P	P	P
citronmelon	P	P	P	P	P	G	G	G	F	---
cocklebur, common	P	P	P	P	GE	GE	PF	P	FG	P
cowpea	P	P	P	P	P	P	G	PF	P	E
crabgrass	E	E	E	E	F	P	GE	P	F	E
crotalaria, showy	P	P	P	P	P	---	---	G	---	P
croton, tropic	P	P	P	P	P	FG	G	G	G	P
crowfootgrass	E	E	G	E	P	P	G	P	F	P
dayflower, Benghal	P	GE	GE	P	G	G	PF	F	---	GE
eclipta	P	PF	PF	P	P	GE	G	GE	G	G
goosegrass	E	E	E	E	F	P	G	P	F	E
jimsonweed	P	P	P	P	G	GE	FG	G	G	F
johnsongrass, seedling	E	F	F	E	G	P	GE	P	F	P
johnsongrass, rhizome	P	P	P	P	P	P	P	P	P	P
lambsquarters, common	GE	FG	F	GE	F	GE	FG	GE	E	FG
morningglory, annual	P	P	P	P	G	FG	F	FG	E	P
nutsedge, purple	P	P	P	P	G	PF	P	P	G	P
nutsedge, yellow	P	F	FG	P	FG	PF	P	P	G	F
panicum, fall	E	G	G	E	PF	P	G	P	F	G
panicum, Texas	GE	P	P	GE	PF	PF	P	P	F	F
pigweed spp.	GE	GE	GE	G	E	E	GE	E	GE	GE
ALS-resistant	GE	GE	GE	G	P	P	GE	E	GE	GE
DNA-resistant	P	GE	GE	P	E	E	GE	E	GE	GE
poinsettia, wild	P	P	P	P	E	GE	P	---	G	G
purslane, common	GE	G	G	GE	G	---	GE	GE	F	G
pusley, Florida	E	G	G	E	G	GE	GE	GE	F	GE
ragweed, common	P	F	P	P	P	GE	G	GE	P	P
redweed	P	P	P	P	---	G	G	GE	G	---
ryegrass, annual	G	G	G	G	F	P	GE	GE	F	FG
sandbur, field	E	FG	G	E	---	P	F	P	F	FG
senna, coffee	P	P	P	P	FG	P	F	PF	G	P
sesbania, hemp	P	P	P	P	P	PF	P	G	G	P
sicklepod	P	P	P	P	P	P	F	P	P	P
sida, prickly	P	P	F	P	GE	FG	GE	GE	G	G
signalgrass, broadleaf	G	FG	FG	G	P	P	G	P	F	FG
smartweed, Pennsylvania	P	P	P	P	G	G	G	PF	E	P
spurge	P	PF	PF	P	---	---	GE	GE	G	G
starbur, bristly	P	P	P	P	F	E	PF	F	G	P
velvetleaf	P	P	P	P	PF	GE	GE	F	GE	G

[1]***Key to Response Ratings***: E = excellent control, 90% or better; G = good control, 80 to 90%; F = fair control, 70 to 80%; P = less than 70% control; --- = Insufficient Data.
[2]PPI, Preplant Incorporated.
[3]PRE, Preemergence.

Preplant Incorporated Herbicides for Weed Management in Peanut

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Intrro (*alachlor*)	3.0-4.0 qt	3.0-4.0 lb	15	70 days	12 hours
Comments: INTRRO is a RESTRICTED USE PESTICIDE. Incorporate to a depth of 1-2 inches deep in the soil zone. Excellent control of annual grasses and small seeded broadleaves. Performance on Palmer amaranth is slightly better than PROWL. Use a minimum of 3 qt/A for control of nutsedge on coarse textured soils. Do make more than two applications per year or exceed 4.0 qt/A per season. Do not feed forage or hay from treated crop.					
metolachlor (various)	1.0-1.33 pt	1.0-1.33 lb	15	90 days	24 hours
s-metolachlor (various)	1.0-1.33 pt	0.95-1.27 lb			
Comments: Controls small seeded annual grass and broadleaf weeds and may provide limited Florida beggarweed suppression. Metolachlor does control or suppress yellow nutsedge but limited activity on purple nutsedge. Incorporation with implements other than power tiller requires two passes, preferably at cross angles. Deep incorporation may reduce effectiveness. May be tank-mixed with PROWL or SONALAN for control of Texas Panicum. PPI treatments generally provide better control of nutsedge. Heavy rainfall after planting and/or non-uniform incorporation may result in crop injury expressed as delayed emergence and stunted growth of emerging plants. The generic formulations of metolachlor (PARALLEL PCS, STALWART, ME-TOO-LACHLOR) may not provide the same length of residual control as DUAL MAGNUM or EVERPREX.					
Outlook 6EC (*dimethenamid-p*)	12-21 fl oz	0.56-0.98 lb	15	---	12 hours
Comments: Controls small seeded annual grass and broadleaf weeds. Provides suppression of yellow nutsedge but not purple nutsedge. May be tank-mixed with PROWL or SONALAN for control of Texas panicum. Soil incorporated (PPI) OUTLOOK generally provide better control of yellow nutsedge.					
Prowl H_20 3.8CS (*pendimethalin*)	1.8-2.4 pt	0.75-1.0 lb	3	21 days	24 hours
Prowl 3.3EC	2.0 pt	0.95 lb			
Comments: Controls annual grasses and small-seeded broadleaf weeds. Incorporate 1-2 inches deep within 7 days of application. Incorporation with implements other than power tiller requires two passes, preferably at cross angles. Use high rate for Texas panicum or where heavy weed populations are anticipated. May be tank-mixed with OUTLOOK, DUAL, WARRANT, or PURSUIT for control of mixed infestations of annual grasses and nutsedge. Prowl can be applied immediately after planting to a freshly prepared seedbed up to 2 days after planting but before crop emergence. However, adequate incorporation in the form of 0.75" of irrigation or rainfall is needed within 48 hours for optimum activation when applied by this method. In strip-tillage production systems, the rate of PROWL should be increased to 3.0 pts/A (3.3EC) or 2.6 pts/A (3.8CS).					

Preplant Incorporated Herbicides for Weed Management in Peanut (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Pursuit 2AS (*imazethapyr*)	4.0 oz	0.063 lb	2	85 days	4 hours
Comments: Controls purple and yellow nutsedge, wild poinsettia, wild radish, pigweed, and several other annual species. Does not control Florida beggarweed or sicklepod. *Shallow* incorporation is preferred. May be tank- mixed with DUAL, PROWL, or SONALAN for improved grass control including Texas panicum. Incorporated treatments are more persistent than preemergence or postemergence applications and are more likely to result in carryover to the subsequent rotational crop.					
Sonalan HFP (*ethafluralin*)	2.0 pt	0.75 lb	3	---	24 hours
Comments: Controls annual grasses and small-seeded broadleaf weeds. Incorporate 2-3 inches deep within 2 days of application. Incorporation with implements other than power tiller requires two passes, preferably at cross angles. May be tank-mixed with OUTLOOK or DUAL for control of yellow nutsedge. SONALAN may also be applied as a surface application to freshly prepared seedbeds but must be incorporated with a 0.5 inch of rainfall or irrigation event within 2 days after application.					
Strongarm 84WDG (*diclosulam*)	0.45 oz	0.024 lb	2	30 days	12 hours
Comments: STRONGARM provides general broadleaf weed control. Incorporate into top 1-3 inches of final seedbed. Good to excellent control of many species including bristly starbur, annual morningglory, wild poinsettia, eclipta, and copperleaf. Should be tank-mixed with OUTLOOK, DUAL, SONALAN, or PROWL for grass control. Poor control of sicklepod. Control of nutsedge has been variable and inconsistent which can be improved with a tank mix of DUAL.					

Chemigation for Weed Management in Peanut

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
metolachlor (various)			15	90 days	24 hours
or					
s-metolachlor (various)			15		
or					
Prowl H2O 3.8SC (*pendimethalin*)			3		
Prowl 3.3EC					
Comments: Use at normal recommended rates. May be applied by injection through center pivot irrigation systems. Apply after planting but before crop emergence. Requires proper system calibration and safety devices (check valves, cutoff switches, etc.) to provide effective weed control and prevent environmental contamination. Accurate herbicide application through chemigation may provide superior weed control compared to conventional ground applications. Generic formulations of metolachlor (PARALLEL PCS, STALWART, ME-TOO-LACHLOR) may not provide the same length of residual control as DUAL MAGNUM.					

Preemergence Herbicides for Weed Management in Peanut

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
metolachlor (various)	1.0-1.33 pt	1.0-1.33 lb	15	90 days	24 hours
s-metolachlor (various)	1.0-1.33 pt	0.95-1.27 lb			
Comments: If DUAL was used as a PPI treatment, any additional applications of DUAL should be delayed until peanuts begin emerging (at cracking). Overlapping applications of preplant incorporated followed by at-cracking treatments generally provide improved control of Palmer amaranth, Florida beggarweed, and yellow nutsedge. Controls small seeded annual grasses and broadleaf weeds and may provide limited Florida beggarweed suppression. Controls or suppresses yellow nutsedge but not purple nutsedge. May be tank-mixed with PROWL/PENDIMAX or SONALAN for control of Texas panicum and yellow nutsedge. PPI treatments generally provide better control of yellow nutsedge. The generic formulations of metolachlor (PARALLEL PCS, STALWART, ME-TOO-LACHLOR) may not provide the same length of residual control as s-metolachlor (DUAL MAGNUM, EVERPREX). Do not apply more than 4 pt/A/year of DUAL 8E or 2.8 pt/A/year of DUAL MAGNUM or EVERPREX.					
Outlook 6EC (*dimethenamid-p*)	12-21 fl oz	0.56-0.98 lb	15	---	12 hours
Comments: OUTLOOK controls some small seeded annual grasses broadleaf weeds. Provides some suppression of sicklepod and Florida beggarweed. May be tank- mixed with DUAL, PROWL, or SONALAN for improved grass control including Texas panicum. Apply after planting and before crop and weeds emerge. May be used in a split application method. Preemergence treatments generally provide better broadleaf weed control/suppression. Do not exceed 21 oz/A/year of Outlook/Propel 6E.					
Pursuit 2AS (*imazethapyr*)	4.0 oz	0.063 lb	2	85 days	4 hours
Comments: PURSUIT controls purple and yellow nutsedge, wild poinsettia, wild radish, Palmer amaranth, and several other annual species. Does not provide control of Florida beggarweed or sicklepod. May be tank- mixed with DUAL, PROWL/PENDIMAX, or SONALAN for improved annual grass control including Texas panicum. Rainfall is needed for proper activation of PURSUIT with a surface application.					
Sonalan HFP (*ethafluralin*)	2.0 pt	0.75 lb	3	---	24 hours
Comments: SONALAN may be applied as a surface application to freshly prepared seedbeds but must be incorporated by 0.5-1.0" of rainfall or irrigation within 2 days after application. Controls annual grasses and small-seeded broadleaf weeds. May be tank-mixed with OUTLOOK or DUAL for control of yellow nutsedge.					

Preemergence Herbicides for Weed Management in Peanut (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Strongarm 84WDG (*diclosulam*)	0.45 oz	0.024 lb	2	30 days	12 hours
Comments: Apply STRONGARM after planting up to cracking. STRONGARM provides good to excellent control of many species including bristly starbur, wild poinsettia, eclipta, Benghal dayflower, and annual morningglories. STRONGARM is not effective until rainfall or irrigation event of at least 0.25 to 0.5 inches has occurred. Should be tank-mixed with a grass herbicide, such DUAL, PROWL, SONALAN, OUTLOOK. Poor control of sicklepod. Nutsedge control can vary depending on weed density or environmental conditions (especially soil moisture).					
Spartan Charge 3.5SL (*sulfentrazone* + *carfentrazone*)	3.0-5.0 fl oz	0.074-0.123 lb + 0.008-0.014 lb	14 + 14	None	12 hours
Comments: Apply SPARTAN CHARGE prior to planting or up to 3 days after planting. SPARTAN CHARGE will provide postemergence activity on weeds (less than 3 inches in height) present at the time of application. Sprayer calibration and good agitation are essential with application of SPRATAN CHARGE. Avoid excessive overlap of spray swaths. Excellent control of morningglory, Palmer amaranth, lambsquarters, and yellow/purple nutsedge. Do not apply SPARTAN CHARGE after crop emergence, at cracking, or if seedling is close to the soil surface as undesirable crop response may occur. Tank mix with DUAL MAGNUM, PROWL, SONALAN, or OUTLOOK for improved grass control. Do not apply more than 7.0 fl oz/A of SPARTAN CHARGE per 12-month period. Do not apply SPARTAN CHARGE to soils classified as sands with less than 1.0% organic matter. Do not irrigate peanuts after a SPARTAN CHARGE application with water pH higher than 9. Do not irrigate peanuts during cracking. Do not feed treated peanut forage or peanut hay to livestock.					
Valor SX 51WDG (*flumioxazin*)	3.0 oz	0.096 lb	14	60 days	12 hours
Comments: Apply VALOR immediately after planting but no later than 2 days after planting. Significant injury can occur if VALOR is incorporated or applied 3 or more days after planting. Plant peanuts at least 1.5" deep. DO NOT irrigate when peanuts are cracking. Rainfall or irrigation at cracking will cause temporary crop injury that should not result in reduced yields if applied according to the label. VALOR will provide good to excellent control of many broadleaf weeds including Florida beggarweed, *ALS-Resistant Palmer amaranth*, and tropic croton. VALOR will not control annual/perennial grasses, sicklepod, nutsedge, and cocklebur. VALOR can be tank-mixed with PROWL, SONALAN, DUAL MAGNUM, or OUTLOOK. Can also be used in strip-tillage peanut production systems in combination with glyphosate or paraquat to improve burndown control plus residual. Be sure to completely clean spray equipment THE SAME DAY OF USE as directed on the herbicide label. Do not let VALOR sit in the tank overnight.					
Warrant 3ME (*acetochlor*)	1.25-2.0 qt	1.125-1.5 lb	15	90 days	12 hours
Comments: WARRANT provides residual control of small seeded broadleaves (including ALS-resistant Palmer amaranth) and grasses. Apply after planting but before weeds germinate. The optimum rate of WARRANT is 3 pt/A. Do not exceed 4.0 qt/A of WARRANT per season. Tank mix with GLYPHOSATE or PARAQUAT to control weeds that have germinated since planting. Environmental conditions that follow application of WARRANT including cold, wet soils or saturated conditions from excessive rain may result in crop injury. WARRANT applied preemergence to peanut may be tank mixed with PROWL, SONALAN, STRONGARM, TREFLAN, or VALOR.					

Weed Response to Postemergence Herbicides for Peanut Weed Management[1]

	Paraquat	Paraquat + Storm	Paraquat + Basagran	Basagran	Cadre	Classic	Cobra	Fusilade DX	Poast/Poast Plus	Pursuit	Select/MAX	Storm	Ultra Blazer	2,4-DB
anoda, spurred	P	G	FG	G	G	F	F	P	P	F	P	F	P	P
barnyardgrass	G	G	G	P	G	P	G	GE	GE	G	GE	G	G	P
beggarweed, Florida	GE	GE	GE	P	FG	FG	PF	P	P	P	P	P	P	P
bermudagrass	P	P	P	P	P	P	P	G	FG	P	G	P	P	P
citromelon	F	G	F	P	G	P	G	P	P	P	P	F	F	G
cocklebur, common	G	GE	G	E	E	E	GE	P	P	E	P	GE	G	GE
cowpea	FG	F	F	P	PF	F	PF	P	P	P	P	PF	PF	PF
crabgrass	FG	FG	FG	P	G	P	P	G	GE	PF	GE	P	P	P
crotalaria, showy	F	FG	F	P	F	---	E	P	P	F	P	GE	E	F
croton, tropic	P	G	P	P	P	P	G	P	P	P	P	GE	G	P
crowfootgrass	G	G	G	P	G	P	P	FG	FG	P	G	P	P	P
dayflower, Benghal	G	G	G	G	FG	F	---	P	P	FG	P	F	P	P
eclipta	PF	FG	F	G	PF	P	FG	P	P	P	P	G	FG	P
goosegrass	FG	FG	FG	P	F	P	P	G	G	P	G	P	P	P
jimsonweed	P	F	E	E	E	GE	GE	P	P	FG	P	E	E	G
johnsongrass, seedling	G	G	G	P	FG	P	P	GE	GE	GE	GE	P	P	P
johnsongrass, rhizome	P	P	P	P	FG	P	P	GE	FG	G	G	P	P	P
lambsquarters, common	F	FG	F	F	PF	P	P	P	P	P	P	G	G	F
morningglory, annual	P	F	FG	F	G	G	G	P	P	G	P	G	GE	G
nutsedge, purple	PF	F	F	P	GE	PF	P	P	P	G	P	P	P	P
nutsedge, yellow	PF	FG	FG	G	GE	G	P	P	P	FG	P	F	P	P
panicum, fall	G	G	G	P	G	P	P	GE	GE	F	E	P	F	P
panicum, Texas	GE	GE	GE	P	FG	P	P	G	GE	PF	GE	P	P	P
pigweed spp.	F	GE	FG	P	E	F	E	P	P	E	P	GE	E	F
ALS-resistant	F	GE	FG	P	P	P	E	P	P	P	P	GE	E	F
poinsettia, wild	F	G	GE	P	E	P	GE	P	P	PF	P	G	GE	P
purslane, common	G	G	G	G	PF	P	E	P	P	PF	P	GE	G	G
pusley, Florida	P	P	P	P	P	F	G	P	P	P	P	E	E	P
ragweed, common	PF	G	F	F	F	G	E	P	P	P	P	GE	E	F
sandbur, field	F	FG	FG	P	G	P	PF	G	G	---	G	P	P	P
senna, coffee	F	E	E	G	G	P	FG	P	P	F	P	G	E	F
sesbania, hemp	F	G	FG	P	P	E	G	P	P	P	P	E	E	P
sicklepod	GE	GE	G	P	GE	G	P	P	P	P	P	P	P	F
sida, prickly	F	G	G	G	G	P	G	P	P	PF	P	G	P	P
signalgrass, broadleaf	G	G	G	P	G	P	PF	G	GE	G	GE	P	P	P
smartweed, Pennsylvania	GE	G	G	GE	FG	P	GE	P	P	GE	P	GE	GE	P
starbur, bristly	PF	FG	F	G	F	G	GE	P	P	PF	P	G	G	PF
velvetleaf	F	FG	G	G	G	GE	G	P	P	PF	P	FG	PF	P

[1]***Key to Response Ratings***: E = excellent control, 90% or better; G = good control, 80 to 90%; F = fair control, 70 to 80%; P = poor control, less than 70% control; --- = Insufficient Data.

Early Postemergence Herbicides for Weed Management in Peanut (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Pursuit 2AS (*imazethapyr*)	4.0 fl oz	0.063 lb	2	85 days	4 hours

Comments: PURSUIT provides effective control of nutsedge, wild poinsettia, wild radish, bristly starbur, prickly sida, and several other annual species. Weed size is especially critical for effective control of nutsedge, bristly starbur, and prickly sida. If weeds are emerged, NIS or COC should be included. May be tank-mixed with GRAMOXONE or 2,4-DB for broader spectrum control of emerged weeds. Do not graze or feed treated peanut forage, vines, hay, or straw to livestock.

Gramoxone SL 2S (*paraquat*)	8.0-16.0 fl oz	0.125-0.25 lb	22	None	12 hours
paraquat 3.0 S	5.4-10.8 fl oz	0.127-0.25 lb			

Comments: GRAMOXONE is a RESTRICTED USE PESTICIDE. Provides effective contact control of sicklepod, morningglory, Florida beggarweed, Texas panicum, and many other problem weeds. When used alone, paraquat is not effective on smallflower morningglory, prickly sida, wild radish, or tropic croton. Apply anytime up to 28 days after ground crack. GRAMOXONE may be tank mixed with DUAL MAGNUM, PURSUIT, BASAGRAN, 2,4-DB, or STORM. Include NIS at 1 qt per 100 gal spray solution with all paraquat treatments (except DUAL MAGNUM tank mixes). Do not make more than 2 applications per season. Do not apply a total of more than 10.8 oz/A per year (PARAZONE/FIRESTORM) or 16.0 oz/A per year (GRAMOXONE SL). Peanut foliage injury is usually temporary. Conditions of high humidity, wet foliage, and/or wet soils can result in greater foliage burn. Thrips injury retards crop recovery. The success of early postemergence sprays can be greatly improved by 1) applying in a minimum spray volume of 15 GPA; 2) using spray nozzles that produce small droplets; 3) decreasing ground speed; and 4) using lower spray pressures (30 PSI). **Rainfast interval is 30 minutes.**

Gramoxone SL 2E (*paraquat*)	8.0-16.0 fl oz	0.125-0.25 lb	22	None	12 hours
paraquat 3S	5.4-10.8 fl oz	0.127-0.25 lb			
+	+	+			
Basagran 4.0 S (*bentazon*)	1.0 pt	0.5 lb	6	50 days	48 hours

Comments: GRAMOXONE is a RESTRICTED USE PESTICIDE. Provides effective, broad-spectrum early season weed control. Provides some suppression of yellow nutsedge. Generally, reduces peanut injury compared to other paraquat treatments. The lower rate of BASAGRAN (0.5 pt/A) is usually sufficient to reduce peanut foliar burn and provide control of smallflower morningglory. The higher rate of BASAGRAN (1.0 pt/A) is necessary for control of weeds such as bristly starbur and prickly sida. Apply anytime up to 28 days after ground crack. Include NIS at 1 qt per 100 gal spray solution with all paraquat treatments. The success of early postemergence sprays can be greatly improved by 1) applying herbicides in a minimum spray volume of 15 GPA; 2) using spray nozzles that produce small droplets; 3) decreasing ground speed; and 4) using lower spray pressures (30 PSI). DUAL MAGNUM (or generic metolachlors) or WARRANT can be used in combination with this treatment to provide residual control of pigweed. A NIS is **not** recommended if DUAL MAGNUM or generic metolachlors are tank mixed with GRAMOXONE + BASAGRAN. **Rainfast interval is 4 hours.**

Early Postemergence Herbicides for Weed Management in Peanut (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Gramoxone SL 2S (*paraquat*)	8.0-16.0 fl oz	0.125-0.25 lb	22	None	12 hours
paraquat 3S + Storm 4EC (*bentazon* + *acifluorfen*)	5.4-10.8 fl oz + 1.0-1.5 pt	+ 0.33-0.5 lb + 0.17-0.25 lb	6 14	75 days	48 hours

Comments: GRAMOXONE is a RESTRICTED USE PESTICIDE. Provides effective, broad-spectrum early season weed control. Provides some suppression of yellow nutsedge. The tank mix of DUAL MAGNUM/EVERPREX/OUTLOOK improves contact activity and provides residual weed suppression/control but could result in increased crop response. Apply anytime up to 28 days after cracking. Include NIS at 1 qt/100 gal spray solution with all *paraquat* tank mixtures (Except for *s-metolachlor* tank mixes). The success of early postemergence sprays can be greatly improved by 1) applying herbicides in a minimum spray volume of 15 GPA; 2) using flat fan nozzles; 3) decreasing ground speed; and 4) using lower spray pressures (30 PSI). DUAL MAGNUM/EVERPREX (or generic *metolachlor*) or WARRANT can be used in combination with this treatment to provide residual control of pigweed. A NIS is not recommended if DUAL MAGNUM/EVERPREX or generic *metolachlors* are used with GRAMOXONE + STORM. **Rainfast interval is 4 hours.**

Gramoxone SL 2S (*paraquat*)	8.0-16.0 fl oz	0.125-0.25 lb	22	None	12 hours
paraquat 3S + Pursuit 2AS (*imazethapyr*)	5.4-10.8 fl oz + 4.0 fl oz	+ 0.063 lb	2	85 days	4 hours

Comments: GRAMOXONE is a RESTRICTED USE PESTICIDE. Provides effective, broad-spectrum early season weed control. Provides some suppression of yellow nutsedge. Apply anytime up to 28 days after ground crack. Include NIS at 1 qt/100 gal spray solution with all PARAQUAT treatments. The success of "at-crack" sprays can be greatly improved by 1) applying herbicides in a minimum spray volume of 15 GPA; 2) using spray nozzles that produce small droplets; 3) decreasing ground speed; and 4) using lower spray pressures (30 PSI). DUAL MAGNUM (or generic *metolachlor*) or WARRANT can be used in combination with this treatment to provide residual control of pigweed. A NIS is not recommended if *s-metolachlor* is tank mixed with *paraquat* + PURSUIT. **Rainfast interval is 4 hours.**

metolachlor (Stalwart, Parallel PCS, Me-Too Lachlor)	1.0-1.33 pt	1.0-1.33 lb	15	90 days	24 hours
s-metolachlor (Dual Magnum 7.62EC, EverPreX 7.62EC)	1.0-1.33 pt	0.95-1.27 lb			

Comments: At-crack early postemergence applications provide more consistent control of non-emerged broadleaf weeds including Palmer amaranth, crabgrass, and Florida pusley. Apply DUAL MAGNUM/EVERPREX at 1.33 to 2.0 pt/a for improved suppression of Florida beggarweed. May be tank-mixed with PARAQUAT treatments for improved contact activity and for suppression/control of problem broadleaf weeds and nutsedge. May also be tank-mixed with BASAGRAN, BASAGRAN + 2,4-DB, or STORM. DO NOT USE DUAL II MAGNUM OR CINCH FORMULATIONS AFTER PEANUT EMERGENCE. Do apply more than 2.67 pts/A/season of PARALLEL PCS, STALWART, ME-TOO-LACHLOR or 2.67 pts/A/season of DUAL MAGNUM or EVERPREX. The generic formulations of metolachlor (PARALLEL, PARALLEL PCS, STALWART, ME-TOO-LACHLOR) have not provided the same length of residual control of certain weeds as similar rates of s-metolachlor containing herbicides, such as DUAL MAGNUM or EVERPREX. Do not graze or feed peanut forage or fodder to livestock for 30 days following application.

Postemergence Herbicides for Weed Management in Peanut (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Basagran 4S (*bentazon*)	1.5-2.0 pt	0.75-1.0 lb	6	12 days	48 hours
Comments: Apply BASAGRAN from cracking through pegging for postemergence control of yellow nutsedge, cocklebur, bristly starbur, smallflower morningglory, prickly sida, and other small broadleaf weeds. Treat when weeds are small and actively growing. Adjust rate according to weed size as noted on label. Two applications may be required for control of yellow nutsedge. For yellow nutsedge, include crop oil concentrate at 1 qt/A. Infurrow treatments of insecticides and nematicides may predispose peanuts to injury from BASAGRAN. Do not graze treated peanut fields for at least 50 days after last BASAGRAN application. BASAGRAN may be tank mixed with CADRE, HEADLINE SC, OUTLOOK, POAST, PRIAXOR, PURSUIT, 2,4-DB (amine formulation only), COBRA, GRAMOXONE, ULTRA BLAZER. Do not include UAN solution or AMS with the tank mix of BASAGRAN, POAST, and ULTRA BLAZER. **Rainfast interval is 4 hours.**					
Cadre 2AS (*imazapic*)	4.0 fl oz	0.063 lb	2	90 days	12 hours
Impose 2AS					
Comments: CADRE provides excellent control of many broadleaf and grass weeds and both purple and yellow nutsedge. Add a NIS (1 qt per 100 gal of spray solution) or COC (1 qt/A) to the spray mixture. Apply as an early postemergence treatment when weeds are less than 2-3 inches in height. Under conditions of heavy weed pressure, applications of Cadre 10-14 days following an at-cracking treatment (*paraquat* combination) has resulted in superior weed control. May be tank mixed with 2,4-DB for enhanced morningglory and sicklepod control. Tank mixing PARAQUAT with CADRE may result in increased peanut injury. Use of BASAGRAN in combination with CADRE may result in reduced weed control. Do not tank-mix CADRE with a postemergence grass herbicides. **Rainfast interval is 3 hours.**					
Classic 25DF (*chlorimuron*)	0.5 oz	0.008 lb	2	45 days	12 hours
Comments: Apply CLASSIC 60 days after planting for mid-season Florida beggarweed, sicklepod, and bristly starbur control or suppression. Under favorable conditions--good soil moisture, moderate temperatures, and high relative humidity. Avoid applications during periods of drought/heat stress because of potential for poor weed control and crop injury. Applications of CLASSIC may not provide acceptable control of Florida beggarweed that has escaped control or is regrowing after a previous application of CADRE. Include nonionic surfactant at 1 qt/100 gals spray solution with all CLASSIC applications. Addition of ammonium sulfate (2 lb/A) or feed grade urea (2 gal/A) improves activity on bristly starbur. APPLICATIONS OF CLASSIC APPLIED FROM 60 DAYS AFTER CROP EMERGENCE TO 45 DAYS BEFORE HARVEST MAY CAUSE AN INCREASE IN TSWV SYMPTOMS. Temporary yellowing of peanut foliage and reduction of canopy growth may occur. Can be tank-mixed with BRAVO or 2,4-DB. However, combinations of CLASSIC + 2,4-DB result in significantly more foliar crop injury compared to CLASSIC alone. Do not use CLASSIC on Spanish or Georgia-06G peanut varieties. Do not use CLASSIC with the combination of Classic + 2,4-DB on Southern Runner. Do not tank-mix CLASSIC with elemental sulfur. Do not graze treated field or harvest for forage or hay. **Rainfast interval is 1 hour.**					
Cobra 2EC (*lactofen*)	12.5 oz	0.20 lb	14	45 days	12 hours
Comments: Apply COBRA after peanuts reach the 6th true leaf growth stage. Use a COC at 1% v/v (1 gal/100 gals). Provides good control of small, actively growing pigweeds, morningglories, sicklepod, ragweed, copperleaf, wild poinsettia, and eclipta. COBRA can be tank-mixed with BASAGRAN, CADRE, PURSUIT, CLASSIC, DUAL MAGNUM, INTRRO, OUTLOOK, SELECTMAX, and 2,4-DB. Do not exceed 25 fl oz/A of COBRA per season. Do not make sequential applications of COBRA within 14 days of the first application. Do not make more than two COBRA applications per season. Do use treated peanut foliage and vines for feed or forage. **Rainfast interval is 30 minutes.**					

Postemergence Herbicides for Weed Management in Peanut (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Fusilade DX 2EC (*fluazifop-p-butyl*)	8.0-24.0 fl oz	0.125-0.375 lb	1	40 days	12 hours
Comments: For the control of annual and perennial grass weeds. Do not apply more than 48 oz/A/season. Do not apply more than 24 oz/A/application. Wait a minimum of 14 days between applications. Use a NIS at 1 qt or COC at 1 gal per 100 gal of spray solution. FUSILADE DX also has some activity on bristly starbur. Do not feed treated plants to livestock or harvest for livestock feed. **Rainfast interval is 1 hour.**					
Poast 1.5EC (*sethoxydim*)	1.0-1.5 pt	0.19-0.28 lb	1	40 days	12 hours
Poast Plus 1.0EC	1.5-2.25 pt				
Comments: For control of annual and perennial grasses. Apply when annual grasses are small (1-6 inches) and actively growing. Under favorable conditions, large Texas panicum can be controlled. For perennial grass control, two applications are usually required for satisfactory control. Always POAST with 1 qt/A COC. Tank-mixtures with other broadleaf herbicides, such as 2,4-DB, STORM, BLAZER, or BASAGRAN may reduce grass control. Do not apply foliar sulfur 14 days before or after application to minimize risk of peanut foliage burn. Reduced spray volumes (10 GPA) may improve grass control. Do not allow livestock to graze or be fed treated vines. **Rainfast interval is 1 hour.**					
Pursuit 2AS (*imazethapyr*)	4.0 fl oz	0.063 lb	2	85 days	4 hours
Comments: Generally, PURSUIT should be used early postemergence when weeds are extremely small. Controls pigweeds, morningglories, bristly starbur, cocklebur, and spurge. Compared to PPI, PRE, and At Crack/Early POST treatments, PURSUIT POST applications are weak on nutsedge, Florida pusley, Texas panicum, and goosegrass. PURSUIT may be tank-mixed or used in sequence with herbicides approved for use in peanut. Postemergence control of escaped wild poinsettia is greatly enhanced in combination with PARAQUAT. Do not graze or feed treated peanut forage, vines, hay, or straw to liverstock. **Rainfast interval is 1 hour.**					
Select 2EC (*clethodim*)	6.0-16.0 fl oz	0.094-0.25 lb	1	40 days	24 hours
Select MAX 0.97EC	9.0-16.0 fl oz				
Comments: For control of annual and perennial grasses. Apply SELECT/SELECT MAX when grasses are small (<6 inches) and actively growing. Under favorable conditions, large Texas panicum and bermudagrass can be effectively controlled. Heavy bermudagrass pressure or larger Texas panicum will require a 2nd application. When tank-mixing with a broadleaf herbicide or controlling perennial grasses, increase rates (8-16 ozs/A-SELECT; 16-32 oz/A-SELECT MAX). Do not apply more than 32 oz/A/year (SELECT) or 64 oz/A/year (SELECT MAX). Always apply with a COC at 1% v/v (SELECT/ARROW). A NIS (0.25% v/v) can be used with SELECT MAX to reduce crop injury potential but may reduce grass control. Apply SELECT at 16-32 fl oz/A or SELECT MAX at 32-64 fl oz/A for suppression of annual and perennial grasses exceeding recommended heights to enhance harvest efficiency. May be tank-mixed with BASAGRAN, BLAZER, STORM, ORTHENE, DANITOL, or FOLICUR. Do not tank-mix with chlorothalonil products or reduced grass control can occur. **Rainfast interval is 1 hour.**					
Storm 4S (*bentazon* + *acifluorfen*)	1.5 pt	0.5 + 0.25 lb	6 + 14	75 days	48 hours
Comments: STORM controls actively growing (<4 inches) annual morningglories, sicklepod, Palmer amaranth, cocklebur, prickly sida, ragweed, eclipta, tropic croton, and several other broadleaf weeds with less injury than BLAZER alone. Do not make a sequential application of ULTRA BLAZER or STORM within 15 days following the initial application of STORM. Include NIS or COC. STORM may be tank mixed with 2,4-DB and PARAQUAT. Do not graze or feed treated peanut forage, vines, hay, or straw to liverstock. **Rainfast interval is 4 hours.**					

Postemergence Herbicides for Weed Management in Peanut (cont)

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Strongarm 84WDG (*diclosulam*)	0.45 oz	0.024 lb	2	30 days	12 hours

Comments: Apply STRONGARM from cracking to the initiation of flowering (beginning bloom, R1), but no later than 30 days after planting. The optimum growth stage to apply STRONGARM for Benghal dayflower control is at the 1- to 2-leaf growth stage and actively growing. Add a non-ionic surfactant at 1 qt per 100 gal of spray solution for optimum activity. STRONGARM maybe tank mixed with other postemergence herbicides labeled for peanut. Do not apply more 0.45 oz/A of STRONGARM from all use patterns (preemergence, preplant incorporated, and postemergence applications) per season. STRONGARM may cause temporary yellowing or chlorosis of peanut foliage after application and symptoms will vary according to environmental and crop growth factors.

Ultra Blazer 2S (*acifluorfen*)	0.5-1.5 pt	0.125-0.38 lb	14	75 days	48 hours

Comments: ULTRA BLAZER provides control of morningglories, tropic croton, wild radish, and wild poinsettia. Adjust use rate according to weed size and species as noted on the label. Use 1.0 pt/A or less for control of highly sensitive species, such as hemp sesbania and showy crotalaria. Slight to moderate peanut foliage burn may result. Do not apply more than 2 pt/A per season as a postemergence treatment. Apply with NIS at 1 qt/100 gal spray solution (0.25% v/v). Allow a minimum of 15 days between sequential applications. May be tank-mixed with 2,4-DB (1 pt/A). ULTRA BLAZER + 2,4-DB tank mixture is generally more injurious to peanuts than either product alone. May be tank-mixed with BASAGRAN for control of broadleaf weeds such as morningglories, cocklebur, and prickly sida. Do not use treated peanut vines for feed or forage. **Rainfast interval is 4 hours.**

Warrant 3ME (*acetochlor*)	1.25-2.0 qt	1.125-1.5 lb	15	90 days	12 hours

Comments: WARRANT provides residual control of small seeded broadleaves (including ALS-resistant Palmer amaranth) and grasses. Apply after crop emergence up to right before flowering but before weeds germinate. The optimum rate of WARRANT is 3 pt/A. Do not exceed 4.0 qt/A of WARRANT per season. Allow at least 7 days between sequential applications. WARRANT may be tank mixed with GRAMOXONE, FIRESTORM, PARAZONE, CADRE, COBRA, PARAQUAT, STORM, ULTRA BLAZER, or 2,4-DB to expand spectrum of weed control or for control of emerged weeds at time of application. Environmental conditions that follow application of WARRANT including cold, wet soils or saturated conditions from excessive rain may result in crop injury.

Zidua 0.85WG (*pyroxasulfone*)	1.5-2.1 oz	0.080-0.112 lb	15	None	12 hours

Comments: Apply ZIDUA to peanuts from at-cracking to the 1st trifoliate growth stage through pod formation for residual control of weeds germinating after application. Tank mix partners include, but are not limited to, BASAGRAN, CADRE, OUTLOOK, POAST, PROWL H2O, PURSUIT, and/or PARAQUAT. ZIDUA may be tank mixed or applied sequentially with fungicide and/or insecticide products labeled for peanuts. If an additional application of ZIDUA is needed during the growing season, then the maximum combined rates from all applications can not exceed 5.0 oz/A per season. Sequential applications need to be separated by at least 14 days.

2,4-DB 1.75S	14-28 fl oz	0.19-0.38 lb	4	45-60 days*	48 hours
2,4-DB 2.0S	13-26 fl oz	0.20-0.40 lb			

Comments: Apply 2,4-DB as an over-the-top treatment for broadleaf weed control. Use rates and application timing varies by specific product label. For control of annual morningglories, sicklepod, prickly sida, cocklebur, and hemp sesbania, apply 2,4-DB when weeds are less than 4 inches in height. A second application may be necessary, but do not make more than 2 applications per season. Do not apply if peanuts are under drought stress. 2,4-DB may be applied from 2 weeks after planting up to 12 weeks after planting. 2,4-DB may be tank mixed with fungicides labeled for peanuts. Do not tank-mix with postemergence grass herbicides. Do not feed treated peanut vines or peanut hay to livestock. *Refer to product label for specific preharvest interval. **Rainfast interval is 1 hour.**

Non-Selective Applicator for Peanut

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Gramoxone 2SL (*paraquat*)	0.67 pt	0.25 lb	22	15 days	12 hours

Comments: Paraquat is a RESTRICTED USE PESTICIDE. Mix 1 part GRAMOXONE with 1 to 1.5 parts water to prepare a 40-50% solution. Add non-ionic surfactant at 0.25% v/v of the finished volume. Set equipment for an application rate of 2 pt/A of the herbicide:water mixture. Apply through a non-selective applicator, such as recirculating rope or carpet roller, for suppression and/or control of ALS-resistant Palmer amaranth and/or to prevent seed production (application must be made before appearance of seed heads). Make application when target weed(s) have sufficient height differential with the peanut canopy and set equipment to minimize dripping. Low ground speed (5 mph or less) enhances coverage and activity of GRAMOXONE. Do not exceed 0.5 lb ai/A (1 qt/A) total for the entire growing season from all *paraquat* applications. Do not allow livestock to graze in treated areas. Do not feed hay or threshings from treated fields to livestock. **Rainfast interval is 30 minutes**.

Harvest Aids for Peanut

Herbicide	Rate/Acre Broadcast		Mode of Action	Preharvest Interval	Restricted Entry Interval
	Formulation	Active Ingredient			
Aim 2EC (*carfentrazone*)	1.0-2.0 oz	0.016-0.031 lb	14	7 days	12 hours

Comments: Apply AIM for late-season desiccation/defoliation of troublesome broadleaf weeds present at harvest. AIM is less effective on smallflower morningglory. Use in combination with either a NIS (0.25% v/v) or COC (1% v/v). Coverage is essential for satisfactory performance. AIM may cause peanut leaf spotting or burning. Use at least 15 GPA for optimum results. Do not graze or feed treated peanut hay to livestock. Only 1 application per season is permitted. **Rain-free period is 6 to 8 hours.**

Benghal Dayflower Herbicide Programs in Peanut

Program 1

a) Preemergence ***Immediately After Planting (before BENGHAL DAYFLOWER is emerged):*** *Apply Valor @ 3 oz/A + Dual Magnum or generic metolachlor (Stalwart, Parallel PCS, Me-Too-Lachlor) @ 1 pt/A or Warrant @ 3 pt/A,*
followed by:
b) ***Postemergence application when BENGHAL DAYFLOWER is 1-2" tall:*** *Apply Cadre/Impose 2L @ 4 oz/A + Dual Magnum or generic metolachlor (Stalwart, Parallel PCS, Me-Too-Lachlor) @ 1pt/A.*

Program 2

a) ***Early Postemergence (before 28 days after peanut cracking):*** *Apply Gramoxone SL@ 12 oz/A or Firestorm/Parazone @ 8 oz/A + Storm at 1 pt/A + Dual Magnum or other generic metolachlor product @ 1 pt/A or Warrant @ 3 pt/A,*
followed by:
b) ***POST (2-3 weeks after at-crack spray, but before BENGHAL DAYFLOWER is 1-2" tall)):*** *Apply Cadre @ 4 oz/A + Dual Magnum or generic metolachlor (Stalwart, Parallel PCS, Me-Too-Lachlor) @ 1 pt/A.*
**When using Dual Magnum or generic metolachlor POST in combination with Cadre/Impose, Gramoxone/Firestorm, or Strongarm, additional spray adjuvants (NIS, COC) are not necessary.*

Application Timing and Growth Stages for Grass Herbicides in Peanut

	Fusilade DX	**Poast**	**Poast Plus**	**Select**	**Select Max**
Maximum Rate/A/Season	48 oz	2.5 pt	3.75 pt	32 oz	64 oz
Maximum Rate/A/Application	24 oz	1.5 pt	2.25 pt	16 oz	32 oz
broadleaf signalgrass	12 oz (2-4")	1.0 pt (up to 8")	1.5 pt (up to 8")	6-8 oz (2-6")	9-16 oz (2-6")
crabgrass	12 oz (1-2")	1.0 pt (up to 6")	1.5 pt (up to 6")	6-8 oz (2-6")	9-16 oz (2-6")
crowfootgrass	---	---	---	6-8 oz (2-6")	9-16 oz (2-6")
sandbur	12 oz (2-4")	1.25 pt (up to 3')	1.875 pt (up to 3")	6-8 oz (2-6")	9-16 oz (2-6")
goosegrass	8 oz (2-4")	1.0 pt (up to 6")	1.5 pt (up to 6")	6-8 oz (2-6")	9-16 oz (2-6")
fall panicum	12 oz (2-6")	1.0 pt (up to 8")	1.5 pt (up to 8")	6-8 oz (2-8")	9-16 oz (2-8")
Texas panicum	12 oz (2-8")	1.0 pt (up to 8")	1.5 pt (up to 8")	6-8 oz (2-6")	9-16 oz (2-6")
Johnsograss (rhizome)	12-24 oz (1st) (8-18") 8-24 oz (2nd) (6-12")	1.5 pt (1st) (up to 25") 1.0 pt (2nd) (up to 12")	2.25 pt (1st) (up to 25") 1.5 pt (2nd) (up to 12")	8-16 oz (1st) (12-24") 6-8 oz (2nd) (6-18")	12-32 oz (1st) (12-24") 9-24 oz (2nd) (6-18")
bermudagrass	12-24 oz (1st) (4-8" runners) 8-24 oz (2nd) (4-8" runners)	1.5 pt (1st) (up to 6" stolon) 1.0 pt (2nd) (up to 4" stolon)	2.25 pt (1st) (up to 6" stolon 1.5 pt (2nd) (up to 4" stolon	8-16 oz (1st) (3-6" runners) 8-16 oz (2nd) (3-6" runners	12-32 oz (1st app) (3-6" runners) 12-32 oz (2nd) (3-6" runners)
--- = no information provided on the label.					

PEANUT DISEASE MANAGEMENT

Dan Anco, Extension Peanut Specialist

Seedling Diseases:
All peanut seed should be treated with a fungicide to reduce the incidence of seed-transmitted and soilborne seedling diseases such as Aspergillus crown rot, Cylindrocladium, Pythium and Rhizoctonia. **Dynasty PD** (mefenoxam + fludioxonil + azoxystrobin), **Rancona V PD** (ipconazole + carboxin + metalaxyl), **Vitavax PC** (Captan + PCNB + carboxin), **Trilex Star** (Captan + trifloxystrobin + metalaxyl + thiophanate-methyl), and **Trilex Optimum** (Captan + trifloxystrobin + metalaxyl) seed treatments are all effective in reducing seedling disease and protecting stand counts. Adequate stand counts reduce the risk of tomato spot wilt virus.

Tomato spotted wilt virus (TSWV):
This virus is transmitted to peanuts by thrips, primarily tobacco thrips. TSWV stunts plants, reduces yield and causes shriveled, misshapen pods. All peanut fields in S. C. are vulnerable to yield loss from TSWV regardless of whether the farm has any history of peanut production.

A 6-step program is recommended to reduce Tomato Spotted Wilt:
Using more of these together improves chances of minimizing TSWV risk and yield loss.

1. **Varietal Resistance** – Varieties with partial resistance to TSWV are listed in the variety characteristic chart of the peanut production guide. No variety is immune.

2. **Planting Date Window** – Early planting (Late April – 10 May) has greater risk of virus infection, but with large acreage, we must start planting the first week of May. Late planting (1 June or later) may also increase virus risk. The thrips model from NCSU (https://climate.ncsu.edu/cottonTIP) can be used to provide an indication of how much general thrips pressure is predicted for a location and planting window.

3. **Plant Population/Seeding Rate** – The goal is a uniformly emerged stand of 4 plants per row ft. Plant 6 seeds/row ft (or at least 5/row ft for large seeded Virginia types) into good soil moisture. Uniform emergence and vigorous early growth reduce virus risk.

4. **Insecticide Treatment** – Apply in-furrow treatments of Thimet 20G (4.7 lb/A on 38" rows to all fields. See insecticide table for phorate rates by row spacing. Admire Pro (10 fl oz in-furrow) or Velum Total (18 fl oz/A) tank mixed with inoculant may also be used for preventing thrips stunting under low virus risk (e.g., Bailey, TifNV-High O/L). However, imidacloprid (Admire Pro or Velum Total) usually <u>increases severity of virus infections</u>.

   If thrips are stunting peanut seedlings, treat immediately with acephate:
   Orthene 75S (0.5-1.0 lb/A) or Orthene 97SP (6-12 oz/A).

5. **Strip-tillage** – Surface crop residue reduces the number of thrips landing in peanut fields, in turn reducing virus infection.

6. **Twin-row planting** – faster ground cover means less virus. Twin-row planting requires a specialized planter.

Tomato spotted wilt management is mostly over when the planter leaves the field.

Leaf Spots and Other Foliar Diseases:
Foliar disease control programs for S. C. are targeted primarily at **late leaf spot** (*Nothopassalora personata*) because this disease most consistently causes economic loss. Late leaf spot spores can be carried for many miles in the wind and therefore any field is at some risk regardless of peanut history. However, field history greatly affects late leaf spot risk because leaf spot spores persist on peanut residue in the soil. All fields should be rotated out of peanut for a minimum of two years to reduce late leaf spot pressure. Adjacent fields which had poor late leaf spot control at the end of the previous season can also be a source of significant infection, especially if upwind. Fortunately, other row crops and weeds are not significant hosts for late leaf spot. Late leaf spot is diagnosed by the black spores on the underside of dark brown to black lesions on leaves (see pictures). Yellow halos may or may not be present surrounding late leaf spot lesions.

Other foliar fungal diseases include **early leaf spot, pepper spot, leaf scorch, web blotch, Phyllosticta leaf spot, and rust.** There are also several physiological leaf spot symptoms which commonly occur, often in response to stress, such as "**irregular leaf spot**". Physiological leaf spots do not respond to fungicides and can be difficult to distinguish from fungal diseases in the field. The best and simplest management approach is that if our fungicide program is good enough to prevent the most common and aggressive disease (late leaf spot), then we will usually be OK on the other foliar diseases.

Risk factors for late leaf spot:

- Short rotations (less than 2 years out of peanuts)
- Highly susceptible variety (e.g., Virginia types, TUFRunner 511, Georgia 13M, Spain)
- Late planting (May 26 and later)
- Poor control of volunteer peanuts in rotational crops or nearby fields
- Poor end of season control of late leaf spot in an adjacent upwind field the previous year
- Starting fungicide programs any later than 45 DAP; better early than late
- Extending spray intervals beyond 15 days
- Repeated, frequent periods of leaf wetness: excessive rain, frequent irrigation
- Rain off immediately after application – wait 24 h to irrigate
- Consecutive use of fungicides with the same mode of action (except chlorothalonil); products like strobilurins (Abound, Headline) and Topsin must be tank mixed (with chlorothalonil) to reduce risk of resistance development or control failure

Early Season Protection: Application of Propulse, Proline, or Velum Total in-furrow at planting can help contribute early-season protection of leaf spots. Our studies in 2017 to 2019 on runner and Virginia type peanuts have shown Thimet applied in-furrow at planting provides significant protection against late leaf spot.

Importance of Chlorothalonil (Bravo and generics): Chlorothalonil is the foundation of peanut leaf spot control programs because it is the only product proven to have multiple modes of action to reduce the risk of developing leaf spot resistance. Multiple sequential chlorothalonil applications have been used for over 40 years without resistance development. Alternating or tank mixing chlorothalonil with other products can delay development of resistance towards those alternative compounds. Chlorothalonil in the last spray can also help prevent resistant leaf spot strains from overwintering and causing infection in the following year.

Slowing a Growing Leaf Spot Epidemic: Effective fungicide programs are designed to prevent disease, not "cure" it after the fact. If something goes wrong and you find late leaf spot lesions in the bottom of the canopy (particularly with > 30 days until harvest) treat immediately with Provost Silver 13 fl oz + Microthiol Disperss 5 lb/A, Priaxor 4 fl oz + Provost Opti 10.7 fl oz/A, or Topsin 4.5FL 10 fl oz + 1.5 pt Bravo (less effective than prior 2 options). Retreat in 10 days.

White Mold:
White mold (*Sclerotium rolfsii*) is the most consistently damaging soil disease under S. C. conditions. This fungus invades peanut lateral branches in contact with the soil, as well as pods and pegs. White mold infections are driven primarily by high soil temperatures and humidity. Dry weather offers no protection from white mold. Drought can prevent infection from being noticed aboveground, but infection underground on pegs and pods can continue where it may not be noticed until harvest. Some of our most severe white mold outbreaks often occur under drought with excessive canopy temperatures.

Symptoms include dark brown lesions on stems and pods, rotted pods and pegs, wilting of individual or multiple stems and plant death. Unless severely infected, tap roots generally remain intact and flexible with white mold, whereas CBR infection decays tap roots much quicker.

Signs: Mycelium of *S. rolfsii* is white and produces a fan-like growth as it spreads. The resting stage of white mold (sclerotia) persists in the soil from year to year making rotation out of host crops (peanut, soybean and other legumes including many weeds) highly important. These sclerotia can be seen as small (< 5/64" = 2 mm), round structures that are initially white and later become tan to dark brown. With ample moisture, sclerotia can be found on infected peanut tissues or leaf litter. **Note:** A similar looking fungus, false white mold (*Phanerochaete*), also produces white mycelium and can be found in peanut fields. <u>False white mold does not produce sclerotia and does not damage peanuts</u>; if it is found on peanuts and is scraped away, tissue beneath it will look healthy.

Risk factors for white mold:

- Peanut or soybean history
- Less than 2 years rotated out of peanut, soybean or other legume
- Any variety other than Bailey, Sullivan, Sugg, Wynne or Georgia 12Y should be considered highly susceptible. AU-NPL 17, FloRun 331, Georgia 14N, TifNV-Hi O/L, Georgia 07W and TUFRunner 511 also show some tolerance though not as good as the previous group.
- Early planting (first week of May or earlier); delaying planting until mid-May may help suppress white mold due to higher seedling soil temperatures and faster early root growth
- Lack of rain preventing fungicide from being washed into the soil
- Extended, unusually hot temperatures in July and August

Variety resistance (particularly Bailey, Sullivan, Georgia 12Y, FloRun 331 and AU-NPL 17) is far more effective than any chemical treatment in suppressing white mold. These varieties typically control white mold with standard fungicide programs.

Early Season Banded Sprays: Banded application of Proline (38" rows: 5.5 fl oz/A in 20 gal/A on 12" band) OR Elatus (38" rows: maximum 8.9 oz/A in $\geq$ 10 gal/A, 7 – 10" band) to peanut seedlings at 21 – 35 DAP can improve white mold control under extreme disease pressure. See table on Early Season Band Treatment Options for row-spacing banded rates. **Note:** In-furrow fungicide treatments <u>have not</u> been effective in suppressing white mold (see details below regarding CBR control). See following tables for fungicide efficacy and comments.

Night/Pre-Dawn Spraying: Peanut plants fold their leaves at night making it easier for soil fungicide treatments to reach the base of the plant and soil surface. Applying white mold treatments at night has been shown to increase control effectiveness, at least under severe white mold pressure. If Bravo (a non-systemic) is being relied on for leaf spot control, control of this foliar disease may be reduced with night spraying because of reduced leaf coverage. For growers interested in trying night applications, we recommend the 60, or 60 and 75 DAP treatments as priorities.

Cylindrocladium Black Rot (CBR):
CBR is caused by a soil fungus (*Cylindrocladium parasiticum*) that occurs in the same field areas from year to year, often in low spots. CBR is transmitted from field to field by contaminated seed and equipment. **Rotation** (≥ 2 years out of peanuts and elimination of soybean from the rotation) and **resistance** are the best defenses against severe CBR. Rotation alone will not eliminate significant injury.

Symptoms and signs: When first infected, peanut plants can turn light green or yellow. As CBR infections progress, peanut stems or entire plants wilt and eventually die. CBR rots roots, including the tap root, causing them to turn black and fall apart (tap roots infected by white mold remain intact and flexible much longer). Under drier conditions, symptoms of CBR infection may be limited to chlorotic yellowing and plant stunting. When conditions have been moist, brick-red reproductive structures (perithecia) might appear on crowns, lower stems, pegs and pods. Infected seed can develop cinnamon-colored speckles (microsclerotia) on seed coats before rotting.

Risk factors for CBR:

- Confirmed history of economic CBR loss in the field
- Soybean or peanut history
- Short rotations out of peanut, soybean or other legumes
- Poorly drained, more organic soils such as found in low areas of a field
- Any variety other than Bailey, Perry or Sugg (Emery is particularly susceptible to CBR)
- Lack of control over seed source (seed transmission)
- Early planting (April): lower soil temperatures slow root growth

CBR Management:
Variety resistance (Bailey) is far more effective than any chemical treatment in suppressing CBR. Bailey often adequately suppresses CBR without fumigation or in-furrow fungicides.

On susceptible varieties in fields with a proven history of CBR loss, use **Propulse** (13.6 fl oz/A) OR **Proline** (5.7 fl oz/A) **in-furrow** (with inoculant), OR **fumigate with Vapam (10 gal/A)**. Vapam must be shanked into a bed at ~10" depth 14 days prior to planting. Soil temperature at 4" depth should be at least 60º F. Avoid fumigating when there is a high risk of heavy rain (> 1.0") within 2 days. See the following tables on fungicide efficacy and comments.

Rhizoctonia Limb Rot:
Rhizoctonia Limb Rot is caused by naturally-occurring soil fungi, *Rhizoctonia* spp. (e.g., *R. solani*), that can cause lesions and rot on limbs/stems, leaves, pegs, and pods. Lesions on stems are light to dark brown and often have a target pattern. Dense canopies and prolonged moisture (e.g., irrigation) encourages disease development. Damage caused by tractor traffic increases occurrence of limb rot. Management recommendations are similar as for white mold (see Disease Response Chart for fungicide activity).

Web Blotch:
Web blotch, caused by *Phoma arachadichola*, produces lesions on upper leaf surfaces. Symptoms start as small, tan to dark brown blotches with irregular edges or netlike gray-brown lesions that can become large (0.5") and cover entire leaves. Older lesions darken and have rough, dull surfaces. Severe infections cause leaves to become brittle, which can lead to substantial defoliation. Web blotch development favors cool, moist conditions and is more common under irrigation. Many of the fungicides effective against late leaf spot share activity towards web blotch (see Disease Response Chart for fungicide activity).

General Guidelines for Fungicide Programs:

- Begin leaf spot control **absolutely no later than 45 DAP**. For high risk situations such as highly susceptible varieties (e.g., Bailey, Sullivan, Georgia 13M, TUFRunner 511), or short rotations, particularly under irrigation, increase late leaf spot protection using one of the options listed in footnotes of the following tables. **Many fields benefit from starting fungicide protection at 30 – 40 DAP when conditions favor leaf spot development.**

- **Apply a soil fungicide (see following disease control table) starting absolutely no later than 60 DAP.** White mold must be prevented. Hot weather accelerates white mold growth.

- If premium fungicides (e.g., Miravis, Priaxor, Provost Opti, Proline) are substituted for basic tebuconazole + chlorothalonil treatment, prioritize their use starting at 60 DAP rather than later to get the most potential for improved white mold and/or leaf spot control.

- Soil fungicides must be washed into the soil to be effective against white mold, but **wait 24 – 48 h before irrigating** to also help control leaf spot.

- **Except for treatments containing chlorothalonil (Bravo), do not make consecutive applications of the same mode of action (MOA).** Bravo has multiple modes of action which has allowed for many years of use without leaf spot resistance. In each field, do not apply more than a combined total of 2 strobilurin-containing products (Abound, Elatus, Evito, Headline or Priaxor) in any growing season to reduce risk of resistance, and do not apply strobilurin fungicides alone.

- **Never apply Topsin, tebuconazole, or strobilurins (Abound, Headline) alone, and do not make more than 2 tank-mixed Topsin applications per season.** Topsin is very susceptible to development of resistance. Late leaf spot is already resistant to tebuconazole, and it is already resistant to strobilurins in several areas.

- **No fungicide program is fool-proof.** Spot check fields for leaf spot and white mold, particularly from 60 DAP to two weeks before anticipated digging date.

- Under low pressure, a final leaf spot application at 105 DAP may be adequate to provide control through at least a 135 DAP harvest date, but check fields at 105 – 120 DAP. If leaf spot is present on 5% of lower leaves and harvest will be delayed > 135 DAP, apply an additional chlorothalonil treatment. If no leaf spot is present and harvest will be delayed beyond 145 DAP, apply an insurance treatment. Many fields including Virginias are requiring fungicide protection at 120 DAP to manage late leaf spot depending on weather and year.

- From our studies and work with peanut Extension and research specialists in the VC and southeast, it appears that for mature runner types, yield loss starts to become significant after approximately 30% of the canopy becomes defoliated from leaf spot. For mature Virginia types, losses started to become significant at 25% or more canopy defoliation. **For a crop that is not yet at optimal maturity, the situation is more complicated, but as a rough guide, Virginia types after 40% defoliation losses appear to increase more than gains from additional maturity. For not yet mature runners, they appear to tolerate at least 50% defoliation before increasing yield loss. Soil, weather and digging conditions are very important and harvest decisions should take all factors into account.**

Note: The disease control programs on the following pages are example guidelines. Timing should be modified to account for opportunities to wash soil fungicides into the pegging zone if no irrigation is available. Under drought conditions, growers have to rely on judgment of the 5-day weather forecast to decide when to apply a soil fungicide before a rain. Ideally, fungicide treatments would be washed into the soil after 1 – 2 days to get both maximum foliar and soil disease suppression.

DISEASE CONTROL PROGRAM OPTIONS

If premium fungicides are substituted for basic tebuconazole + chlorothalonil (generic Folicur + Bravo), prioritize their use starting 60 DAP rather than later to maximize potential benefits.

<table>
<tr><th colspan="7">Treatment options and timing (days after planting)</th></tr>
<tr><th>30</th><th>45*</th><th>60*</th><th>75</th><th>90</th><th>105</th><th>120</th></tr>
<tr><td rowspan="6">Bravo (1-1.5 pt) (+ Cadre)
(unless leaf spot risk is known low)</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td rowspan="6">Bravo for late maturing peanuts**</td></tr>
<tr><td rowspan="5">tebuconazole
7.2 fl oz
+ Bravo 1.5 pt</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td></tr>
<tr><td rowspan="4">Substitute,
see below</td><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td rowspan="2">tebuconazole
7.2 fl oz
+ Bravo 1.5 pt</td><td rowspan="4">tebuconazole
7.2 fl oz
+ Bravo 1.5 pt</td></tr>
<tr><td>Substitute,
see below</td></tr>
<tr><td>tebuconazole 7.2
+ Bravo 1.5 pt</td><td>Substitute,
see below</td></tr>
<tr><td>Substitute,
see below</td><td>Substitute,
see below</td><td>Substitute,
see below</td></tr>
</table>

*****Under high leaf spot risk (e.g., very susceptible variety, irrigated or with frequent rain-off and leaf wetting, or late planting) use a premium fungicide with strong leaf spot activity at 60 DAP; use of additional premium products can improve management. Spray intervals can be reduced to 10 days for improved leaf spot control under frequent rain-off conditions. **Make sure leaf spot prevention begins no later than 45 DAP and soil fungicide is applied no later than 60 DAP.** White mold must be prevented; hot weather and a closed canopy in Jul – Aug accelerates white mold growth. Do not use surfactants or crop oil with fungicides unless necessary for herbicide performance in tank mixes. The goal is to wash white mold fungicides into the soil. Spray **before** irrigation or rain when possible.

******An extra late season Bravo application may be needed for late maturing peanuts or for earlier maturing peanuts if disease is present. If it has been 15 days since the last application and peanuts will be dug within the next 25 days, do not treat unless > 5% of leaflets in the bottom of the canopy have late leaf spot lesions. Never spray fungicide within 2 weeks of harvest – it is off-label and is too late to affect defoliation.

The treatments in the following tables can be substituted for tebuconazole + Bravo from 60 DAP to 105 DAP. Except for treatments containing Bravo (chlorothalonil), consecutive use of the same mode of action (MOA) group is not recommended in order to delay leaf spot resistance. Bravo has multiple modes of action and there has been no evidence of resistance in 40+ years of use.

MOA = Fungicide Resistance Action Committee (FRAC) Mode of Action Group. Having the same mode(s) of action does not mean treatments are equally effective.

There is no single perfect all-around fungicide. The best programs combine several products that complement each other to minimize disease and resistance risk at reasonable cost.

2020 Fungicide Supply

As of January, 2020, there does not appear to be an anticipated shortage of chlorothalonil and tebuconazole for the 2020 growing season. The following are a few example programs assuming limited chlorothalonil and tebuconazole availability. As always, an effective disease management program strongly benefits from the combined use of multiple integrated pest management practices (e.g., variety resistance, length of rotation period, planting date).

Where available supplies are further limited, the more effective 1.5 pt rate of Bravo listed here may be reduced to the 1 pt rate, or substitutions may be used.

Example treatment options and timing (days after planting) for limited chlorothalonil (Bravo) and tebuconazole (generic Folicur) availability situations

0	30	45	60	75	90	105	120
Higher risk							
Thimet 4.7 lb/A in-furrow at plant	Bravo 1 pt	Alto 5.5 oz + Microthiol Disperss 5 lb	Miravis 3.4 oz + teb 7.2 oz OR Miravis + Elatus 8 oz OR Miravis + Convoy 32 oz	(skip)	Provost Opti 10.7 oz + Microthiol Disperss 5 lb OR Revytek 12 oz	Bravo 1.5 pt + teb 7.2 oz	Bravo 1.5 pt + teb 7.2 oz
Lower risk							
		Bravo 1.5 pt OR Absolute 7 oz	Provost Opti 10.7 oz + Microthiol Disperss 5 lb OR Elatus 8 oz OR Priaxor 8 oz	Bravo 1.5 pt + teb 7.2 oz OR Bravo 1.5 pt + Convoy 16 oz	Provost Silver 13 oz OR Elatus 8 oz	Bravo 1.5 pt + Topsin 10 oz + teb 7.2 oz	Bravo 1.5 pt

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Approximate Rainfast Times After Application for Selected Fungicides

Alto	1 hour
Aproach Prima	1 hour
Bravo WeatherStik	When dry
Elatus	1 hour
Fontelis	1 hour
Headline	When dry
Lucento	2 hours
Miravis	1 hour
Priaxor	When dry
Proline	When dry
Provost Siliver	2 hours if dry when applied, 3 hours if wet (dew)
Revytek	When dry

As a reminder, the above rainfast times are generally more applicable for efficacy against foliar diseases like late leaf spot than they are for soil diseases, since rain often helps fungicides reach lower areas where soil diseases are active.

PEANUT DISEASE CONTROL

FOLIAR DISEASE CONTROL ONLY

(Early and late leaf spot, pepper spot, web blotch, rust)

Product	Rate/A	MOA*	Comments
Bravo Weather Stik 6SC (and chlorothalonil generics)	1.5 pt	M5	Chlorothalonil products are preventative only against leafspot and require excellent coverage. **Rust** infection is rather rare in SC peanut production, but if rust is detected with more than 3 weeks to harvest, include chlorothalonil every 10 days until 2 weeks before harvest.
Bravo + Topsin 4.5 FL or Topsin M 70W	1 pt + 8-10 fl oz 0.33-0.5 lb	M5 + 1	Topsin should only be used in Bravo tank mixes. Maximum 2 appl. per season.
Alto 100 SL + Bravo	5.5 fl oz + 16 fl oz	3 + M5	Systemic triazole activity + protectant Bravo.
Miravis 1.67 SC	3.4 fl oz	7	Exceptional leaf spot activity, strong residual. Requires soil fungicide mix.
Elatus 0.45 WG	7.3-9.5 fl oz	7 + 11	Systemic. Leaf spot activity benefits from Bravo tank mix under high pressure.
Provost Silver 3.5	11-13 fl oz	3	Highly effective against soil and foliar diseases.
Provost Opti 3.6 + Microthiol Disperss	10.7 fl oz + 5 lb	3 + M2	Excellent activity against soil and foliar diseases. Microthiol Disperss greatly enhances leaf spot activity of Provost Opti.
Priaxor 4.17	4-6 fl oz	7 + 11	Systemic activity against leaf spot.
Revytek 3.33	8-15 fl oz	3 + 7 + 11	Highly effective systemic activity against leaf spot. SC white mold data limited.
Bravo + Topguard	1 pt + 7-14 fl oz	M5 + 3	Topguard adds systemic leaf spot control to Bravo.
Absolute 500 SC	3.5 fl oz	3 + 11	Systemic triazole and strobilurin activity.
Headline 2.08 + Bravo	6-9 fl oz + 16 fl oz	11 + M5	Highly systemic and rain-fast. We are seeing reduced strobilurin effectiveness against leaf spot.
Custodia 2.67 SC	15.5 fl oz	3 + 11	Add 1 pt/A Bravo for late leaf spot use. Max 2 appl.
Muscle ADV 3.84	2 pt	3 + M5	Add 0.5 pt/A Bravo for late leaf spot use.
Lucento 4.17	5.5 fl oz	3 + 7	Systemic activity against leaf spot.

FOLIAR AND SOIL DISEASE CONTROL

(Other than CBR)

Product	Rate/A	MOA*	Comments
Tebuconazole (generic Folicur 3.6) + Bravo	7.2 fl oz + 1.5 pt	3 + M5	Tebuconazole alone no longer controls leaf spot or web blotch. Must be tank mixed with Bravo.
Convoy 40SC + Bravo	13-16 fl oz +1.5 pt	7 + M5	Must be tank mixed with Bravo for adequate leaf spot control. Effective white mold suppression.
Umbra 3.37 + Bravo	19-38 fl oz + 1 pt	3 + 7 + M5	Effective white mold suppression. Tank mixing with Bravo improves leaf spot control.
Provost Silver 3.5	13 fl oz	3	Highly effective against soil and foliar diseases.
Elatus 0.45 WG	7.3-9.5 fl oz	7 + 11	Excellent white mold activity. Traditionally excellent leaf spot activity may be becoming variable.
Priaxor 4.17	8 fl oz	7 + 11	Systemic activity against white mold and leaf spot.
Revytek 3.33	15 fl oz	3 + 7 + 11	Highly effective systemic activity against leaf spot. SC white mold data limited.
Fontelis 1.67	16 fl oz	7	Systemic activity against white mold and leaf spot.
Lucento 4.17	5.5 fl oz	3 + 7	Systemic activity against white mold and leaf spot.
Propulse 3.34	13.6 fl oz	3 + 7	Systemic activity against soil and foliar disease.
Custodia 2.67 SC	15.5 fl oz	3 + 11	Add 1 pt/A Bravo for late leaf spot use. Max 2 appl.
Muscle ADV 3.84	2 pt	3 + M5	Add 0.5 pt/A Bravo for late leaf spot use.
Headline 2.08 + Bravo	12-15 fl oz + 16 fl oz	11 + M5	Highly systemic and rain-fast. We are seeing reduced strobilurin effectiveness against leaf spot. Headline erratic on white mold due to rapid uptake on leaves.

***Except for treatments containing Bravo (chlorothalonil), consecutive use of the same mode of action (MOA) group is not recommended in order to delay leaf spot resistance.**

PEANUT DISEASE CONTROL (cont.)

Early Season Banded Treatment Options for Improved White Mold and Leaf Spot Management			
Product	**Rate/A**	**MOA**	**Comments**
Elatus 0.45 WG	8.9 oz (38" rows)	7 + 11	Recommended as early season (approximately 21 DAP) banded application for high risk white mold fields. May also provide early season leaf spot control. Apply in a minimum of 10 gal/A. Set band width at 7 – 10" for single rows (twin-rows: widen band to cover both rows). **Banded rates** are 0.5 – 0.65 oz/1,000 row ft, which is equivalent to 8.7 – 9.5 oz/A on 30" rows, 7.3 – 9.4 oz/A on 36" rows, and 6.9 – 8.9 oz/A on 38" rows. Do not exceed 9.5 oz/A.
Proline 480 SC	5.5 fl oz (38" rows) 5.7 fl oz (30", 36" rows)	3	Recommended as early season (21-35 DAP), high volume (20 gal/A) banded application (up to 12" band) for high risk white mold fields. Also provides extended (21 day) early season leaf spot control. Banded rate is 0.4 fl oz/1,000 row ft (maximum 5.7 fl oz/A), which is equivalent to 5.7 fl oz/A on 30" or 36" rows and 5.5 fl oz/A on 38" rows. **Proline must be used in-furrow for CBR suppression** (see below) **and over the top for white mold control.**

CBR CONTROL			
Product	**Rate/A**	**MOA**	**Comments**
Proline 480 SC (in-furrow, suppression)	5.5 fl oz (38" rows) 5.7 fl oz (30", 36" rows)	3	**Resistance**: Bailey variety is more effective than any chemical treatment in reducing CBR loss and often provides adequate control without fumigation or in-furrow fungicide treatment. **Crop rotation** is extremely important in reducing CBR risk. Delaying planting until mid-May can suppress CBR by increasing soil temp. **Proline** is applied in-furrow with inoculant. In-furrow rate is 0.4 fl oz/1,000 row ft (maximum 5.7 fl oz/A), equivalent to 5.7 fl oz/A on 30" or 36" rows and 5.5 fl oz/A on 38" rows.
Propulse 3.34 SC (in-furrow, suppression)	13.6 fl oz	3 + 7	**Resistance**: Bailey variety is more effective than any chemical treatment in reducing CBR loss and often provides adequate control without fumigation or in-furrow fungicide treatment. **Crop rotation** is extremely important in reducing CBR risk. Delaying planting until mid-May can suppress CBR by increasing soil temp. **Propulse** is applied in-furrow with inoculant. Also provides effective early season late leaf spot protection
Vapam HL (metam sodium 42%)	10 gal	NC	**Resistance**: Bailey variety is more effective than any chemical treatment in reducing CBR loss and often provides adequate control without fumigation or in-furrow fungicide treatment. **Vapam** must be shanked into the soil (8" depth) and bedded at least 14 days prior to planting. Soil temperature at 4" depth should be 60°F. Do not fumigate when rain (1.0" or more) is expected within 48 hrs.

GUIDE TO PEANUT FUNGICIDES

Product	Chemistry	MOA*	Risk of leaf spot resistance	Feed hay	PHI (days)	Strengths	Limitations
Abound	Strobilurin (azoxystrobin)	11	High	Y	14	Has white mold activity and may be the best Rhizoctonia material. Systemic leaf spot and web blotch activity.	Erratic against established white mold infections 75 – 90 DAP. Mix with Alto or Bravo to improve leaf spot activity.
Absolute	Triazole (tebuconazole) + Strobilurin (trifloxystrobin)	3 + 11	Already resistant + high	N	14	Systematic leaf spot activity.	Less effective against white mold.
Alto	Triazole (cyproconazole)	3	High	Y	30	Systematic leaf spot activity.	Minimal if any soil disease control. Mix with Bravo.
Aproach Prima	Triazole (cyproconazole) + Strobilurin (picoxystrobin)	3 + 11	High + high	Y	30	Systemic leaf spot activity.	Minimal if any soil disease control, leaf spot activity benefits from chlorothalonil or sulfur tank mix.
Bravo/ generics	Chloronitrile (chlorothalonil)	M5	Low	N	14	Low cost, reliable leaf spot control. Multiple modes of action reduce risk of leaf spot resistance. Can make multiple consecutive appl.	No soil disease activity. Not curative or systemic. Less effective than many systemics on web blotch. Preventative activity only against leaf spot.
Convoy	Benzamide (flutolanil)	7	Low	N	40	Excellent white mold and Rhizoctonia activity.	No activity against foliar diseases or CBR. Must tank-mix with chlorothalonil.
Custodia	Triazole (tebuconazole) + Strobilurin (azoxystrobin)	3 + 11	Already resistant + high	N	14	Activity against foliar and soil diseases.	Needs Bravo tank-mix for adequate leaf spot control. Max 2 appl. recommended.
Domark	Triazole (tetraconazole)	3	Medium risk	N	14	Systemic activity against leaf spots.	Not effective for soil disease. Requires Bravo tank mix for effective late leaf spot activity.
Elast	Guanidine (dodine)	U12	Low to medium	Y	14	Leaf spot alternative to Bravo for lower disease pressure situations.	Less effective than Bravo for leaf spot on highly susceptible varieties. No soil efficacy.
Elatus	Carboxamide (benzovindiflupyr) + Strobilurin (azoxystrobin)	7 + 11	Medium to high	Y	30	Systemic late leaf spot activity. Excellent activity against white mold.	Should be alternated with MOA alternative to strobilurin and carboxamide. Requires Bravo tank mix under high late leaf spot pressure.
Endura	Carboxamide (boscalid)	7	Medium to high	N	14	Activity against Sclerotinia blight (not common in SC). Good leaf spot activity.	Inadequate against white mold.
Evito	Strobilurin (fluoxastrobin)	11	High	Y	14	Performance of 5.7 oz similar to 18 oz Abound.	Performance of 5.7 oz similar to 18 oz Abound.
Folicur/ generics	Triazole (tebuconazole)	3	Already resistant	N	14	Very cost-effective control of white mold and limb rot.	Not effective against web blotch. No longer effective against late leaf spot; must tank-mix with Bravo.
Fontelis	Carboxamide (penthiopyrad)	7	Medium to high	Y	14	Excellent white mold activity and effective against leaf spot.	Rotate with alternative chemistry to reduce leaf spot resistance risk.
Headline	Strobilurin (pyraclostrobin)	11	High	N	14	Systemic leaf spot activity at 6-9 oz, some white mold activity at 12-15 oz rates. Rapid uptake for systemic activity in leaves.	White mold activity erratic. Leaf spot activity of Headline (and other strobilurins) may have declined. Do not exceed 2 strobilurin appl. per season.

GUIDE TO PEANUT FUNGICIDES (Cont.)

Product	Chemistry	MOA*	Risk of leaf spot resistance	Feed hay	PHI (days)	Strengths	Limitations
Lucento	Triazole (flutriafol) + Carboxamide (bixafen)	3 + 7	Medium to high	N	14	Systemic leaf spot activity. Active against soil diseases including white mold.	Should be rotated with other products and MOA for effective disease management programs.
Miravis	Carboxamide (pydiflumetofen)	7	Medium to high	Y	14	Exceptional leaf spot activity, strong residual	Requires tank mix for soil disease control. Rotate with alternative chemistry to reduce leaf spot resistance risk.
Muscle ADV	Triazole (tebuconazole) + Chloronitrile (chlorothalonil)	3 + M5	Already resistant + low	N	14	Activity against foliar and soil diseases.	Needs Bravo tank-mix for adequate leaf spot control.
Priaxor	Carboxamide (fluxapyroxad) + Strobilurin (pyraclostrobin)	7 + 11	Medium to high	N	14	White mold and leaf spot activity at 8 oz. Has demonstrated highly effective leaf spot control.	Maximum of two appl. per season recommended.
Proline	Triazole (prothioconazole)	3	Medium	N	14	Excellent leaf spot and white mold activity in early season band. CBR suppression in-furrow.	Rotate with alternative chemistry to reduce leaf spot resistance risk.
Propulse	Triazole (prothioconazole) + Carboxamide (fluopyram)	3 + 7	Medium to high	N	14	Excellent leaf spot and white mold activity. CBR suppression in-furrow.	Rotate with alternative chemistry to reduce leaf spot resistance risk.
Provost Silver	Triazole (prothioconazole + tebuconazole)	3	High	N	14	High control for major foliar (leaf spot) and soil (WM, Rhizoc.) diseases.	Triazoles vulnerable to leaf spot resistance. Rotate or tank-mix with other chemistry.
Provost Opti + Microthiol Disperss	Triazoles above + Sulfur	3 + M2	Medium to high	N	14	Microthiol Disperss 5 lb/A greatly improves leaf spot activity of Provost Opti	Must be rotated with other chemistries.
Quash	Triazole (metconazole)	3	Medium	N	14	Effective against white mold.	Needs Bravo tank-mix for leaf spot control.
Revytek	Triazole (mefentrifluconazole) + Carboxamide (fluxapyroxad) + Strobilurin (pyraclostrobin)	3 + 7 + 11	Medium to high	Y	14	Systemic and highly effective foliar activity; active against soil diseases. Multiple MOA.	SC white mold data limited.
Topguard	Triazole (flutriafol)	3	Medium	N	7	Systemic leaf spot control, active against white mold.	Triazoles vulnerable to leaf spot resistance. Must be rotated or tank-mixed with other MOA.
Topsin 4.5FL	Benzimidazole (thiophanate-methyl)	1	Very high	Y	14	Topsin adds systemic activity to Bravo. Cost effective, high risk treatment for leaf spot.	Topsin alone very susceptible to resistance. Must be tank-mixed and limited to two applications per year. Little or no soil activity.
Umbra	Triazole (flutriafol) + Carboxamide (flutolanil)	3 + 7	Medium to high	N	40	Excellent white mold and Rhizoctonia activity, some leaf spot activity.	Leaf spot control requires a tank mix partner (bravo) for effective management.
Velum Total	Carboxamide (fluopyram)	7	Medium to high	N	14	In-furrow control of leaf spot, thrips and nematodes.	Imidacloprid component often increases TSWV severity.

DISEASE RESPONSE CHART FOR PEANUT FUNGICIDES

Product	Rate/A	Late leaf spot	White mold	Rhizoctonia limb rot	Cylindrocladium black rot (CBR)	Web blotch
Absolute	3.5-7 oz	Good	Poor	Good? (7 oz)	None	Good?
Alto + Bravo	5.5 oz + 1 pt	V. Good	Fair/Poor	Fair/Poor?	Poor	Good
Aproach Prima	6.8 oz	Good	Fair/Poor	?	Poor	Good?
Bravo (or generics)	1.5 pt	V. Good	None	None	None	Fair
Convoy + Bravo	13-32 oz + 1.5 pt	Good	V. Good/Ex.	V. Good	None	Fair
Domark	5.25-6.9 oz	Good	None	None	None	Good?
Evito	5.7 oz	Good	Good	?	Poor	Good?
Elast[1]	15 oz	Fair	None	None	None	None
Elatus	7.3-9.5 oz	Good/V. Good	Ex.	V. Good/Ex.?	Poor	Good
Endura	8-10 oz	Good	Fair	?	Poor	Good
Fontelis	16 oz	Good	Ex.	Good?	Poor	?
tebuconazole + Bravo	7.2 oz + 1-1.5 pt	V. Good	V. Good	V. Good	Poor/Fair	Good?
Headline	6-12 oz	Fair/Good	Fair (12-15 oz)	Good/V. Good?	Poor	Ex.
Lucento	5.5 oz	Good	Good	?	?	?
Miravis	3.4 oz	Ex.	None	None	None	V. Good?
Priaxor	4-8 oz	V. Good/Ex.	Good/V. Good (6-8 oz)	V. Good/Ex.? (8 oz)	Poor	Good?
Priaxor + Provost Opti	4 oz + 10.7 oz	Ex.	Ex.	V. Good?	Poor/Fair	Good?
Proline	5.7 oz	Ex.	Ex.	V. Good	Good (in-furrow)	Good?
Propulse	13.6 oz	Ex.	Ex.	V. Good	V. Good/Ex. (in-furrow)	Good?
Provost Silver	13 oz	V. Good	V. Good	V. Good	Poor/Fair	Good?
Provost Opti + Microthiol Disperss	10.7 oz + 5 lb	Ex.	V. Good	V. Good	Poor/Fair	Good?
Quash + Bravo	3-4 oz + 1 pt	V. Good	V. Good	?	Poor?	Good?
Revytek	8-15 oz	V. Good/Ex.	V. Good?	?	?	?
Topguard	7-14 oz	Fair/Good	Good	?	None	Good?
Topsin 4.5FL[2] + Bravo	8-10 oz + 1.5 pt	V. Good[2]	None	Fair?	None	Fair?
Umbra + Bravo	19-38 oz + 1 pt	V. Good	V. Good/Ex.	V. Good	None	Fair

***Ratings are based on the relative performance of the listed application rates. Effective disease control and resistance prevention requires multiple application programs with a combination of materials. None** = no control; **Poor** = low level of control; **Fair** = erratic control or suppression only; **Good** = controls typical disease pressure; **V. Good** = very good: better than average disease control; **Ex.** = excellent: consistent superior control.

[1]**Elast** is not recommended for highly susceptible Virginia-type varieties.
[2]**Topsin** is highly effective against leaf spot as a tank-mix with Bravo. Never use Topsin alone, and never exceed 2 total Topsin applications per season.

PEANUT INSECT MANAGEMENT

D. Anco, Extension Peanut Specialist

See the following tables for insect control recommendations, active ingredient concentrations and use precautions. In many cases, controlling peanut volunteers during rotational years helps prevent insect population buildup and damage in the following year.

Sucking, Piercing, Rasping Pests

Thrips can cause serious crop stunting and yield loss from both direct feeding and virus transmission (tomato spotted wilt). All commercial peanuts planted in S. C. should be treated at planting with a preventative in-furrow insecticide (Thimet 20G). Imidacloprid (Admire Pro or Velum Total) in-furrow can also be used for thrips control; however, since imidacloprid often increases virus, it benefits from pairing with virus-resistant varieties (e.g., Bailey, Sullivan, TifNV-High O/L). Aldicarb (AgLogic 15G) in-furrow has also been effective against thrips. Immediate foliar application of Orthene is recommended if in-furrow treatment fails to prevent thrips stunting.

Potato leafhopper feeding causes peanut leaflets to turn yellow at the tip in a V-shaped pattern (hopperburn). This chlorotic symptom is often confused with nutrient deficiency. Hopperburn typically begins on field borders. If 15 to 20% of the entire field becomes affected, treat by mixing a recommended insecticide in with the next fungicide application. Bailey, Sugg, Sullivan and Wynne are particularly susceptible.

Threecornered alfalfa hoppers are green, wedge-shaped insects that feed by piercing peanut laterals, stems, and leaf petioles. The circular feeding pattern forms a girdle around the stem which blocks the flow of plant sugars. Girdles may cause the affected branch of the plant to wilt and even snap off if bent. Plants often put out above-ground (adventitious) roots at the wound site on lower stems. In SC, girdling activity increases significantly in July. The risk of economic injury is apparently greater on runner types with small plant size. Pyrethroid insecticides are effective against hoppers, but these can flare secondary pest problems (spider mites).

Spider mites can damage drought stressed peanuts in August and September. Stressed fields should be spot checked for yellow “hits” indicating where mites are feeding. Spider mites can be seen with a hand lens on the underside of leaflets. Webbing may be present with heavy infestation. These twospotted spider mites get their name from the two spots (one on each lateral side) of their body. Mite suppression requires ground application, thorough coverage, and potentially a second application in 5-7 days. Lorsban or pyrethroid application greatly increases the risk of mite outbreaks. **Irrigation is the best defense against spider mite injury.**

Soil Insects

Lesser cornstalk borers attack pods, pegs, lateral stems and the crown at the soil line during extended drought stress. Fields with lighter soils are particularly vulnerable. In addition to losses from direct injury, LCB damage is associated with increased white mold and aflatoxin levels due to the wounds it causes. Rapid canopy closure and reduced soil temperatures lower LCB risk. **Irrigation is the best defense against lesser cornstalk borer.** Granular Lorsban (13 lb/A) can be applied at pod set (about 50 – 55 DAP) to high risk fields (sandy soils under drought stress). About 1/4" rain/irrigation is needed within 10 days of application for Lorsban to be effective. Lorsban also reduces pod damage from wireworm, burrower bugs, and southern corn rootworm feeding. Unfortunately, Lorsban kills predatory insects and causes outbreaks of corn earworm, granulate cutworm and spider mites under drought stress later in the season. Late fall tillage before planting covers can help reduce but will not eliminate LCB winter survival. LCB damage is typically less severe under reduced-tillage.

Granulate Cutworm. See foliage feeding insects below.

Burrower bugs primarily attack reduced-tillage peanut fields under drought stress. These are essentially underground stink bugs which feed directly on kernels by piercing pods with their needle-like mouthparts. In addition to direct yield and grade loss (reduced kernel weight), burrower bug damage can lead to Seg. II loads and increased aflatoxin levels (Seg. III). **Irrigation is also the best defense against burrower bug injury.** Late fall tillage can help reduce but will not eliminate burrower bug winter survival. Lorsban application can significantly reduce burrower bug damage but must be applied preventatively (July). Lorsban is not routinely recommended for managing burrower bug (see LCB comments above about associated outbreaks).

Wireworms are immature or larval stages of click beetles that commonly feed on peanut pods. Although wireworms are capable of causing significant injury, thus far economic damage to peanut has been minimal under S. C. conditions. The only practical treatment for wireworms is preventative Lorsban application.

Southern corn rootworm is the immature stage of the eleven-spotted cucumber beetle. This worm tunnels into peanut pods under high soil moisture conditions, usually in more organic soils such as found in bottom areas, particularly under irrigation. Rootworm injury has been a relatively minor concern thus far under S. C. conditions. Preventative granular Lorsban is the only practical treatment for rootworms.

Foliage Caterpillars

Corn earworm is the most common foliage feeding insect on peanuts. Corn earworms usually appear in peanut fields during the last week of July or first week of August after the moths emerge from corn fields. Corn earworms initially feed in plant terminals, then blooms, older leaves and pegs as they mature. It is difficult to separate corn earworm from tobacco budworm with the naked eye; several non-pyrethroid products are effective on both.

Fall armyworms are not usually an economic problem on peanut, but they can occur in very high numbers during outbreak years. Infestations typically occur in mid-August, a couple weeks after corn earworms first appear.

Granulate cutworm can defoliate small plants in June and can also be a problem late in August where Lorsban was previously used because Lorsban kills fire ants and other predators. Granulate cutworms have distinctive Chevron or “sergeant stripe” markings along the back. Granulate cutworms initially feed on blooms, then leaves, pegs and pods as they mature. During the day cutworms can be found curled up under shed leaves and other organic matter on the soil surface. The larvae climb up the plant at night to feed. Symmetrical feeding damage (from feeding when the leaves are folded at night) is a clue to look for granulate cutworms on and in the soil.

Velvetbean caterpillars can rapidly defoliate late maturing peanuts during late August to October in southern coastal plain counties of S. C., especially Jasper, Hampton, Allendale and Colleton counties. Velvetbean caterpillars range from light green to almost black. A key identification characteristic is medium to large worms thrash violently when handled. Moths land with their wings out and have a line that stretches wing tip to wing tip. They are easy to control.

Scouting for Foliage Caterpillars: Use a 3' shake cloth to look for worms starting the last week of July. Work the dowel handle up under lateral stems to the plant crown and bend the other side of the plants over the cloth. Beat down vigorously 15 times to knock worms onto the cloth. Shake the plants, bend them back out of the way and count the worms on the cloth. Also count worms under the cloth on both sides of the row to calculate worms/row ft. Check at least three areas/field.

Rank-growing, unstressed peanuts with a closed canopy can tolerate at least 8 foliage feeding worms per row ft. The treatment threshold is 4 worms per row ft on stressed plants which have not lapped the middle or where Lorsban has previously been applied. Runner varieties with slow growing canopies can be more susceptible to direct injury from foliage feeding. Weed control may also be affected by delayed canopy closure on runner varieties. **Irrigation, vigorous canopy growth, and avoidance of unnecessary early season insecticide applications are the best defense against foliage-feeding worms.**

PEANUT INSECT CONTROL

Sucking/Piercing/Rasping Pests			
Insect	**Product**	**Rate/A**	**Comments**
Thrips In-furrow	Thimet 20G Admire Pro Velum Total AgLogic 15G	4.7 lb (38" rows) 10 fl oz 18 fl oz 7 lb	Preventative in-furrow thrips control is a must on all peanuts planted in S.C. Maximum labeled Thimet rate is 5.5 oz/1,000 row ft, equivalent to 4.7 lb/A on 38", 5.0 lb on 36", and 6.0 lb on 30" rows. Twin rows: use 3.5 oz/1,000 row ft in each row, which equals 6.0 lb/A on 38" centers. **Admire Pro and Velum Total control thrips but usually increase tomato spotted wilt virus. Pair with highly virus-resistant varieties (e.g., Bailey, Sugg, Sullivan).** Twin rows: maximum labeled rate for Admire Pro is 10.5 fl oz/A/season. Splitting 5 fl oz into each row will usually require follow up with foliar Orthene for adequate thrips suppression.
Thrips Foliar	Exirel 0.83 SE Orthene 75S Orthene 97SP Diamond 0.83EC Radiant SC	13.5-20.5 fl oz 0.5-1.0 lb 0.375-0.75 lb 6-12 fl oz 1.5-3 fl oz	Apply foliar Orthene immediately if in-furrow treatments do not prevent thrips stunting. Diamond suppresses immature thrips; it will not control adults. Exirel at cracking for thrips suppression.
Leafhoppers	Besiege 1.25 SC* Orthene 75S Orthene 97SP **Pyrethroids** Asana XL 0.66EC Baythroid XL 1EC Brigade 2EC Declare 1.25CS Karate Z 2.08CS Mustang Max 0.8EC Proaxis 0.5CS	5.0-8.0 fl oz 0.6-1.0 lb 0.5-0.75 lb 3.9 fl oz 1.0-1.8 fl oz 2.1-6.4 fl oz 1-1.5 fl oz 1.0-1.6 fl oz 1.75-4 fl oz 1.9-3.2 fl oz	Hopperburn starts on field borders usually in June - July. Treat if hopperburn is spreading across the field and approaching 15-20% symptomatic leaflets. Bailey and Sugg varieties are particularly susceptible to hopperburn. *Besiege is a pyrethroid + diamide mix. For control of both hoppers and worms, use worm rates below.
Spider mites	Comite II Omite 30WS	2.25 pt 3-5 lb	Use ground application, 20 gal/A at 40-60 psi. Repeat appl. after 5-7 days. Lorsban causes mite outbreaks. Avoid unnecessary worm insecticides to reduce mite risk**. Irrigation is the best mite defense.** Use of pyrethroids labeled for spider mite control (e.g., Danitol) is <u>not</u> recommended.
Three-cornered alfalfa hopper	Besiege 1.25 SC* Orthene 75S Orthene 97SP **Pyrethroids** Baythroid XL 1EC Brigade 2EC Declare 1.25CS Karate Z 2.08CS	5.0-8.0 fl oz 0.65 lb 0.5 lb 1.8-2.4 fl oz 2.1-6.4 fl oz 0.8-1.3 fl oz 1.0-1.6 fl oz	Treat at 45-60 days after planting to prevent injury. *Besiege is a pyrethroid + diamide mix. For control of both hoppers and worms, use worm rates below.

Foliage Feeding Worms			
Insect	**Product**	**Rate/A**	**Comments**
Beet armyworm, **Fall armyworm,** **Soybean looper**	Besiege 1.25 SC Blackhawk 36 WDG Coragen 1.67 SC Diamond 0.83EC Exirel 0.83 SE Intrepid Edge 3F Prevathon 0.43 SC Radiant 1 SC Steward 1.25 SC	6-10 fl oz 1.7-3.3 oz 3.5-5.0 fl oz 6-12 fl oz 13.5-20.5 fl oz 4-8 fl oz 14-20 fl oz 3-8 fl oz 9.2-11.3 fl oz	Unstressed plants with a large, closed canopy can tolerate 8 total worms/row ft. Treat if populations reach 4/row ft on drought stressed, unlapped peanuts or on fields previously treated with Lorsban. Fall armyworm attacks peanut in outbreak years from mid-August to early September. Loopers seldom significantly defoliate peanuts by themselves but typically occur with other defoliators. If Besiege or Coragen are used for loopers or beet armyworms, use the maximum labeled rate. Exirel not labeled for beet armyworm.
Corn earworm	Besiege 1.25 SC Blackhawk 36 WDG Coragen 1.67 SC Exirel 0.83 SE Intrepid Edge 3F Lannate 2.4 LV Lannate 90 SP Prevathon 0.43 SC Radiant 1 SC Steward 1.25 SC **Pyrethroids** Asana XL 0.66 EC Baythroid XL 1EC Brigade 2 EC Danitol 2.4 EC Declare 1.25 CS Karate Z 2.08CS Mustang Max 0.8EC Proaxis	6-10 fl oz 1.7-3.3 oz 3.5-5.0 fl oz 10-20.5 fl oz 4-8 fl oz 12-18 fl oz 0.25-0.38 lb 14-20 fl oz 3-8 fl oz 9.2-11.3 fl oz 3.9-5.8 fl oz 1.8-2.4 fl oz 2.1-6.4 fl oz 10.6-16 fl oz 1.0-1.5 fl oz 1.3-1.9 fl oz 3.2-4 fl oz 2.5-3.8 fl oz	Same threshold as for beet armyworm. Peanuts can often withstand significant defoliation (at least 30%) prior to pegging. We have not measure any yield response to treating early season earworm infestations. However, weed control on small canopy runners may be affected by delayed canopy closure. **Corn earworm is difficult to separate from tobacco budworm with the naked eye; several non-pyrethroid products are effective against both.**
Cutworms	See granulate cutworm recommendations under soil insects below.		
Tobacco budworm	Besiege 1.25 SC Blackhawk 36 WDG Coragen 1.67 SC Exirel 0.83 SE Intrepid Edge 3F Prevathon 0.43 SC Steward 1.25 SC	6-10 fl oz 1.7-3.3 oz 3.5- 5.0 fl oz 10-20.5 fl oz 4-8 fl oz 14-20 fl oz 9.2-11.3 fl oz	Same threshold as for beet armyworm. Peanuts can withstand significant defoliation (at least 30%) prior to pegging. We have not measured any yield response to treating early season budworm infestations. However, weed control on small canopy runners may be affected by delayed canopy closure. See corn earworm comment.
Velvetbean caterpillar	Besiege 1.25 SC Blackhawk 36 WDG Coragen 1.67 SC Diamond 0.83EC Dimilin 2L Intrepid Edge 3F Prevathon 0.43 SC Radiant 1 SC **Pyrethroids** Asana XL 0.66 EC Baythroid XL 1EC Brigade 2 EC Danitol 2.4 EC Declare 1.25 CS Karate Z 2.08 CS Mustang Max 0.8EC Proaxis 0.5 CS	5-8 fl oz 1.7-3.3 oz 3.5-5.0 fl oz 6-8 fl oz 2.0 fl oz 4-8 fl oz 14-20 fl oz 3-8 fl oz 3.9-5.8 fl oz 1.8-2.4 fl oz 2.1-6.4 fl oz 10.6-16 fl oz 1.0-1.5 fl oz 1.3-1.9 fl oz 1.3-4 fl oz 2.5-3.8 fl oz	Velvetbean caterpillar is a late season pest (Sep - Oct) that can defoliate peanuts quickly. This pest is usually easy to control but often misidentified as an armyworm, leading to unnecessary treatment cost. Adding Dimilin 2L (2 fl oz/A) to the last fungicide treatment will prevent VBC in high risk areas (southern coastal plain counties). **Do not use Dimilin to control established populations.** **Note:** Steward is one of the few insecticides that <u>will not</u> control velvetbean caterpillar.

Soil Insects			
Insect	**Product**	**Rate/A**	**Comments**
Burrower bug, **Lesser cornstalk borer,** **Southern corn rootworm,** **Wireworms**	All 4 pests: Lorsban 15 G Lesser cornstalk borer and southern corn rootworm only: Beseige 1.25 SC Wireworms only: Lorsban 4E (at planting) Lesser cornstalk borer only: Diamond 0.83EC Exirel 0.83 SE Prevathon 0.43 SC	13.3 lb 10 fl oz 4 pt 6-12 fl oz 13.5-20.5 fl oz 14-20 fl oz	Apply with a 5" bander directly over the row the first week of July. Some rain (~0.2") is needed within 10-14 days of application to be effective. Lorsban often causes spider mite and worm outbreaks. Burrower bug injury almost always occurs in reduced tillage fields under severe late season (Aug to early Sep) drought stress. Lesser cornstalk borer injury typically only occurs under severe drought stress. **Irrigation is the best defense against burrower bug or lesser cornstalk borer injury.** Besiege, Diamond, Exirel, or Prevathon for lesser corstalk borer – apply at first signs of feeding before pests reach damaging levels.
Granulate cutworm	Besiege 1.25 SC Coragen 1.67 SC Exirel 0.83 SE Prevathon 0.43 SC Steward 1.25 SC	8-10 fl oz 4-5.0 fl oz 13.5-20.5 fl oz 20 fl oz 9.2-11.3 fl oz	Treat if defoliation exceeds 30% on small plants in June or about 50-55 DAP. Previous Lorsban treatment triggers cutworm outbreaks in August. Granulate cutworms are now resistant to pyrethroids.
Note: there are many generic insecticide brands, particularly for pyrethroids. For equivalent rates compare active ingredient concentrations to the following table. Also see pre-harvest interval and use precautions. The label is the law. Always read and follow all pesticide label restrictions.			

PEANUT INSECTICIDE ACTIVE INGREDIENTS & USE PRECAUTIONS

Active ingredient	Brand name and formulation	IRAC* Group	PHI (Days)	Comments
Acephate	**Orthene** 75S **Orthene** 97SP	1B	14	Do not feed or graze.
Aldicarb	**AgLogic** 15G	1A	90	Do not feed or graze. Do not exceed 17 lb/A/season.
Chlorpyrifos	**Lorsban** 15G	1B	21	Do not exceed 26.6 lb/A/season.
Diamides				
Chlorantraniliprole	**Coragen** 1.67 SC **Prevathon** 0.43 SC	28 28	1 1	Do not exceed 4 appl. per season or 0.2 lb a.i. of chlorantraniliprole per acre/season.
Chlorantraniliprole + lambda-cyhalothrin	**Besiege** 1.25 SC	28 3A	14	Do not exceed 31 oz/A/season.
Cyantraniliprole	**Exirel** 0.83 SE	28	14	Do not exceed 0.4 lb a.i. per acre per year.
Diflubenzuron	**Dimilin** 2L	15	28	Do not exceed 3 appl. per season.
Imidicloprid	**Admire Pro** 4.6F **Velum Total** 2.17F	4A	14	Increases tomato spotted wilt virus; use only on highly resistant varieties. Do not feed or graze.
Indoxycarb	**Steward** 1.25 SC	22	14	Do not exceed 45 fl oz/A/season.
Methomyl	**Lannate** 2.4 LV **Lannate** 90 SP	1A	21	Do not feed or graze.
Methoxyfenozide + spinetoram	**Intrepid Edge** 3F	18 5	7	Do not exceed 3 appl./season. Max 1 lb methoxyfenozide or 0.188 lb spinetoram/A/season. Do not feed or graze.
Novaluron	**Diamond** 0.83EC	15	28	Do not exceed 36 fl oz/A/season. Do not feed or graze.
Phorate	**Thimet** 20G	1B	90	Do not exceed 5.5 oz/1000 row ft or 7.5 lb/A. Do not feed or graze.
Propargite	**Comite II** 6 EC **Omite** 30WS	12C	14	Do not exceed 2 appl. per season. Do not feed or graze.
Pyrethroids				
Beta-cyfluthrin	**Baythroid XL** 1 EC	3A	14	Do not exceed 0.066 lb ai/A/season.
Bifenthrin	**Brigade** 2 EC		14	Do not exceed 0.5 lb ai/A/season. Do not feed or graze treated vines.
Esfenvalerate	**Asana XL** 0.66 EC		21	Do not feed or graze.
Fenpropathrin	**Danitol** 2.4 EC		14	Do not feed forage or hay within 14 days of treatment. Do not exceed 2.66 pt/A/season.
Gamma-cyhalothrin	**Declare** 1.25 CS **Proaxis** 0.5 CS		14	Do not exceed 0.38 pt/A (Declare) or 0.96 pt/season (Proaxis).
Lambda-cyhalothrin	**Karate Z** 2.08 CS		14	Do not feed or graze.
Zetamethrin	**Mustang Max** 0.8EC		7	Do not exceed 0.15 lb ai/A/season. Do not feed or graze.
Spinetoram	**Radiant** 1 SC	5	3	Do not exceed 3 appl. per season. Do not feed or graze.
Spinosad	**Blackhawk** 36 WDG	5	3	Do not exceed 9 fl oz/A/season.

*IRAC group number (Insecticide Resistance Action Committee) indicates mode of action. Repeated pest exposure to the same mode of action increases the risk of insecticide resistance. **Note: there are many generic insecticide brands, particularly for pyrethroids. For equivalent generic rates compare active ingredient concentrations to this table. The label is the law. Always read and follow all pesticide label restrictions.**

DETERMINING HARVEST MATURITY

D. Anco and J.S. Thomas

Determining when to dig is highly important because peanut maturity determines grade and yield. Over-mature peanuts can quickly lose peg strength, resulting in significant yield loss. There are many practical considerations which affect digging date such as vine health, weather forecast, total acreage and combine capacity. A sound disease management program in the critical 60 – 105 DAP interval provides the vine health needed later in the season to leave the crop in the ground to build grade, weight and crop value. Late season storms may also require leaving the crop in the ground longer than planned. If a large acreage is planted late, some fields may have to be dug before reaching maximum grade to reduce overall risk. It is seldom practical to dig every field at optimum maturity, but there are some useful guidelines to determine when to start digging, and which fields are most mature.

Days After Planting (DAP) should never be used as the sole basis for determining digging date, but it is a good guideline for when to check fields and can be used in combination with other methods. Peanuts can reach harvest maturity from 120 – 150+ days in S. C. depending on variety and growing season, but 130 – 140 days is typical for medium maturity varieties, with Virginia types generally on the short end and runners on the long end of this interval. Never dig at less than 130 DAP without verifying maturity by checking pod color. Once peanuts reach 150 DAP (140 days for Virginia types), the risk of declining peg strength on over-mature pods goes up significantly on mid-maturity varieties. Over-mature pods often have a slight pink tint to the outside of the pod (see pictures), a coal-black mesocarp, a tan-brown seed coat, and may have visible deterioration of the peg.

Simplified Three Pile Hull Color Method: Pod maturity can be determined by scraping away the outer hull layer with a pocket knife or blasting with a pressure washer to reveal the color of the middle layer or mesocarp. Put the pods in a 12" diameter wire basket made of ¼" hardware cloth. A small electric pressure washer with 1,300 – 1,600 psi is adequate, but make sure it has an oscillating or "turbo" type nozzle.

As peanuts mature the mesocarp color changes from white to yellow, orange, brown, and then black. Kernels in pods with an orange mesocarp color, and even most kernels in late-yellow stage pods are mature enough to ride the grade screen (sound mature kernels). Although these yellow and orange pods may produce sound mature kernels, they will continue to increase both yield and grade by adding weight as they mature.

Pull up a clump of 2 – 3 plants from a representative area of the field, and remove all full-size pods (100 – 200). Be sure to remove all full-size/harvestable pods rather than selecting just the most mature. Scrape the upper surface or "saddle" of each pod and place in one of three piles corresponding to color (white to yellow, orange, and brown to black).

Count the pods in each pile and determine the percentage for each color pile. **For Virginia types, the maturity target is to have 70% of pods in the orange, brown and black categories combined, 30% of pods in the brown and black categories combined, and 1-2% coal black. For runners the target is to have 75 – 80% in orange + brown + black categories, 40% in brown + black categories, and 5% coal black.** The objective of these guidelines is to attain at least a 70% grade (total sound mature kernels). It takes about 10 – 14 days for pods to move from the midpoint of one color category to another. The brown-black category will increase by about 1% per day under adequate soil moisture and temperature conditions.

RELATIONSHIP BETWEEN PLANT AGE AND HARVEST MATURITY

Days after planting	Pod mesocarp color categories	Maturity comments
120	Late yellow and orange color categories have the most pods.	Check fields by hull color, planting date, and variety to begin to determine the order of digging and which will mature first.
130	Orange to brown mesocarp color categories have the most pods.	130 DAP is considered an early digging date for medium maturity runner varieties under typical weather conditions, but medium maturity Virginia types can mature in 132 – 135 days. Mature peanuts should produce grades of at least 70% TSMK under adequate rainfall conditions.
140	30 – 40% brown/black mesocarp color; some pods have slight pink exterior color indicating over-maturity.	Medium maturity runners mature; Virginia types can become over-mature. Grade should be excellent (at least 72% TSMK) assuming normal rainfall.
150	Over 40% of harvestable pods in brown/black category. Seed coat turns tan to copper color on over-mature pods and some pegs may be deteriorated.	Deteriorating peg strength on over-mature pods can cause significant loss, particularly on Virginia types.

NEVER RELY ON PLANT AGE ALONE TO DETERMINE DIGGING DATE. THIS IS ONLY AN EXAMPLE UNDER TYPICAL GROWING CONDITIONS. MANY FACTORS INFLUENCE ACTUAL MATURITY.

Maturity Board: Pods are collected and scraped or blasted as described above to reveal mesocarp color. The pods are then laid out on a color chart to predict days to maturity.

Shell Out Method: This is a traditional method used for Virginia type peanuts. Pods are twisted or snapped open to check for internal hull color. When 65% of pods have some darkening on the inside of the hull and veins apparent on the seed coat, the sample is considered mature.

Digger Operation: More yield is lost from improper digging date decisions and digger operation than any other aspect of peanut production. The digger has to stay centered on the row. Check taproot length on inverted peanuts to see that pods are not being sheared off from running too shallow. Also check the inverted row for "stars" on the end of pegs which indicate excessive pod loss. These stars are formed from pieces of the hull when the peg breaks at the point of pod attachment. When pegs break at the pod attachment point, it indicates a physical problem such as dull blades, improper angle or depth, hard ground, or shaker speed not matching ground speed. If pegs break in the middle instead of at the point of pod attachment, there will be no "stars" on the ends of the pegs and the pods will still have a short length of peg attached. This condition indicates that pod loss is being caused either by disease or over-maturity.

Digger ground speed should match pto speed such that the vines flow smoothly up over the digger. As a general guide, losing one pod per row ft equals at least 40 lb/A yield loss on runners, or 60 lb/A loss on large Virginia types. Waiting even a single day can sometimes make a dramatic difference in harvest loss on wet soils. Combine setup is critical to maintaining grade. Try to avoid having peanuts weather after digging since wetting and drying causes loose shelled kernels (LSK). LSKs are correlated with aflatoxin contamination. Prolonged wetting after inversion can also cause mold and sprout problems.

The following chapter includes greater details on these subjects.

PEANUT HARVEST MACHINERY SETUP AND OPERATION GUIDE

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The purpose of this chapter is to provide growers with some items to consider relative to harvest losses and capacities when operating diggers and combines. Digger setup and operation, along with proper timing often has a greater impact on yield recovery than any other aspect of peanut production; put simply, more revenue can be made or lost during digging than during any other field operation from seedbed preparation to combining. Even with the greatest care in proper setup and maintenance, digging losses in 2013 through 2017 Clemson studies on Virginia type peanuts were demonstrated to range from 52-700 lb/ac (average 275 lb/ac) under good soil moisture conditions (3-7% volumetric moisture content) and 140-600 lb/ac (average 344 lb/ac) under dry soil moisture conditions (1.6-2.4% volumetric moisture content). In all of these studies, the numbers reported were as dry weight and only those losses considered to be mechanically induced; over-mature and diseased pod losses were not included in the numbers reported.

Digger: Row Center Deviation

Substantial losses will be incurred if the digger's path is not maintained precisely over the row center. One study indicated 105 lb/ac yield loss for every 0.5 in. deviation from row center (Ortiz et al., 2013). Studies conducted by N.C. State and University of Georgia independently demonstrated approximately 10% boost in yield recovery from the implementation of RTK auto-steering to maintain the peanut digging path directly over the planting path (Gary Roberson and George Vellidis, personal communication). While capital costs of such guidance systems are high, the payoff period can be short due to the large gains. Assuming 2 ton/ac peanuts at $400/ton, a 10% increase in yield recovery would amount to an additional 0.2 tons/ac, or $80/ac. The average peanut producer in S.C. harvests about 250 ac per year, so his expected return on investment from an RTK system could be as much as $20,000 in just the first year, which is in the ballpark of the cost of an RTK guidance system. In other words, the system would be paid for in the first year.

Digging Angle (and therefore depth)

Digging angle is controlled by top link extension length. Retracting or shortening the top link results in a more aggressive angle, causing the blades to run deeper; extending or lengthening the top link results in a less aggressive angle, causing the blades to run shallower. To complicate this, soil friability will also have an effect on blade depth. Soil friability defines the ease in which digger blades and pods can be moved through the soil; generally heavier soils or less sandy textures have lower friability and lighter soils or sandier textures have higher friability. Soil moisture and organic matter content can also impact friability – generally friability increases with increasing soil moisture and/or organic matter content. While increasing soil moisture content generally results in improved friability and therefore reduced digging losses, in soils with sufficient clay content there is a point where further increasing moisture content can make the soil sticky, which will cause it to adhere to the digger blades and to the pods, increasing digging losses.

It has been speculated that the primary function of the digger blade is to sever the tap root. Observations from Clemson research suggest that another important function of the blade is to destroy the soil structure in the pod zone, making the pods easier to remove from the soil. If the blade is too deep, then it has less effect on destruction of the pod zone. If the digging angle is set properly for the least friable soil in a field, then it will likely be too aggressive and therefore too deep in the most friable soil. Clemson studies have demonstrated that the effect of soil friability on blade depth as a function of digging angle is most pronounced in dry soil conditions, where the

soil is less friable. Clemson studies also suggest that the effect of soil friability on blade depth is most pronounced with lighter weight diggers; i.e., heavier digger models (per unit width) have less tendency to move vertically. Proper depth adjustment results in blades cutting the taproot about an inch below the pods. The digger blade experiences less resistance in more friable soils, allowing it to move to a greater depth at a given top link adjustment than the depth to which it would travel in a less friable soil. Conversely, less friable soils provide greater resistance to blade travel than more friable soils, which causes the blade to travel to a shallower depth for a given top link position.

If the top link is too short, the peanuts will be dug too deep and excessive soil builds up on blades causing losses presumably by pushing the plants forward before the taproot is severed. Additionally, destruction of the soil structure in the pod zone is reduced at greater blade depths. In extremely too deep cases, the taproot is not sheared, the soil structure is intact, and plants are ripped from the ground. Further losses may occur as pods ride over soil mounded on the blades. If the top link is too long, the peanuts will be dug too shallow, shearing some pods and leaving others in the soil. So, if the top link is properly setup for a medium texture soil, relative to the range present in a given field, movement into a lighter or more friable soil will result in excessive blade depth and movement into a heavier or less friable soil will result in inadequate depth, both of which conditions will contribute to greater harvest losses. This assumes that the field has sufficient differences in soil variability to warrant different settings.

While Clemson University and Amadas Industries (Amadas Industries, Inc., Suffolk, Va.) are working on development of an automated blade depth control system, the technology is not currently commercially available. In the meantime, a 2013 digging loss study in Virginia type peanut conducted by Clemson University at Edisto REC provides some direction as to proper top link setup for soils with variable textures. In this study, the proper digging angle was established in each of three soil texture zones on the basis of EC, defined as “lightest”, “medium”, and “heaviest”. If the entire field had been dug using the proper digging angle for the lightest texture, digging losses would have been 720 lb/ac. Applying the proper digging angle for the medium texture to the entire field would have resulted in 474 lb/ac digging losses. And, application of the proper digging angle for the heaviest soil texture to the entire field would have resulted in digging losses of 437 lb/ac. So, this study suggested that if a fixed top link position is to be applied across the entire field, that the least digging losses will be incurred if that setting is determined in the heaviest or least friable soil in the field. In short, the study suggested that if proper depth cannot be maintained, then it is better to dig too deep than to dig too shallow.

The 2013 Clemson study also indicated that on-the-go adjustment of digging angle to match conditions should result in reduced digging losses. There are operators who adjust digging depth on-the-go; to do so, they generally set the top link for the heaviest (least friable) soil texture in a field with the three point hitch in its lowest position, resulting in the most aggressive digging angle required. When lighter, or sandier soils are encountered where the blades would otherwise travel too deep, adjustment is performed by either lifting the three point hitch slightly or by manually extending a hydraulic top link. Such methods require a high level of operator experience and attentiveness but can be very successful in reducing digging losses. This on-the-go adjustment is the same principle employed in the Clemson/Amadas digging depth control technology, except that adjustment is automated through feedback from a depth gauge sensor mounted to the digger.

Digger: Conveyor Speed

Amadas and KMC operator’s manuals suggest that the conveyor speed should be matched to your forward travel speed. It is generally assumed that conveyors traveling too fast tend to prematurely rip the vines from the soil, which increases pod losses. It is also assumed that conveyors traveling too slowly tend to cause the vines to bunch up at the bottom of the conveyor, causing excessive

agitation of the vines and therefore increased pod losses. A 2016 Clemson study demonstrated similar results for Amadas and KMC diggers in Virginia type peanut, suggesting that digging losses for 80-110% conveyor speed (as percent of travel speed) were similar, whereas digging losses increased by 100-200 lb/ac when conveyor speed was equal to 120% of travel speed. Results from a similar Clemson study in 2017 suggested optimum conveyor speeds of 85% for both digger brands in Virginia type peanuts, with significant reductions in yield (>250 lb/ac) at all higher conveyor speeds tested (100%, 115%, and 130%). Similar tests in 2017 in runner type peanut suggested that optimum conveyor speeds for the KMC digger were 100-115%, with at least 350 lb/ac reduction in yield observed from digging at 70%, 85%, or 130%; results for the Amadas digger in runner peanut in 2017 were inconclusive at the time of this report. The results do not refute the manufacturers' recommendations of matching conveyor speed to ground speed, but suggest that lagging the conveyor slightly in excessive vine growth conditions (e.g., Virginia type peanuts) may be beneficial. More testing across a range of soil textures, soil moistures, and peanut varieties must be conducted for confidence in recommendations.

A simple way to set the conveyor speed to match ground speed is to adjust it until the inverted windrow falls slightly (about 2 ft) down-field from where the plants were growing. This can be assessed by placing a flag outside of the digger path at the beginning of a row and observing the location of the end of the windrow relative to the flag. This only works well if the digger is engaged at full operating speed prior to entering into the peanuts. If the end of the windrow is several feet farther into the field than the flag, then the conveyor speed is lagging. If the end of the windrow is equal in position to or behind the flag, then the conveyor is faster than the ground speed. Current models of Amadas and KMC diggers provide an interface with a digital readout of the conveyor speed in mph, so that hydraulic flow rate can be easily adjusted to match conveyor speed to travel speed.

In absence of a digital readout, an accurate method of setting conveyor speed relative to ground speed can be conducted through simple calculation and setup. Clemson Precision Ag has created a conveyor speed calculator website at the following link:

http://precisionag.sites.clemson.edu/Calculators/PeanutDigger/ConveyorSpeed/

Digger: Ground Speed

Amadas literature suggest "starting speeds" of 2.5 to 3 mph and KMC literature suggests ground speeds of 3 to 3.5 mph. KMC further suggests that digging too fast causes bunching and that digging too slowly pulls vines apart, pulling off pods. The larger pod Virginia type peanuts have more surface area per pod and therefore higher drag forces, so they are more likely to be ripped from the peg resulting in losses. Because of this, it is reasonable to assume that lower speeds should be used for Virginia type peanuts, as compared to those used for runner type and other, smaller pod peanuts.

A 2016 Clemson study in Virginia type peanuts tested ground speeds of 2, 3, 4, and 5 mph on Amadas and KMC 2-row diggers. Conveyor speed for these tests was set to match ground speed. The Amadas digger was tested in a Champs variety field, and the KMC digger was tested in a separate Wynne variety field. Results from the Amadas test showed no significant difference in digging losses between ground speeds of 2 and 3 mph, which resulted in the lowest digging losses, with an increase in digging loss of 230 lb/ac per mph above 3 mph. The results suggested an economically optimum digging speed of 3 mph for the Amadas digger, given the conditions in the study. Results from the KMC test showed significant differences in digging losses between the 2, 3, and 4 mph digging speeds, with the least digging losses incurred at 2 mph and 270 lb/ac additional losses for each mph above 2 mph. The results suggested an economically optimum digging speed of 2 mph for the KMC digger, given the conditions in the study. Because the two

diggers in this study were tested in different peanut varieties and separate fields, comparison of performance between the diggers from this test is not appropriate.

A similar test in 2017 showed similar results for both diggers. Comparisons between diggers cannot be made because the tests for each digger were conducted in different fields with different varieties. There was no significant difference in yield for the KMC digger in runner type peanut at speeds of 1.5 and 2.5 mph, but a significant yield reduction (>500 lb/ac) was observed from digging at 3.5 mph or 4.5 mph. Tests on the Amadas digger in runner type peanut were inconclusive at the time of this report. For the KMC digger in Virginia type peanut, there was a significant reduction in yield from digging at any speed above 1.5 mph; yield losses were approximately 160 lb/ac per mph above 1.5 mph. The same results were observed in the Amadas digger in Virginia type peanut with significant yield reduction observed at any ground speed greater than 1.5 mph, amounting to about 240 lb/ac in yield reduction per mph above 1.5 mph.

In ideal situations, digging ground speeds should be economically optimized. Further testing is required to substantiate, but it is expected that optimum digging speeds will vary as a function of conditions. Theoretically, economically optimum digging speed should: decrease with increasing pod size, increase with increasing sand content, increase with increasing organic matter, and decrease with decreasing soil moisture content. However, weather conditions at harvest and required timeliness of digging with respect to other farming operations must also be considered, which make generalizations about economically optimum digging speeds challenging to make. Table 1 can be used as a general guide for selecting digger speeds; it assumes a field efficiency (digging time divided by total time in field) of 85% and a row width of 38 inches.

Peanut digging capacities and operating times across various ground speeds for 4- and 6-row diggers on 38 inch rows.

4-Row Diggers			6-Row Diggers		
Speed (mph)	Capacity (ac/hr)	Time (hr/10 ac)	Speed (mph)	Capacity (ac/hr)	Time (hr/10 ac)
2	2.6	3.8	2	3.9	2.6
2.5	3.3	3.1	2.5	4.9	2.0
3	3.9	2.6	3	5.9	1.7
3.5	4.6	2.2	3.5	6.9	1.5
4	5.2	1.9	4	7.8	1.3
4.5	5.9	1.7	4.5	8.8	1.1
5	6.5	1.5	5	9.8	1.0

Estimation of Digging Losses

If you suspect problems with your digger setup or if you want to compare one mode of operation to another, you may want to take the time to estimate your digging losses. Digging losses are challenging to quantify because they must be distinguished from combining losses and because some of the lost pods are located below-ground. The best way to effectively measure pod losses is to count or weigh pod losses within a particular sample area. Sampling should be conducted after digging but prior to combining. A standard sample grid should be constructed, such as a small PVC pipe frame. A manageable frame size would be one or two rows wide by one foot long. Multiple samples should be collected from different areas to build confidence in the estimate, as digging losses can be highly variable. Sampling requires carefully moving a section of windrow to the side, placing the frame on the ground, and collecting all above- and below-ground losses found within the frame area. Digging losses will generally be greatest in the least sandy (heaviest) soils and lowest in the sandiest (lightest) soils, so it may be desirable to take samples from different areas of the field, although the most economically important areas to assess are generally the heavier soils.

NOTE: Digging losses reported in all of the above tests reflect what we refer to as mechanical digging losses; over-mature and diseased pods are not included in the counts. If you are comparing modes of operation of the digger, over-mature and diseased pods should be ignored, as they are generally not attributable to digger setup and operation.

A general estimate of losses is provided elsewhere in this guide, stating that each pod lost per row foot is equivalent to 40 lb/ac in runner type and 60 lb/ac in Virginia type peanuts. A more accurate estimate of dry weight collected from the sampling area can be calculated by multiplying the estimated dry weight per pod by the number of pods. Table 2 gives some estimates of dry weight per pod for different pod lengths.

Estimated peanut pod dry weight as a function of pod length (Virginia types). From Clemson Agricultural Mechanization & Business, student Creative Inquiry data.

Pod Length, in	Pod Dry Weight, g	Pod Length, in	Pod Dry Weight, g
0.50	0.499	1.50	2.076
0.75	0.269	1.75	2.245
1.00	1.391	2.00	2.534
1.25	1.732	2.25	3.457

Another estimate of pod dry weight determined by the Clemson Agricultural Mechanization & Business undergraduates enrolled in a Creative Inquiry project was by measurement of total sample length. If all pods are lined up end to end, the total length of the "pod line" formed can be used to estimate weight of the sample as: DW = 1.423 * L (Eq.1), where DW is dry weight in grams and L is length of "pod line" in inches. More accurately, Equation 1 can be used to calculate digging losses based on each sample collected (Eq. 2):

$$\text{Loss} = \frac{\text{DW}}{\text{L} \cdot \text{W}} \cdot 15{,}193$$

Where,
Loss = digging losses (lb/ac),
DW = dry weight of sample (g), as estimated above,
L = length of sampling frame (in), measured along row, and
W = sampling frame width (in).

Example calculation. Consider an example where 12 pods averaging 1.5 in. length were collected from within a sampling frame, with a sampling frame width of 38 in. and a sampling frame length of 12 in. Using the data in Table 2, the dry weight of the sample is estimated to be 12 · 2.076 = 24.9 g. Alternatively, length of a "pod line" from the same sample would be 18 in. and Eq. 1 would estimate the sample dry weight to be 1.423 · 18 = 25.6 g. Either of these values could then be applied to Eq. 1 to estimate pound per acre digging losses, for example:

$$\text{Losses} = \frac{25.6}{12 \cdot 38} \cdot 15{,}193 = 853 \text{ lb/ac}$$

Estimating Yield from Windrow Pod Count

There are occasions when a grower wishes to estimate peanut yields after digging but before combining. We have provided a calculator for your use in doing this, which is based on a pod count and estimated weight per pod. The calculator is available at the following link:

http://precisionag.sites.clemson.edu/Calculators/EstimatePeanutYield/

Peanut Combine Field Capacities

Estimation of peanut combine field capacity is especially useful when seeking to match your harvest capacity with your digging capacity. Data collected from several years of peanut combine harvest data was used to estimate typical field efficiencies for peanut combines. Header width multiplied by ground speed determines your theoretical field capacity, which is the amount of field area covered per unit time when harvesting. The field efficiency takes into account turning time, unloading time, and other "non-working" time in the field; it is calculated as "harvesting time" divided by "total time in the field". Field efficiency multiplied by theoretical field capacity calculates effective field capacity, which is the reasonable amount of area you should expect to be able to cover per unit time. When applying field capacity to determine harvestable acres per day, be sure to account for an appropriate number of suitable harvest hours in the day, since peanut combines in S.C. conditions can generally only work for a portion of each day. The tables below can be used to estimate effective field capacity. Combines with conveyor offloading systems have higher field capacities than those with dump-type offloading because offloading time is reduced if not eliminated entirely as "down-time". Self-propelled combines also have higher field efficiencies than pull-type combines, mostly due to reduction in turning time. The following four tables provide estimated field capacities by combine type, header width, and ground speed. The field efficiencies applied here were generalized from field data but may not match the field efficiencies from your operation.

	Pull-Type, Dump, FE=0.60		
	Effective Field Capacity ac/hr		
Speed mph	**12 ft Width**	**18 ft Width**	**24 ft Width**
0.50	0.44	0.65	0.87
0.75	0.65	0.98	1.31
1.00	0.87	1.31	1.75
1.25	1.09	1.64	2.18
1.50	1.31	1.96	2.62
1.75	1.53	2.29	3.05
2.00	1.75	2.62	3.49
2.25	1.96	2.95	3.93
2.50	2.18	3.27	4.36
2.75	2.40	3.60	4.80
3.00	2.62	3.93	5.24

	Pull-Type, Conveyor, FE=0.75		
	Effective Field Capacity ac/hr		
Speed mph	**12 ft Width**	**18 ft Width**	**24 ft Width**
0.50	0.55	0.82	1.09
0.75	0.82	1.23	1.64
1.00	1.09	1.64	2.18
1.25	1.36	2.05	2.73
1.50	1.64	2.45	3.27
1.75	1.91	2.86	3.82
2.00	2.18	3.27	4.36
2.25	2.45	3.68	4.91
2.50	2.73	4.09	5.45
2.75	3.00	4.50	6.00
3.00	3.27	4.91	6.55

	Self-Propelled, Dump, FE=0.75		
	Effective Field Capacity ac/hr		
Speed mph	**12 ft Width**	**18 ft Width**	**24 ft Width**
0.50	0.55	0.82	1.09
0.75	0.82	1.23	1.64
1.00	1.09	1.64	2.18
1.25	1.36	2.05	2.73
1.50	1.64	2.45	3.27
1.75	1.91	2.86	3.82
2.00	2.18	3.27	4.36
2.25	2.45	3.68	4.91
2.50	2.73	4.09	5.45
2.75	3.00	4.50	6.00
3.00	3.27	4.91	6.55

	Self-Propelled, Conveyor, FE=0.90		
	Effective Field Capacity ac/hr		
Speed mph	**12 ft Width**	**18 ft Width**	**24 ft Width**
0.50	0.65	0.98	1.31
0.75	0.98	1.47	1.96
1.00	1.31	1.96	2.62
1.25	1.64	2.45	3.27
1.50	1.96	2.95	3.93
1.75	2.29	3.44	4.58
2.00	2.62	3.93	5.24
2.25	2.95	4.42	5.89
2.50	3.27	4.91	6.55
2.75	3.60	5.40	7.20
3.00	3.93	5.89	7.85

AVOIDING COLD INJURY

In S. C. we have enough peanut growing season to minimize the risk of cold injury in most years. However, having a significant acreage planted late (after 25 May) and drought stress during pod fill are factors that delay harvest and increase the risk of cold damage.

A peanut planted on 26 May will reach 140 DAP on the 13th of October. It's not a problem to have some peanuts planted the last week of May and even a few in early June. We typically still have excellent combining conditions in mid-October. The problem comes when a lot of acres are planted late and need to be combined in mid to late October. Any glitch in the weather gets us behind and pushes combining toward November when cold injury risk climbs every day.

A mid season drought also delays harvest if we have enough rain in August to set a late crop of pods that we have to wait on.

Peanuts are usually most susceptible to frost the day they are dug because the kernel moisture content is high. Kernels with freeze injury are included in the "damaged kernel" category and like anything that contributes to damaged kernels, can potentially cause catastrophic loss. **When total damaged kernels reach 3.5%, the peanuts are assigned to segregation 2 (the oil market) and can be sold for as low as 35% of loan ($125/ton) if they can't be cleaned below 3.5% total damage.**

Fortunately, when we get a predicted frost risk in late Oct. to early Nov. in the S. C. coastal plain, it is usually a one or two-day event followed by warmer weather. So it makes sense to watch the forecast and plan on interrupting digging for a day or two until the front moves through if a hard frost is predicted. Peanuts which have dried for three days have relatively low frost injury risk.

Predicting ground level frost is tricky since forecast lows are based on temperatures about 5 ft above ground height. The actual temperature on dug peanuts is kept warmer by heat radiating from the soil. Local terrain and air drainage complicates the issue, because low pockets in fields are sinks for cold air and may frost.

The bottom line is that with lows predicted at 38°F we keep digging, with lows predicted at 34°F we wait a day for sure, and with lows in between 35 – 37°F it becomes a judgement call for how well you feel the weather prediction is for individual fields.

What about frost damage to the foliage of peanuts still in the ground? Peanuts in the ground are safe. A light frost will cause some terminal browning that the plant can tolerate. Even if a hard frost in November kills 50% of the leaves or more, the peanuts will hold on the plant for a week or more until favorable weather arrives.

After the frost moves through we can go back at it. Don't count on severely frost-singed peanut vines maturing more, but don't feel like they have to be dug the day after frost hits the leaves either. We have seen runners with 50% of the leaves burned green back up with new foliage. Just get to them as soon as you have good digging conditions. In November we run out of growing season for peanut anyway since there is little progress during any part of the day below 60°F.

In summary, if you can help it, don't dig right before a potential hard frost is forecast.

PEANUT GRADING – TERMINOLOGY AND ECONOMIC SIGNIFICANCE

D. Anco and J.S. Thomas

The following definitions are intended to assist growers in understanding the economic significance of peanut grading terminology. A simplified description of the grading process is used which does not include all aspects of USDA approved peanut grading procedures.

Farmers' Stock Peanuts: The peanuts the grower brings to the buying point.

Foreign Material (FM): Everything other than loose peanut kernels and in-shell peanuts in the farmers' stock sample. Foreign material includes dirt, peanut vines, sticks, stones, insect parts, peanut hulls, and "raisins" or "twisters". Raisins or twisters are very immature, shriveled pods which can not be commercially shelled.

Foreign material is the first component to be separated from the grade sample of farmers' stock peanuts. There is no penalty for foreign material up to 4%. At 5% FM there is a 0.05 cents/lb ($1/ton) penalty which increases with additional % FM. At 10% FM, the penalty is 0.3 cents/lb ($6/ton or $12/A for 2-ton peanuts). Foreign matter penalties may vary at different buying points. For example, some charge no penalty up to 7% but then impose a $10/ton cleaning fee.

LSK (loose shelled kernels): Kernels and parts of kernels which are free from the hull in a load of farmers' stock peanuts.

LSKs are the second component separated out in grading. **LSKs are undesirable** because they spoil more rapidly and are **more likely to be contaminated with aflatoxin**. LSKs are checked for Aspergillus mold by the grader.

LSKs are worth only $0.07/lb ($140/ton) vs. $0.18/lb ($360/ton) for an "average" 72% TSMK load. So **each percent LSK results in a $2.20/ton loss ($4.40/A for 2-ton peanuts)**.

At this point the grade sample has had the foreign material and LSKs removed. The remaining intact pods are then run down a set of sizing rollers to presize them for proper shelling and to determine the percent "fancy pods" for Virginia types.

Fancy Pods: The percentage of fancy (larger) pods is determined (Virginia types only) by the percentage that rides a 34/64" roller spacing. **The grower is not rewarded for fancy pods** other than that they must meet the 40% fancy pod minimum to qualify for the Virginia type market.

At this point the sample is shelled and the kernels will be mechanically shaken on screens.

ELK (extra large kernels): An ELK screen is **used only for Virginia types**. ELK is the percentage by weight of kernels from the shelled sample that rides a 21.5/64 x 1" screen.
There is a premium of 0.0175 cents/lb (35 cents/ton) for each percent ELK. A 40% ELK has a premium value of $14/ton (about $28/A for 2-ton peanuts). Let's say you grow a Bailey with a 38% ELK vs. a Gregory with a 48% ELK, the **10% ELK difference would be worth $3.50/ton or only about $7/A** for assuming the extra risk of growing a large-pod variety.

SMK (sound mature kernels): The percentage by weight of kernels from the shelled sample that

rides a 15/64 x 1" (Virginia type) or 16/64 x ¾" (Runner type) screen.

Each percent increase in SMK increases peanut value by about $5.00/ton. See TSMK below.

SS (sound splits): The percentage by weight of kernels from the shelled sample that consists of undamaged split kernels or broken kernels (undamaged ¼ to ¾ kernel pieces; pieces less than ¼ kernel remain in OK (other kernel category); pieces larger than ¾ kernel are considered SMKs.

There is no sound split penalty up to 4% and for each percent above 4, the penalty is only 80 cents per ton.

TSMK (total sound mature kernels): TSMK is the total of SMK (sound mature kernels) + SS (sound splits). ELKs (extra large kernels) are also included in TSMK for Virginia types.

This is the number that counts. Each percent increase in TSMK is worth about 0.25 cents/lb ($4.96/ton), or about $10.00/A for 2-ton peanuts. So a 1 point increase in TSMK is worth more than a 10 point increase in ELK. Higher TSMK also correlates with higher yield.

OK (other kernels): The percentage by weight of kernels from the shelled sample that falls through the SMK screen. Other kernels are mostly smaller, less mature kernels. Pieces of broken kernels less than ¼ kernel size are also included in other kernels.

Other kernels are worth less than sound mature kernels. When you look at a grade sheet this might not be clear because as the percent OKs increases from left to right on the price sheet, the sample value increases by about 0.07 cents/lb ($1.40/ton) for each point increase. So it might look like higher OK values are good news, but compare that 0.07 cent/lb increase to the 0.25 cent/lb ($4.96/ton) value of a 1 point increase in TSMK (read up the chart). Immature kernels (OKs) are worth something, but mature kernels (SMKs) are worth more.

DK (damaged kernels): The percentage by weight of kernels from the shelled sample that are judged to be inedible due to decay, mold, insect damage, sprouting (> 1/8"), discoloration or pitting darker than light yellow, freeze damaged, or skin-discoloration (< 3.5%).

Although graders do have picture and definition guidelines, **the determination of damaged kernels is somewhat subjective**. Minor pitting, discoloration, or other damage to the kernel skin or flesh does not constitute a damaged kernel. Notice that broken kernels are also <u>not</u> included in damaged kernels; instead they are classified as sound splits and thus contribute to TSMK.

Damaged kernels are the major component of total damage penalties – see below.

Freeze Damage: The percentage by weight of kernels from the shelled sample that have characteristics of freeze damage such as hard, translucent, or discolored flesh. This damage is included in damaged kernels (DK) and thus contributes to total damage.

Concealed Damage – RMD:
Concealed damage – rancid, moldy, or decayed, is damage detected after the kernel sample is put through a kernel splitter and examined on a belt. This damage is added to damaged kernels (DK) to determine total damage.

Total Damage: The sum of damaged kernels (DK), including freeze damage and concealed RMD.

Once total damaged kernels reach 3.5% by weight, the peanlty can be catastrophic. At

damage levels slightly above 3.5%, the peanuts can sometimes be cleaned (~$10/ton cleaning fee). If they can't be cleaned below 3.5% damage the load is classified as Segregation II and is consigned to the oil market, with a potential value as low as $125 per ton (35% of loan value).

Hulls: The percentage by weight of hulls from the shelled sample. Although no grade premiums or penalties are based on hull weight, the lower the percentage hull weight, the higher the grade. Hull weights in the lower twenties indicate excellent grades because they indicate that the total kernel weight is in the high seventies.

***Aspergillus flavus* mold:** This mold is capable of producing aflatoxin. Only three grade components are examined for the presence of *A. flavus* mold (LSKs, OKs, and DKs) because these components have the greatest risk. The grader indicates on the grade sheet that *A. flavus* either was or was not detected.

Detection of *A. flavus* is bad news. Detection results in the lot being be cleaned for a fee and re-examined. If the contamination is not adequately removed by cleaning, the **peanuts are consigned to segregation III for the oil market, with a potential value as low as $125/ton (35% of loan value)**. Avoidance of late-season drought stress is the only sure preventative for aflatoxin

Afla-Guard biopesticide has been used successfully as a preventative treatment across a range of locations to consistently reduce aflatoxin contamination in resulting farmer stock peanuts produced in that field that year. Afla-Guard is a natural nontoxigenic version of the *A. flavus* fungus that competitively displaces toxigenic strains to prevent infections on peanut. However, due to the variability in predicting conditions conducive for aflatoxin contamination when Afla-Guard needs to be applied (40-80 DAP) combined with its price, automatic preventative application is not always profitable.

PEANUT GRADING TERMS

Grading Term	Definition	Penalty or Reward
FM Foreign material	Everything but in-shell peanuts and loose kernels.	No penalty up to 4%. At 5% lose $1/ton and increases with each %. FM not usually a problem even in strip-till.
LSK Loose shelled kernels	Kernels free from the hull.	With each percent LSK you lose $2.20/ton. More importantly, LSKs associated with and checked for aflatoxin.
Fancy pods	Pods big enough to ride a 34/64" roller spacing.	No reward or penalty. Only varieties with 40% fancy pods qualify as Virginia types
ELK Extra large kernels	Kernels big enough to ride a 21.5/64 x 1" screen (Virginia types only).	Premium of $0.35/ton for each percent ELK. So a 40% ELK has a $14/ton premium. A variety with 10% higher ELK worth only $3.50/ton more.
SMK Sound mature kernels	Kernels mature enough to ride a screen standard: 15/64 x 1" (Virginia type) or 16/64 x ¾" (runner type).	Each percent SMK increases value by about $5.00/ton (see TSMK below).
SS Sound splits	Undamaged split kernels in the shelled sample.	No penalty up to 4%; $0.80/ton penalty for each percent above 4%.
TSMK Total sound mature kernels	ELKs + SMKs + SSs (only Virginia types are graded for ELKs)	This is the important number. **Each percent TSMK increases value by about $5.00/ton**. **So a 1% increase in TSMK is worth more than a 10% increase in ELK**.
OK Other kernels	Smaller, immature kernels that fall through the SMK screen standard.	Each percent increase in other kernels detracts from the sound mature kernels.
DK Damaged kernels	Kernels judged to be inedible due to mold, insect damage, sprouting, or freeze injury.	**≥ 3.5% the penalty is severe** because if the load can't be cleaned ($10/ton cleaning fee) it is considered segregation II with an oil market value as low as $125/ton (35% of loan).
FD Freeze damage	Freeze damage is included in damaged kernels.	Same as DK penalty above.
Concealed RMD Concealed damage – rancid, moldy, decayed.	Damage detected after kernels in the grade sample are split in half.	Same as DK penalty above.
TD Total damage	The total of damaged kernels, freeze damage, and concealed damage.	Same as DK penalty above.
Aflatoxin	A toxin produced by *Aspergillus flavus* and related molds.	If the load can't be cleaned, it goes into segregation III – the oil market (as low as $125/ton). LSKs, DKs, and OKs are checked for *Aspergillus*.

PEANUT PRODUCERS' TOP TEN LIST

Preplant

1. Field Selection / Rotation:
Peanuts require well-drained land and do best on soils with a sandy surface. Avoid fields with recent soybean history as best you can and eliminate soybeans from the rotation in the future. Sustainable peanut production requires a minimum of 2 years (3 years better) of cotton or corn (no legumes) in between peanut crops.

2. Soil test:
P and K are seldom needed if previous crop has adequate fertility. Use the **Peanut Fertility Check List** (see Peanut Production Guide) to compare soil test values to sufficiency levels for all nutrients. **Zinc can severely stunt or kill peanuts**. Raise pH to reduce toxicity risk in high Zn fields. Soil Ca levels above 600 lb/A and Ca to K ratio of 3:1 or higher are desirable. Raise soil Ca with lime if pH allows.

At-Plant

3. Get them inoculated:
Use only liquid in-furrow inoculants; they have been most consistent and are less likely to clog. Inoculants are live bacteria; handle with care to keep them alive. Make sure a steady stream (no pulse pumps) hits dead center in the bottom of the open furrow and gets into moisture. Use 5 gal minimum. Do not use chlorinated water. Don't plant too shallow (< 1.5"). Always plant into moisture; dry soil kills inoculant and causes erratic emergence, which increases virus problems. Peanuts can be planted up to 3" deep if necessary for good moisture.

4. Reduce tomato spotted wilt virus risk:
– Plant resistant varieties to the extent possible. The predominant varieties (e.g., Bailey, Sugg, Sullivan, Georgia 06G, Ga 09B, Florida-07), and many more all have good virus resistance. April – early May planting increases virus risk. The first week of May still has increased virus risk, but large acreages need to get started planting. Optimum planting interval for S. C. is 5 – 25 May.
– Get a consistent, uniformly emerged stand; target is 4 plants/row ft (need 6 seed/ft, or ≥ 5/ft on Virginia types or large seeded runners).
– Control thrips with in-furrow insecticide (e.g., Thimet 5.5 oz/1000 row ft (4.7 lb on 38" rows).
– Strip tillage and twin-row planting reduce tomato spotted wilt.

0 to 45 DAP

5. Establish and maintain weed control (first 45 days critical):
– Valor (3 oz) is recommended for severe pigweed pressure. Valor must be applied within 2 days of planting, preferably watered in. Prowl/Sonolan or Dual can be tank-mixed. Do not plant shallower than 1.5" to reduce Valor injury.
– The first flush of weeds usually needs Gramoxone (+ Basagran or Storm) treatment before Cadre application (30 – 45 DAP). Dual can be applied post-emergence with Gramoxone or Cadre instead of (or in addition to) PPI for extended pigweed control.
– Use 2,4-DB, Blazer, Cobra or Storm where needed for escapes. Select or Poast Plus for grass.

Bloom

6. Give them calcium:
– All Virginia type peanuts should get 300 lb/A Ca (1500 – 2000 lb landplaster) at blooming.
– Calcium must be available in the pegging zone when the first pods begin to form.
– Better early than late with land plaster!

45 DAP

7. Prevent foliar and soil disease:

Although peanuts on "new" land should be relatively free of diseases, severe white mold or CBR loss can still occur, particularly in fields with a soybean history. Peanuts have to be protected from a complex of both soil and foliar diseases with a preventative program. **Start leaf spot treatment no later than 45 DAP** and **white mold treatment at 60 DAP.** Increase leaf spot protection on high risk leaf spot varieties (Champs, Georgia 09B, Georgia 13M, Gregory, TUFRunner 511). See the Production Guide for example fungicide programs. **60 to 90 DAP is the most critical white mold treatment interval.**

60 DAP

8. Irrigation management:

– Peanut is an indeterminate, drought-tolerant crop, but irrigation can be critical to **maximize returns from calcium, activate herbicides and move fungicides** into the soil.

– **Irrigation also greatly reduces insect damage (lesser cornstalk borer and burrower bug) thereby reducing Seg. II risk and aflatoxin (Seg. III) risk.**

– The critical water use period is during pod fill, approximately 60 – 110 DAP when peanuts need 1.0 – 1.5" per week minus rain. See the irrigation section for scheduling.

25 July – 30 August

9. Check for insects:

– Cutworms occasionally defoliate peanuts in late June or early July.

– Beginning in late June, watch for leafhopper "hopperburn" getting started on field edges.

– Corn earworms, followed by fall armyworms, feed on peanut primarily from the last week of July through August. Velvetbean caterpillars sometimes strip peanuts in the lower part of the state in late (September – October). Fully lapped, unstressed peanuts can tolerate up to 8 worms/ft. The threshold is 4 worms/ft on unlapped or stressed peanuts.

– There are some significant soil pests (lesser cornstalk borer, wireworm, burrower bug, rootworm), but the greatest threats (borers & burrower bugs) can be managed with irrigation.

130 DAP

10. MORE MONEY IS MADE OR LOST WITH DIGGING DECISIONS THAN ANY OTHER ASPECT OF PEANUT PRODUCTION.

Timing: Medium maturity Virginia types generally reach harvest maturity in about 130 – 135 DAP under typical S. C. growing conditions. But many practical considerations figure into when the first field is dug, including vine health, acreage, equipment availability, when you started planting and weather predictions. Runner types usually mature later and are more forgiving at harvest. Some varieties require > 150 days to mature. Start spot checking maturity at about 120 DAP. Use the pod blast or hull scrape method (see this and other techniques in the Peanut Production Guide) to sort pods into color piles and determine which fields should be dug first. Some pod color guidelines for Virginia type maturity: 70% of pods in orange + brown + black categories, 30% in brown + black and 1 – 2% coal black. Runners: 75 – 80% in orange + brown + black, 40% in brown + black and 5% coal black. The grade target is ≥ 70% TSMK. Practical considerations sometimes prevent waiting on full maturity in every field, particularly for the first field to be dug. **If digging before 130 DAP, use pod color to make sure you're not too early; if waiting after 140 DAP, make sure you're not late.**

Digger operation: It is easy to ruin a great crop with the digger. **Staying on the row** with the digger is a must (GPS guidance can quickly pay for itself in peanuts). Matching digger ground speed to shaker speed, digger running depth and soil conditions are also critical.

PEANUT MANAGEMENT CALENDAR

BEFORE PLANTING	
January	Soil test: compare soil test values to sufficiency levels for all nutrients in Peanut Fertility Table. Take advantage of invited, out-of-state speakers on peanut production and marketing (State Peanut Growers Meeting).
February	Attend area production meeting for update on product test results. Plan land preparation for conventional tillage.
March	Early decisions on variety selection may increase the odds of getting the variety you want.
April	30 days pre-plant, burn down weeds or cover crop for strip-tillage.
Late April – May	For conventional tillage and non-irrigated, can pre-plant incorporate Prowl or Sonolan. If Vapam fumigation is used for CBR control, it should go out at least 14 days pre-plant when there is good soil moisture but minimal risk of rain within 2 days of application.

PLANTING TO DIGGING

Approx. days after planting	**Example date: <u>if planted 15 May</u>**	**Growth Stage**	**Management Steps**
0	15 May example planting date	Planted	Plant 5 – 6 seeds/row ft into good moisture at 1.5" depth (max. 3" if necessary). Inoculate all new fields and fields out of peanuts for 3 years with liquid in-furrow inoculant. Hit the center of furrow! Use in-furrow Thimet (phorate) 5.5 oz/1000 row ft (4.7 lb on 38" rows) for thrips. Imidacloprid can be used, but watch virus risk of variety and planting date. Spread planting dates of large acreage and plant late maturing varieties last to spread harvest maturity. Optimal planting interval about 5 – 25 May.
0-2	15-17 May	--	If Valor is used, it must be applied at planting or within 2 days of planting. Prowl/Sonolan or Dual can be tank-mixed.
7	22 May	Cracking – Emergence	A pegging zone (4" depth) soil test can be used to re-evaluate landplaster needs on runner types.
7 – 28	22 May – 12 June	Seedling	Apply Gramoxone (+ Basagran or Storm) when needed to control first weed flush from cracking through seedling stage. If thrips injury/stunting occurs after emergence treat immediately with Orthene (acephate).
35	19 June	Bloom (R1)	Land plaster applied at bloom 35 DAP (early better than late). Typical Cadre timing is about 35 DAP. Can tank mix Bravo at 30 – 35 DAP. If 2 Gramoxone applications are used instead of Cadre, the 2nd application must be made < 28 days after cracking (~35 DAP).
45	29 June	Peg (R2)	Apply Bravo or Bravo + teb. absolutely no later than 45 DAP. Boron can be tank-mixed with the first herbicide or fungicide if need indicated by soil test (< 0.4 lb). Water is needed to move gypsum into the pegging zone and sustain pod development. Check to see that the taproot has active nodules (15 large (1/8")) nodules/taproot if inoculation problems suspected: yellow plants. Cutworms can defoliate in late June – early July. Start weekly spot check for hopperburn on field edges.

Days after planting	Date (if planted 15 May)	Growth Stage	Management Steps
50	4 July	Swollen peg (R3)	Check for weed escapes; use 2,4-DB or other post-emergence herbicides where needed. It usually takes a minimum of 60 DAP to close the canopy. If Lorsban 15G is used to prevent soil insects, it should be applied during pegging (about the first week of July).
60	14 July	Full size pod / begin pod-fill (R4 – R5)	60 and 45 DAP appl. most critical for leaf spot control. Soil disease (white mold) control should begin at 60 DAP or by 15 July. Mn can be tank-mixed with the 60 DAP fungicide appl. if required by soil test. If Blazer is used, it should be applied 75 days preharvest (about 60 DAP). Spot spray escaped grasses where necessary with Select or Poast Plus. Most critical water use period begins; apply 1.0 – 1.5”/week minus rain 60 – 110 DAP. Apogee growth regulator timing is 50% vines touching for 1st appl. and 2nd appl at 100% row closure.
75	29 July	Pod-fill, full-size seed in oldest pods (R6)	Treat for white mold and leaf spot. 75 and 90 DAP are critical white mold treatments. Peak water usage period is around 75 DAP. Check weekly for corn earworm and fall armyworm starting around 1 August through first week of September. Spot check fields weekly for leaf spot and white mold from 60 DAP until 2 weeks prior to harvest.
90	13 Aug.	Pod-fill, full size seed (R6)	Treat for white mold and leaf spot. Under severe drought stress watch for spider mite hits in late August to September, particularly where Lorsban is used.
100	23 Aug.	Early maturity, oldest pods show internal hull color (R7)	Final fungicide application for Virginia types typically goes on about 105 DAP in moderate to low pressure years, but fields should be spot checked again at 120 – 125 DAP for leafspot control. See below for late treatment rules.
120	12 Sept.	Early maturity (R7)	Begin checking fields for maturity to plan digging dates. Use the hull scrape method to determine the percentage in white, yellow, orange, and brown-black hull color categories. At 120 DAP determine which fields will be the last ones dug and decide if leaf spot control is adequate. If projected harvest is 3 weeks away and 5% of lower leaves have late leafspot lesions, treat immediately. 110 – 125 DAP 0.75 – 1.0”/wk as needed to prevent severe wilting. Have digger and combine ready to go.
130-140	27 Sept.	Harvest maturity (R8)	Never dig strictly based on DAP but it is a good guideline in seasons with adequate soil moisture. Variety, seasonal temp. and rainfall determine maturity. Use hull color guidelines to verify harvest maturity. Disease control earlier in the season is critical to maintain the peg strength to carry peanuts to full maturity and provide a margin of safety if weather prevents timely digging. In October check for velvetbean caterpillar defoliation on the latest maturing fields in extreme southern area of S.C.
150	12 Oct.	Over-mature (R9)	Even on healthy plants, by 150 DAP there is a high risk of pod loss from deteriorating peg strength on medium maturity Virginia-types.

PEANUT MATURITY CALENDAR

Dates of indicated days after planting:

Planting date	Bloom	First pegs	Critical pod-fill, water use, and white mold control period about 60-110 DAP.				Hull scrape to estimate harvest time.		*Typical maturity range for medium maturity varieties.				*Increasing risk of over-maturity and pod loss.		
	35	**45**	**60**	**75**	**90**	**105**	**120**	**125**	**130**	**135**	**140**	**145**	**150**	**155**	**160**
May 1	6-5	6-15	6-30	7-15	7-30	8-14	8-29	9-3	9-8	9-13	9-18	9-23	9-28	10-3	10-8
2	6-6	6-16	7-1	7-16	7-31	8-15	8-30	9-4	9-9	9-14	9-19	9-24	9-29	10-4	10-9
3	6-7	6-17	7-2	7-17	8-1	8-16	8-31	9-5	9-10	9-15	9-20	9-25	9-30	10-5	10-10
4	6-8	6-18	7-3	7-18	8-2	8-17	9-1	9-6	9-11	9-16	9-21	9-26	10-1	10-6	10-11
5	6-9	6-19	7-4	7-19	8-3	8-18	9-2	9-7	9-12	9-17	9-22	9-27	10-2	10-7	10-12
6	6-10	6-20	7-5	7-20	8-4	8-19	9-3	9-8	9-13	9-18	9-23	9-28	10-3	10-8	10-13
7	6-11	6-21	7-6	7-21	8-5	8-20	9-4	9-9	9-14	9-19	9-24	9-29	10-4	10-9	10-14
8	6-12	6-22	7-7	7-22	8-6	8-21	9-5	9-10	9-15	9-20	9-25	9-30	10-5	10-10	10-15
9	6-13	6-23	7-8	7-23	8-7	8-22	9-6	9-11	9-16	9-21	9-26	10-1	10-6	10-11	10-16
10	6-14	6-24	7-9	7-24	8-8	8-23	9-7	9-12	9-17	9-22	9-27	10-2	10-7	10-12	10-17
11	6-15	6-25	7-10	7-25	8-9	8-24	9-8	9-13	9-18	9-23	9-28	10-3	10-8	10-13	10-18
12	6-16	6-26	7-11	7-26	8-10	8-25	9-9	9-14	9-19	9-24	9-29	10-4	10-9	10-14	10-19
13	6-17	6-27	7-12	7-27	8-11	8-26	9-10	9-15	9-20	9-25	9-30	10-5	10-10	10-15	10-20
14	6-18	6-28	7-13	7-28	8-12	8-27	9-11	9-16	9-21	9-26	10-1	10-6	10-11	10-16	10-21
15	6-19	6-29	7-14	7-29	8-13	8-28	9-12	9-17	9-22	9-27	10-2	10-7	10-12	10-17	10-22
16	6-20	6-30	7-15	7-30	8-14	8-29	9-13	9-18	9-23	9-28	10-3	10-8	10-13	10-18	10-23
17	6-21	7-1	7-16	7-31	8-15	8-30	9-14	9-19	9-24	9-29	10-4	10-9	10-14	10-19	10-24
18	6-22	7-2	7-17	8-1	8-16	8-31	9-15	9-20	9-25	9-30	10-5	10-10	10-15	10-20	10-25
19	6-23	7-3	7-18	8-2	8-17	9-1	9-16	9-21	9-26	10-1	10-6	10-11	10-16	10-21	10-26
20	6-24	7-4	7-19	8-3	8-18	9-2	9-17	9-22	9-27	10-2	10-7	10-12	10-17	10-22	10-27
21	6-25	7-5	7-20	8-4	8-19	9-3	9-18	9-23	9-28	10-3	10-8	10-13	10-18	10-23	10-28
22	6-26	7-6	7-21	8-5	8-20	9-4	9-19	9-24	9-29	10-4	10-9	10-14	10-19	10-24	10-29
23	6-27	7-7	7-22	8-6	8-21	9-5	9-20	9-25	9-30	10-5	10-10	10-15	10-20	10-25	10-30
24	6-28	7-8	7-23	8-7	8-22	9-6	9-21	9-26	10-1	10-6	10-11	10-16	10-21	10-26	10-31
25	6-29	7-9	7-24	8-8	8-23	9-7	9-22	9-27	10-2	10-7	10-12	10-17	10-22	10-27	11-1
26	6-30	7-10	7-25	8-9	8-24	9-8	9-23	9-28	10-3	10-8	10-13	10-18	10-23	10-28	11-2
27	7-1	7-11	7-26	8-10	8-25	9-9	9-24	9-29	10-4	10-9	10-14	10-19	10-24	10-29	11-3
28	7-2	7-12	7-27	8-11	8-26	9-10	9-25	9-30	10-5	10-10	10-15	10-20	10-25	10-30	11-4
29	7-3	7-13	7-28	8-12	8-27	9-11	9-26	10-1	10-6	10-11	10-16	10-21	10-26	10-31	11-5
30	7-4	7-14	7-29	8-13	8-28	9-12	9-27	10-2	10-7	10-12	10-17	10-22	10-27	11-1	11-6
31	7-5	7-15	7-30	8-14	8-29	9-13	9-28	10-3	10-8	10-13	10-18	10-23	10-28	11-2	11-7
June 1	7-6	7-16	7-31	8-15	8-30	9-14	9-29	10-4	10-9	10-14	10-19	10-24	10-29	11-3	11-8
2	7-7	7-17	8-1	8-16	8-31	9-15	9-30	10-5	10-10	10-15	10-20	10-25	10-30	11-4	11-9
3	7-8	7-18	8-2	8-17	9-1	9-16	10-1	10-6	10-11	10-16	10-21	10-26	10-31	11-5	11-10
4	7-9	7-19	8-3	8-18	9-2	9-17	10-2	10-7	10-12	10-17	10-22	10-27	11-1	11-6	11-11
5	7-10	7-20	8-4	8-19	9-3	9-18	10-3	10-8	10-13	10-18	10-23	10-28	11-2	11-7	11-12
6	7-11	7-21	8-5	8-20	9-4	9-19	10-4	10-9	10-14	10-19	10-24	10-29	11-3	11-8	11-13
7	7-12	7-22	8-6	8-21	9-5	9-20	10-5	10-10	10-15	10-20	10-25	10-30	11-4	11-9	11-14
8	7-13	7-23	8-7	8-22	9-6	9-21	10-6	10-11	10-16	10-21	10-26	10-31	11-5	11-10	11-15
9	7-14	7-24	8-8	8-23	9-7	9-22	10-7	10-12	10-17	10-22	10-27	11-1	11-6	11-11	11-16
10	7-15	7-25	8-9	8-24	9-8	9-23	10-8	10-13	10-18	10-23	10-28	11-2	11-7	11-12	11-17

***VARIATION IN SEASONAL TEMPERATURE AND DROUGHT STRESS, VARIETY & OTHER FACTORS AFFECT MATURITY. VIRGINIA TYPE PEANUTS ARE MUCH MORE SUSCEPTIBLE THAN RUNNERS TO LOSS FROM OVER-MATURITY. Use the hull scrape guidelines to verify maturity. Vine health, weather forecast & combining capacity also affect the digging decision.**

Last revised: 01/2019

PEANUTS - DRYLAND, CONVENTIONAL TILLAGE

ESTIMATED COSTS AND RETURNS PER ACRE
3000 POUND YIELD

	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	YOUR FARM
1. GROSS RECEIPTS					
PEANUTS	LBS	3000.00	$0.218	$652.50	
TOTAL RECEIPTS:				**$652.50**	**$0.00**
2. VARIABLE COSTS					
SEED	LBS	120.00	$0.93	$111.60	
INOCULANT	ACRE	1.00	$7.00	$7.00	
FERTILIZER					
PHOSPHATE	LBS	40.00	$0.52	$20.80	
POTASH	LBS	40.00	$0.40	$16.00	
BORON	LBS	2.50	$1.48	$3.70	
MANGANESE	LBS	2.00	$1.51	$3.02	
LIME (PRORATED)	TON	0.50	$47.50	$23.75	
LAND PLASTER (SPREAD)	TON	0.75	$60.00	$45.00	
HERBICIDES	ACRE	1.00	$93.85	$93.85	
INSECTICIDES	ACRE	1.00	$19.45	$19.45	
FUNGICIDES	ACRE	1.00	$81.46	$81.46	
GROWTH REGULATOR	ACRE	0.00	$23.42	$0.00	
CROP SCOUTING	ACRE	1.00	$7.00	$7.00	
HAULING	TON	1.50	$15.00	$22.50	
CROP INSURANCE	ACRE	1.00	$20.00	$20.00	
DRYING AND CLEANING	TON	1.00	$50.00	$50.03	
STATE CHECK-OFF FEE	TON	1.50	$2.00	$3.00	
NATIONAL ASSESMENT **	ACRE	1.00	$5.33	$5.33	
TRACTOR/MACHINERY	ACRE	1.00	$71.36	$71.36	
LABOR	HRS	3.98	$11.25	$44.78	
INTEREST ON OP. CAP.	DOL.	$324.82	5.0%	$16.24	
TOTAL VARIABLE COSTS:				**$665.87**	**$0.00**
3. INCOME ABOVE VARIABLE COSTS:				**-$13.37**	**$0.00**
4. FIXED COSTS					
TRACTOR/MACHINERY	ACRE	1.00	$128.80	$128.80	
TOTAL FIXED COSTS:				**$128.80**	**$0.00**
5. OTHER COSTS					
LAND RENT	ACRE	1.00	$60.00	$60.00	
GENERAL OVERHEAD	DOL.	$665.87	7.0%	$46.61	
TOTAL OTHER COSTS:				**$106.61**	**$0.00**
6. TOTAL COSTS:				**$901.28**	**$0.00**
7. NET RETURNS TO RISK AND MANAGEMENT:				**-$248.78**	**$0.00**

BREAK-EVEN YIELD			**BREAK-EVEN PRICE**	
VARIABLE COSTS	3298	LBS	VARIABLE COSTS	$0.222
TOTAL COSTS	4719	LBS	TOTAL COSTS	$0.300

* PLEASE NOTE: THIS BUDGET IS FOR PLANNING PURPOSES ONLY.

** NATIONAL ASSESSMENT IS 1% OF GROSS RECEIPT AT LOAN RATE, ALSO NAMED NATIONAL PROMOTION AND RESEARCH AS

PEANUTS - DRYLAND, CONVENTIONAL TILLAGE

PER ACRE MACHINERY AND LABOR REQUIREMENTS FOR 3000 YIELD PEANUTS

MONTH	OPERATION	TIMES OVER	LABOR HOURS	MACHINE HOURS	VARIABLE COSTS	FIXED COSTS
4	HEAVY DISK 14'	2.00	0.33	0.30	$7.04	$7.56
5	LIGHT DISKING W/ HERBICIDE 16'	1.00	0.17	0.15	$3.07	$3.11
5	SUBSOILER-PLANTER 6-ROW	1.00	0.20	0.18	$6.82	$7.92
5-9	SELF PROPELLED SPRAYER 90'	8.00	0.09	0.08	$6.72	$7.84
10	DIGGER INVERTER 6-ROW	1.00	0.37	0.34	$17.72	$20.03
10	PEANUT COMBINE 4-ROW	1.00	0.61	0.55	$29.99	$82.34
10	PEANUT DUMP CART	1.00	0.45	0.41	$15.25	$26.49
PER ACRE TOTALS FOR SELECTED OPERATIONS			1.77	1.60	$71.36	$128.80
UNALLOCATED LABOR(HRS./AC.)			2.21			

INCOME ABOVE VARIABLE COSTS AT DIFFERING YIELDS AND PRICES

YIELD	PRICE ($/lbs.)				
LBS.	$0.18	$0.20	$0.22	$0.24	$0.26
2000	-$297.34	-$257.34	-$222.34	-$177.34	-$137.34
2500	-$225.42	-$175.42	-$131.67	-$75.42	-$25.42
3000	-$153.50	-$93.50	-$41.00	$26.50	$86.50
3500	-$81.58	-$11.58	$49.67	$128.42	$198.42
4000	-$9.66	$70.34	$140.34	$230.34	$310.34

CHEMICAL USE ASSUMPTIONS FOR 3000 YIELD PEANUTS

	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	MONTH
HERBICIDES:					
pendimethalin (Prowl)	PT	2.30	$4.98	$11.46	APR
flumioxazin (Valor)	OZ	3.00	$7.06	$21.19	MAY
imazapic (Cadre)	OZ	4.00	$3.46	$13.86	JUN
paraquat (Gramoxone Extra)	PT	0.75	$3.68	$2.76	JUN
metolachlor (Dual Magnum)	OZ	16.00	$0.92	$14.69	JUN
2, 4-DB	PT	1.00	$4.05	$4.05	JUN
lactofen (Cobra)	OZ	12.50	$1.41	$17.62	JUL
clethodim (Select)	OZ	8.00	$0.76	$6.09	JUL
2,4-D	PT	1.00	$2.13	$2.13	JUL
INSECTICIDES:					
lambda-cyhalothrin (Karate-Z)	OZ	1.60	$2.76	$4.41	AUG
phorate (Thimet)	LB	4.70	$3.20	$15.04	MAY
FUNGICIDES:					
chlorothalonil (Bravo)	PT	6.50	$6.72	$43.67	JN/JUL/AUG/SEP
prothioconazole+tebuconazole (Provost)	OZ	10.70	$1.70	$18.19	2X JUL AUG
benzovindiflupyr+azoxystrobin (Elatus)	OZ	8.00	$2.45	$19.60	AUG
GROWTH REGULATOR:					
prohexadione calcium (Apogee)	OZ	4.80	$4.88	$23.42	2X JUL
TOTAL:				$218.18	

The above listed chemicals are examples and do not imply exclusive recommendations by Clemson University. Contact your local Extension Agent and consult the South Carolina Pest Management Handbook for more information.

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Last revised: 01/2019

PEANUTS - DRYLAND - STRIP TILL

ESTIMATED COSTS AND RETURNS PER ACRE
3000 POUND YIELD

	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	YOUR FARM
1. GROSS RECEIPTS					
PEANUTS	LBS	3000.00	$0.218	$652.50	
TOTAL RECEIPTS:				**$652.50**	**$0.00**
2. VARIABLE COSTS					
SEED	LBS	120.00	$0.93	$111.60	
INOCULANT	ACRE	1.00	$7.00	$7.00	
FERTILIZER					
PHOSPHATE	LBS	40.00	$0.52	$20.80	
POTASH	LBS	40.00	$0.40	$16.00	
BORON	LBS	2.50	$1.48	$3.70	
MANGANESE	LBS	2.00	$1.51	$3.02	
LIME (PRORATED)	TON	0.50	$47.50	$23.75	
LAND PLASTER (SPREAD)	TON	0.75	$60.00	$45.00	
HERBICIDES	ACRE	1.00	$105.20	$105.20	
INSECTICIDES	ACRE	1.00	$19.45	$19.45	
FUNGICIDES	ACRE	1.00	$54.61	$54.61	
GROWTH REGULATOR	ACRE	0.00	$23.42	$0.00	
CROP SCOUTING	ACRE	1.00	$10.00	$10.00	
HAULING	TON	1.50	$15.00	$22.50	
CROP INSURANCE	ACRE	1.00	$20.00	$20.00	
DRYING AND CLEANING	TON	1.00	$50.00	$50.03	
STATE CHECK-OFF FEE	TON	1.50	$2.00	$3.00	
NATIONAL ASSESMENT **	ACRE	1.00	$5.33	$5.33	
TRACTOR/MACHINERY	ACRE	1.00	$77.34	$77.34	
LABOR	HRS	3.89	$11.25	$43.76	
INTEREST ON OP. CAP.	DOL.	$321.05	5.0%	$16.05	
TOTAL VARIABLE COSTS:				**$658.14**	**$0.00**
3. INCOME ABOVE VARIABLE COSTS:				**-$5.64**	**$0.00**
4. FIXED COSTS					
TRACTOR/MACHINERY	ACRE	1.00	$145.60	$145.60	
TOTAL FIXED COSTS:				**$145.60**	**$0.00**
5. OTHER COSTS					
LAND RENT	ACRE	1.00	$60.00	$60.00	
GENERAL OVERHEAD	DOL.	$658.14	7.0%	$46.07	
TOTAL OTHER COSTS:				**$106.07**	**$0.00**
6. TOTAL COSTS:				**$909.81**	**$0.00**
7. NET RETURNS TO RISK AND MANAGEMENT:				**-$257.31**	**$0.00**

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BREAK-EVEN YIELD			**BREAK-EVEN PRICE**	
VARIABLE COSTS	3253	LBS	VARIABLE COSTS	$0.219
TOTAL COSTS	4770	LBS	TOTAL COSTS	$0.303

* PLEASE NOTE: THIS BUDGET IS FOR PLANNING PURPOSES ONLY.

** NATIONAL ASSESSMENT IS 1% OF GROSS RECEIPT AT LOAN RATE AND IS ALSO NAMED NATIONAL PROMOTION AND RESEAI

PEANUTS - DRYLAND - STRIP TILL

PER ACRE MACHINERY AND LABOR REQUIREMENTS FOR 3000 YIELD PEANUTS

MONTH	OPERATION	TIMES OVER	LABOR HOURS	MACHINE HOURS	VARIABLE COSTS	FIXED COSTS
5	SUBSOILER-PLANTER 6-ROW	1.00	0.20	0.18	$6.82	$7.92
4-9	SELF PROPELLED SPRAYER 90'	9.00	0.10	0.09	$7.56	$8.82
10	DIGGER INVERTER 6-ROW	1.00	0.37	0.34	$17.72	$20.03
10	PEANUT COMBINE 4-ROW	1.00	0.61	0.55	$29.99	$82.34
10	PEANUT DUMP CART	1.00	0.45	0.41	$15.25	$26.49
PER ACRE TOTALS FOR SELECTED OPERATIONS			1.73	1.57	$77.34	$145.60
UNALLOCATED LABOR(HRS./AC.)			2.16			

INCOME ABOVE VARIABLE COSTS AT DIFFERING YIELDS AND PRICES

YIELD	PRICE ($/lbs.)				
LBS.	$0.18	$0.20	$0.22	$0.24	$0.26
2000	-$289.61	-$249.61	-$214.61	-$169.61	-$129.61
2500	-$217.69	-$167.69	-$123.94	-$67.69	-$17.69
3000	-$145.77	-$85.77	-$33.27	$34.23	$94.23
3500	-$73.85	-$3.85	$57.40	$136.15	$206.15
4000	-$1.93	$78.07	$148.07	$238.07	$318.07

CHEMICAL USE ASSUMPTIONS FOR 3000 YIELD PEANUTS

	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	MONTH
HERBICIDES:					
glyphosate (Roundup ultra)	QT	1.50	$5.44	$8.16	APR
2,4-D	PT	1.50	$2.13	$3.19	APR
pendimethalin (Prowl)	PT	2.30	$4.98	$11.46	MAY
flumioxazin (Valor)	OZ	3.00	$7.06	$21.19	MAY
metolachlor (Dual Magnum)	OZ	16.00	$0.92	$14.69	JUN
imazapic (Cadre)	OZ	4.00	$3.46	$13.86	JUN
paraquat (Gramoxone Extra)	PT	0.75	$3.68	$2.76	JUN
2, 4-DB	PT	1.00	$4.05	$4.05	JUN
lactofen (Cobra)	OZ	12.50	$1.41	$17.62	JUL
clethodim (Select)	OZ	8.00	$0.76	$6.09	JUL
2,4-D	PT	1.00	$2.13	$2.13	JUL
INSECTICIDES:					
lambda-cyhalothrin (Karate-Z)	OZ	1.60	$2.76	$4.41	AUG
phorate (Thimet)	LB	4.70	$3.20	$15.04	MAY
FUNGICIDES:					
chlorothalonil (Bravo)	PT	6.50	$6.72	$43.67	JN/JUL/AUG/SEP
tebuconazole(Folicur)	OZ	28.80	$0.38	$10.94	4X JUL/AUG/SEP
GROWTH REGULATOR:					
prohexadione calcium (Apogee)	OZ	4.80	$4.88	$23.42	2X JUL
TOTAL:				$202.68	

The above listed chemicals are examples and do not imply exclusive recommendations by Clemson University. Contact your local Extension Agent and consult the South Carolina Pest Management Handbook for more information.

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Last revised: 01/2019

PEANUTS - IRRIGATED, CONVENTIONAL TILLAGE

ESTIMATED COSTS AND RETURNS PER ACRE
4000 POUND YIELD

	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	YOUR FARM
1. GROSS RECEIPTS					
PEANUTS	LBS	4000.00	$0.218	$870.00	
TOTAL RECEIPTS:				**$870.00**	**$0.00**
2. VARIABLE COSTS					
SEED	LBS	120.00	$0.93	$111.60	
INOCULANT	ACRE	1.00	$7.00	$7.00	
FERTILIZER					
PHOSPHATE	LBS	40.00	$0.52	$20.80	
POTASH	LBS	60.00	$0.40	$24.00	
BORON	LBS	2.50	$1.48	$3.70	
MANGANESE	LBS	2.00	$1.51	$3.02	
LIME (PRORATED)	TON	0.50	$47.50	$23.75	
LAND PLASTER (SPREAD)	TON	0.75	$60.00	$45.00	
HERBICIDES	ACRE	1.00	$93.85	$93.85	
INSECTICIDES	ACRE	1.00	$19.45	$19.45	
FUNGICIDES	ACRE	1.00	$119.74	$119.74	
GROWTH REGULATOR	ACRE	1.00	$23.42	$23.42	
IRRIG., MACH & LABOR **	ACRE	1.00	$30.00	$30.00	
CROP SCOUTING	ACRE	1.00	$7.00	$7.00	
HAULING	TON	2.00	$15.00	$30.00	
CROP INSURANCE	ACRE	1.00	$20.00	$20.00	
DRYING & CLEANING	TON	1.33	$50.00	$66.70	
STATE CHECK-OFF FEE	TON	2.00	$2.00	$4.00	
NATIONAL ASSESMENT **	ACRE	1.00	$7.10	$7.10	
TRACTOR/MACHINERY	ACRE	1.00	$71.36	$71.36	
LABOR	HRS	3.98	$11.25	$44.78	
INTEREST ON OP. CAP.	DOL.	$388.14	5.0%	$19.41	
TOTAL VARIABLE COSTS:				**$795.68**	**$0.00**
3. INCOME ABOVE VARIABLE COSTS:				**$74.32**	**$0.00**
4. FIXED COSTS					
TRACTOR/MACHINERY	ACRE	1.00	$128.80	$128.80	
IRRIGATION	ACRE	1.00	$100.00	$100.00	
TOTAL FIXED COSTS:				**$228.80**	**$0.00**
5. OTHER COSTS					
LAND RENT	ACRE	1.00	$50.00	$50.00	
GENERAL OVERHEAD	DOL.	$795.68	7.0%	$55.70	
TOTAL OTHER COSTS:				**$105.70**	**$0.00**
6. TOTAL COSTS:				**$1,130.18**	**$0.00**
7. NET RETURNS TO RISK AND MANAGEMENT:				**-$260.18**	**$0.00**

BREAK-EVEN YIELD			**BREAK-EVEN PRICE**	
VARIABLE COSTS	3918	LBS	VARIABLE COSTS	$0.199
TOTAL COSTS	5943	LBS	TOTAL COSTS	$0.283

* PLEASE NOTE: THIS BUDGET IS FOR PLANNING PURPOSES ONLY.

** 4 IRRIGATIONS OF 1 INCH PER ACRE

*** NATIONAL ASSESSMENT IS 1% OF GROSS RECEIPT AT LOAN RATE AND IS ALSO NAMED NATIONAL PROMOTION AND RESEA

PEANUTS - IRRIGATED, CONVENTIONAL TILLAGE

PER ACRE MACHINERY AND LABOR REQUIREMENTS FOR 4000 YIELD PEANUTS

MONTH	OPERATION	TIMES OVER	LABOR HOURS	MACHINE HOURS	VARIABLE COSTS	FIXED COSTS
4	HEAVY DISK 14'	2.00	0.33	0.30	$7.04	$7.56
5	LIGHT DISKING W/ HERBICIDE 16'	1.00	0.17	0.15	$3.07	$3.11
5	SUBSOILER-PLANTER 6-ROW	1.00	0.20	0.18	$6.82	$7.92
5-9	SELF PROPELLED SPRAYER 90'	8.00	0.09	0.08	$6.72	$7.84
10	DIGGER INVERTER 6-ROW	1.00	0.37	0.34	$17.72	$20.03
10	PEANUT COMBINE 4-ROW	1.00	0.61	0.55	$29.99	$82.34
10	PEANUT DUMP CART	1.00	0.45	0.41	$15.25	$26.49
PER ACRE TOTALS FOR SELECTED OPERATIONS			1.77	1.60	$71.36	$128.80
UNALLOCATED LABOR(HRS./AC.)			2.21			

INCOME ABOVE VARIABLE COSTS AT DIFFERING YIELDS AND PRICES

YIELD	PRICE ($/lbs.)				
LBS.	$0.18	$0.20	$0.22	$0.24	$0.26
3000	-$259.03	-$199.03	-$146.53	-$79.03	-$19.03
3500	-$187.56	-$117.56	-$56.31	$22.45	$92.45
4000	-$116.08	-$36.08	$33.92	$123.92	$203.92
4500	-$44.61	$45.40	$124.15	$225.40	$315.40
5000	$26.87	$126.87	$214.37	$326.87	$426.87

CHEMICAL USE ASSUMPTIONS FOR 4000 YIELD PEANUTS

	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	MONTH
HERBICIDES:					
pendimethalin (Prowl)	PT	2.30	$4.98	$11.46	APR
flumioxazin (Valor)	OZ	3.00	$7.06	$21.19	MAY
imazapic (Cadre)	OZ	4.00	$3.46	$13.86	JUN
paraquat (Gramoxone Extra)	PT	0.75	$3.68	$2.76	JUN
metolachlor (Dual Magnum)	OZ	16.00	$0.92	$14.69	JUN
2, 4-DB	PT	1.00	$4.05	$4.05	JUN
lactofen (Cobra)	OZ	12.50	$1.41	$17.62	JUL
clethodim (Select)	OZ	8.00	$0.76	$6.09	JUL
2,4-D	PT	1.00	$2.13	$2.13	JUL
INSECTICIDES:					
lambda-cyhalothrin (Karate-Z)	OZ	1.60	$2.76	$4.41	AUG
phorate (Thimet)	LB	4.70	$3.20	$15.04	MAY
FUNGICIDES:					
chlorothalonil (Bravo)	PT	4.50	$6.72	$30.23	JN/JUL/AUG/SEP
prothioconazole+tebuconazole (Provost)	OZ	20.00	$2.52	$50.31	2X JUL/AUG
benzovindiflupyr+azoxystrobin (Elatus)	OZ	16.00	$2.45	$39.20	AUG/SEP
GROWTH REGULATOR:					
prohexadione calcium (Apogee)	OZ	4.80	$4.88	$23.42	2X JUL
TOTAL:				$256.46	

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Last revised: 01/2019

PEANUTS - IRRIGATED - STRIP TILL

ESTIMATED COSTS AND RETURNS PER ACRE
4000 POUND YIELD

	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	YOUR FARM
1. GROSS RECEIPTS					
PEANUTS	LBS	4000.00	$0.218	$870.00	
TOTAL RECEIPTS:				**$870.00**	**$0.00**
2. VARIABLE COSTS					
SEED	LBS	120.00	$0.93	$111.60	
INOCULANT	ACRE	1.00	$7.00	$7.00	
FERTILIZER					
PHOSPHATE	LBS	40.00	$0.52	$20.80	
POTASH	LBS	60.00	$0.40	$24.00	
BORON	LBS	2.50	$1.48	$3.70	
MANGANESE	LBS	2.00	$1.51	$3.02	
LIME (PRORATED)	TON	0.50	$47.50	$23.75	
LAND PLASTER (SPREAD)	TON	0.75	$60.00	$45.00	
HERBICIDES	ACRE	1.00	$105.20	$105.20	
INSECTICIDES	ACRE	1.00	$19.45	$19.45	
FUNGICIDES	ACRE	1.00	$95.85	$95.85	
GROWTH REGULATOR	ACRE	1.00	$23.42	$23.42	
IRRIG., MACH & LABOR **	ACRE	1.00	$100.00	$100.00	
CROP SCOUTING	ACRE	1.00	$10.00	$10.00	
HAULING	TON	2.00	$15.00	$30.00	
CROP INSURANCE	ACRE	1.00	$20.00	$20.00	
DRYING & CLEANING	TON	1.33	$50.00	$66.70	
STATE CHECK-OFF FEE	TON	2.00	$2.00	$4.00	
NATIONAL ASSESMENT **	ACRE	1.00	$7.10	$7.10	
TRACTOR/MACHINERY	ACRE	1.00	$63.90	$63.90	
LABOR	HRS	3.35	$11.25	$37.69	
INTEREST ON OP. CAP.	DOL.	$411.09	5.0%	$20.55	
TOTAL VARIABLE COSTS:				**$842.73**	**$0.00**
3. INCOME ABOVE VARIABLE COSTS:				**$27.27**	**$0.00**
4. FIXED COSTS					
TRACTOR/MACHINERY	ACRE	1.00	$121.30	$121.30	
IRRIGATION	ACRE	1.00	$30.00	$30.00	
TOTAL FIXED COSTS:				**$151.30**	**$0.00**
5. OTHER COSTS					
LAND RENT	ACRE	1.00	$60.00	$60.00	
GENERAL OVERHEAD	DOL.	$842.73	7.0%	$58.99	
TOTAL OTHER COSTS:				**$118.99**	**$0.00**
6. TOTAL COSTS:				**$1,113.02**	**$0.00**
7. NET RETURNS TO RISK AND MANAGEMENT:				**-$243.02**	**$0.00**

BREAK-EVEN YIELD			**BREAK-EVEN PRICE**	
VARIABLE COSTS	4073	LBS	VARIABLE COSTS	$0.211
TOTAL COSTS	5609	LBS	TOTAL COSTS	$0.278

* PLEASE NOTE: THIS BUDGET IS FOR PLANNING PURPOSES ONLY.

** 4 IRRIGATIONS OF 1 INCH PER ACRE

*** NATIONAL ASSESSMENT IS 1% OF GROSS RECEIPT AT LOAN RATE AND IS ALSO NAMED NATIONAL PROMOTION AND RESEA

PEANUTS - IRRIGATED - STRIP TILL

PER ACRE MACHINERY AND LABOR REQUIREMENTS FOR 4000 YIELD PEANUTS

MONTH	OPERATION	TIMES OVER	LABOR HOURS	MACHINE HOURS	VARIABLE COSTS	FIXED COSTS
5	SUBSOILER-PLANTER 6-ROW	1.00	0.20	0.18	$6.82	$7.92
4-9	SELF PROPELLED SPRAYER 90'	9.00	0.10	0.09	$7.56	$8.82
10	DIGGER INVERTER 6-ROW	1.00	0.37	0.34	$17.72	$20.03
10	PEANUT COMBINE 4-ROW	1.00	0.61	0.55	$29.99	$82.34
10	FRONT-END LOADER	1.00	0.21	0.19	$1.81	$2.19
10	PEANUT DUMP CART	1.00	0.45	0.41	$15.25	$26.49
PER ACRE TOTALS FOR SELECTED OPERATIONS			1.49	1.35	$63.90	$121.30
UNALLOCATED LABOR(HRS./AC.)			1.86			

INCOME ABOVE VARIABLE COSTS AT DIFFERING YIELDS AND PRICES

YIELD	PRICE ($/lbs.)				
LBS.	$0.18	$0.20	$0.22	$0.24	$0.26
3000	-$306.08	-$246.08	-$193.58	-$126.08	-$66.08
3500	-$234.61	-$164.61	-$103.36	-$24.61	$45.40
4000	-$163.13	-$83.13	-$13.13	$76.87	$156.87
4500	-$91.65	-$1.65	$77.10	$178.35	$268.35
5000	-$20.18	$79.82	$167.32	$279.82	$379.82

CHEMICAL USE ASSUMPTIONS FOR 4000 YIELD PEANUTS

	UNIT	QUANTITY	PRICE OR COST/UNIT	TOTAL PER ACRE	MONTH
HERBICIDES:					
glyphosate (Roundup ultra)	QT	1.50	$5.44	$8.16	APR
2,4-D	PT	1.50	$2.13	$3.19	APR
pendimethalin (Prowl)	PT	2.30	$4.98	$11.46	APR
flumioxazin (Valor)	OZ	3.00	$7.06	$21.19	MAY
metolachlor (Dual Magnum)	OZ	16.00	$0.92	$14.69	JUN
paraquat (Gramoxone Extra)	PT	0.75	$3.68	$2.76	JUN
imazapic (Cadre)	OZ	4.00	$3.46	$13.86	JUN
2, 4-DB	PT	1.00	$4.05	$4.05	JUN
lactofen (Cobra)	OZ	12.50	$1.41	$17.62	JUL
clethodim (Select)	OZ	8.00	$0.76	$6.09	JUL
2,4-D	PT	1.00	$2.13	$2.13	JUL
INSECTICIDES:					
lambda-cyhalothrin (Karate-Z)	OZ	1.60	$2.76	$4.41	AUG
phorate (Thimet)	LB	4.70	$3.20	$15.04	MAY
FUNGICIDES:					
chlorothalonil (Bravo)	PT	4.50	$6.72	$30.23	JN/JUL/AUG/SEP
prothioconazole+tebuconazole (Provost)	OZ	20.00	$2.52	$50.31	2X JUL/AUG
benzovindiflupyr+azoxystrobin (Elatus)	OZ	16.00	$0.96	$15.31	AUG/SEP
GROWTH REGULATOR:					
prohexadione calcium (Apogee)	OZ	4.80	$4.88	$23.42	2X JUL
TOTAL:				$243.92	

The above listed chemicals are examples and do not imply exclusive recommendations by Clemson University. Contact your local Extension Agent and consult the South Carolina Pest Management Handbook for more information.

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SOME QUICK PEANUT NUMBERS

S. C. production (2019)	~117,800 tons (~62,000 acres, 3,800 lb/A); 25 of 46 counties produced peanuts commercially. Approx. $53 million crop value @ $450 per ton. ~60% runners, 40% Virginia type.
Seeding	**Rate:** 5 – 6/row ft; ~100 – 125 lb/A runners; ~125 – 150 lb/A Virginias. **Depth:** 1.5 – 2" recommended; up to 3" if necessary to plant into moisture. **Date:** 5 – 25 May optimum planting window.
Fertility	**pH:** 5.8 – 6.5 **Nitrogen:** Get a liquid in-furrow inoculant stream applied directly to the bottom of the furrow in good soil moisture. No response to foliar supplements. **Phosphorus:** 100 lb P_2O_5/A at soil test $\leq$ 4 lb/A, 80 lb at soil test 5-10 lb/A, and 40 lb at soil test 11-19 lb/A is sufficient for peanut, but **maintain P and K levels in rotational crops.** **Potassium:** very conservative recommendations: none needed above 40 lb/A soil test (Melich 1); apply 40 lb K_2O at 29 – 40 lb/A soil test; apply 80 lb at $\leq$ 28 lb/A soil test. **Calcium:** apply 1500 lb gypsum (300 lb Ca) at first bloom. **Manganese:** At pH 6.0 Mn soil test sufficiency is 8 lb/A. Required soil sufficiency level increases 1 lb/A for every 0.1 increase in pH. Apply 0.5 lb Mn (2 – 2.5 lb manganese sulfate or Tecmangam) at 60 and 75 DAP or when deficiency occurs. **Boron:** soil sufficiency 0.5 lb; apply 0.3 – 0.5 lb B (1.5 – 2.5 lb Solubor) foliar total. Maximum seasonal foliar total of 0.5 lb B. **Zinc:** Prevent toxicity. If soil test Zn is 6 – 10 lb, lime to pH 6.2; at 11 – 20 soil test Zn, lime to pH 6.4; at 21 – 30 soil test Zn, lime to pH 6.5.
Yield and general yield loss (38" rows)	2 tons ~100 pods/row ft (runner). Runner loss of 1 pod/row ft = ~40 lb/A loss 2 tons ~66 pods/row ft (Virginia). Virginia loss of 1 pod/row ft = ~60 lb/A loss
Row ft/A	13,756 (38"); 14,520 (36"); 17,424 (30")
Fungicide timing	Begin leaf spot control no later than 45 DAP (30 better). Apply leaf spot + white mold control at 60, 75, 90, 105 (120 also) DAP (see fungicide programs).
Harvest maturity	Virginias: 70% pod color (orange + brown + black); 30% brown + black; 1 – 2% coal black; 132 – 135 days for medium maturity varieties. Runners: 75 – 80% pod color (orange + brown + black); 40% brown + black; 5% coal black; 140 days for medium maturity varieties.
Grade	TSMK (total sound mature kernels): Every 1% increase in TSMK is worth about $5/ton (or $10/A on two-ton peanuts). ELK (extra large kernels): A variety with 10% greater ELK is worth only about $3.60 more per ton (or $7.20/ac more on two-ton peanuts). LSK (loose shelled kernels): Each percent LSK reduces value by $2.20 ($4.40/ac loss on two-ton peanuts). FM (foreign matter): No penalty up to 4% FM; -$1/ton at 5%; -$6/ton at 10% FM. Plus cleaning fee. DK (damaged kernels): Severe penalty when total damaged kernels reach 3.5%; value drops to 35% of loan or ~$125/ton. Fancy pods: Meaningless to grower; no reward or penalty for pod size.
Bulk density	In-shell: 17 – 24 lb/ft^3; shelled: 43 lb/ft^3
Weight/Bu.	35 – 40 lb/bu (green); 20 lb/bu (dry Virginia type); 22 lb/bu (dry runner type)

2,4-DB fiddle leaf; will grow out of it.

2,4-D / Banvel injury.

Blazer or Cobra injury is highly variable.

Crop oil needed for grass herbicides burns.

Woody pegs/corky pods extreme Prowl rate

Valor injury & stunted regrowth.

Cadre yellow "flash" on newest growth.

Command/Zorial are pigment inhibitors.

Manganese deficiency

Zinc toxicity: check pH if soil test Zn > 6 lb.

Boron toxicity – marginal burn.

Thimet toxicity – peanuts will outgrow it.

Ca deficient vs normal kernel embryo.

Potash def. - lateral leaf margins scorched.

Want 15 large (1/8”) nodules/pl. @ 45 DAP.

Split pod from rapid water uptake.

Burrower bug can cause Seg. 2 or Seg. 3.

Thrips cause direct and indirect (tswv) loss

Corn earworm, tobacco budworm similar.

Granulate cutworms hide under debris, soil

Lesser cornstalk borers hit pods pegs stems.

3-cornered hopper stem girdle & egg scars.

Wireworm, not usually economic.

Beet armyworm, dot over middle front leg.

Rhizoctonia limbrot target lesion on lateral.

Lesion nematode damage - usually

CBR – red fruiting bodies at base of plant.

White mold, white mat, cream/orange BBs.

Tomato spotted wilt ring symptoms.

False white mold - yellowish mat, no “BBs”.

Late leaf spot - fuzzy spores on back of leaf.

Not always disease! Surfactant burn spots.

Use <u>oscillating</u> "turbo" nozzle, not high psi

White-Yellow, Orange, Brown, Black

48% Wh+Y, 47% Or, 5% Br+Bl: ~ 2+ wks

35% Wh+Y, 52% Or, 13% Br+Bl: 7-10 day

15% Wh+Y, 52% Or, 33% Br+Bl: Dig.

12% Wh+Y, 42% Or, 46% Br+Bl, Dig!

15% Wh+Y, 23% Or, 62% Br+Bl – Dig!!!

Pink Tinted Pods are Overmature! Dig!

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Photographs by Dan Anco, Jay Chapin and Jacob Stokes (zinc toxicity)

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