# Management and Cultural Practices for Peanuts

D.L. Wright, B.L. Tillman, I.M. Small, D. Pratap, Z. Grabau, S. Paula-Moraes, E. Carter, J.A. Ferrell, M.J. Mulvaney, C. Barrett, and N. DuFault

## Introduction

Peanut has been one of the more profitable crops grown in the Southeastern Coastal Plains for many years. Additional modifications to the USDA farm programs have created opportunity for peanut acreage to increase significantly in Florida since 2000. Budgets should be studied carefully to determine where peanuts fit into a farm operation. Enterprise budgets for irrigated and dry land peanuts can be found at https://agecon.uga.edu/extension/budgets.html. Where peanuts are grown in new areas, yields are often higher than where peanuts have been produced for many years. This is due to lower pest and disease pressure, and peanut yield responds more to lengthy rotation than most other crops. Peanut fits into many rotation schemes including corn, cotton, and other grass crops, and does best when planted after perennial grasses. This production guide is not exhaustive but is intended to provide the basic structure and critical elements needed for successful peanut production. It is organized, as much as possible, by the order of events required to produce a peanut crop, beginning with the importance of crop rotation, information about various tillage methods, variety selection, soil fertility, weed control, planting decisions, disease control, insect control, irrigation, maturity, and finally harvest.

## Crop Rotation and Land Selection and Preparation

Crop rotation is an important cultural practice that is recommended for all crops and especially for peanut. Rotation is recommended to reduce the effects of pests (disease, nematode, insects, and weeds). In many cases, low value crops are the only alternative for rotating with high cash value crops like peanut. In other cases, good systems, such as sod-based rotations, are known but are not used because fencing and other costs are involved. Extensive research has been conducted on rotation for most crops and their impacts on pests. Leafspot management is usually accomplished with a fungicide program but data shows that rotation with cotton or corn can reduce the incidence and severity of disease. Recent data shows that rotations with bahiagrass can reduce the disease even further and will result in higher yields. In one study peanut yields were 19% higher after two years of corn and 41% higher after two years of bahiagrass. Other information from Georgia indicates that growers using a one, two, and three-year rotation under irrigation resulted in a 7, 36, and 34% yield increase, and a 11, 25, and 28% yield increase for non-irrigated peanuts, compared to continuous peanuts under both systems. Good rotations produce more profit and reduce the amount of management and capital inputs needed. Peanuts grow best on well-drained soils and in full sun. If planted on poorly-drained soils, diseases issues are likley and yields are normally low. Peanuts can be grown on sandy or excessively-drained soils, but irrigation may be needed for consistent production on deep sands.

Of all the management practices discussed in this guide, crop rotation for peanut is, by far, the most important. No other single practice has the impact that good crop rotation has to increase yields and reduce disease and pest impacts. Conversely, short rotation, or rotation with crops like soybean, which can host some of the same diseases as peanut, typically reduces yield and increases cost required to control diseases, weeds and insect pests.

## Conservation Tillage Methods for Peanuts

Historically, conventional tillage has been the standard for peanut production. Conventional tillage usually includes moldboard plowing followed by disking or other fine tillage operations. These methods help to reduce weeds and certain insect pests, like the burrower bug. Conventional tillage, however, is costly and time-consuming and increases soil erosion. However, strip tillage is less costly and helps to reduce soil erosion and build soil health. Strip tillage has been adopted by many peanut producers. With this method of tillage, the land is not turned but is subsoiled, and only a strip of soil in the row is tilled (8"-12" wide), while the soil between the rows remains undisturbed with cover crops or crop residue. Yields of crops planted in conservation tillage systems are often different from conventional plantings. They have been shown to be higher, lower, and in many cases the same. The residue on the surface lowers disease incidence of leaf spot, TSWV, white mold, and other diseases. In conventional tillage systems, the plant residue is incorporated into the soil resulting in more disease problems. Questions arise about strip tilling into fields/pastures that have not had crops grown for a few years. Running the strip till rig twice has been shown to increase yield. This can be done 4-5 weeks ahead of planting and again at planting for a more mellow seedbed. There are usually many hard-to-control weed species present including broom sedge and horseweed as well as other broadleaf weeds. Soils in these fields are often mellow in the top few inches due to decomposition of plant residue and not being tilled or compacted by equipment for several years. Normally, if a grower can plant through various plant material there will be no problem with digging. All weeds need to be controlled four to five weeks before planting and 2,4-D is often necessary for some of the hard to control weeds like horseweed and evening primrose. Glyphosate or other similar materials can be used to kill many other weeds a few weeks before planting. Peanut can also be planted into old cotton residue without having stalks in the picker when harvesting peanuts.

Yield variability can often be explained due to cover crops and the time the cover crops were killed and fungi associated with decomposition of the cover crops or previous crop residue. Many of the main seedling pathogens of cotton and peanut (Pythium spp., Rhizoctonia spp., Phytophthora spp., and Fusarium spp.) may be favored by planting in newly killed cover crops or plant residue. Green or newly decomposing plant material can set up favorable conditions for pathogens and result in seedling diseases. Seedling diseases often decrease plant populations and lower crop yields when cover crops are not killed soon enough since carbon and other nutrients are adequate for pathogen growth. With legume cover crops, about 50% of the biomass may be lost during the first four weeks. Grass cover crops may take several weeks longer than legumes to decompose due to a higher carbon to nitrogen ratio. Cover crops decompose more slowly when left on the soil surface as compared to incorporation. Generally, decomposition of cover crops is two to three times faster for each 10°C increase in temperature. Therefore, cover crops decompose more slowly under cool conditions. This results in slower decomposition of cover crops than normal, leaving more food resources for certain plant pathogens to colonize and infect developing crops. Many root and stem diseases can influence plant growth without severe visual, foliar symptoms. One way to overcome having nutrient sources for the pathogens in the spring is to kill the cover crop earlier in the year so that the carbohydrates and proteins are expended by saprophytic micro-organisms leaving inadequate resources for the pathogens. Another way to ensure good results from strip tillage is to precede the peanut crop with two years of bahiagrass and yields will be higher and pests lower than for standard rotations.

## Variety Selection

Variety performance information on peanuts can be found on the web at https://nfrec.ifas.ufl.edu/ for Florida and http://www.swvt.uga.edu/ for Georgia. Deciding which varieties to plant is very important for achieving the best yield and for marketing the crop. Varieties differ in their resistance to diseases as well as other characteristics such as seed size, vine growth, grade and pod yield. Pod yields and grades are the most important factors for growers to determine the economics of growing different varieties. There is often a 10%–20% (400–800 lbs/A) difference between some of the best yielding and the lower yielding varieties. Quality or grade may also vary among varieties, making a difference in the prices received for the commodity. There is only one chance per season to make the right decision with variety selection, and yield limits are set with the variety. For these reasons, it is a good practice to plant more than one variety each season. This will help balance risks associated with disease loss and unpredictable environmental variation that could affect varieties differentially. Table 1 presents some basic characteristics of Runner type peanuts that can impact disease risk, harvestability, and planting costs. Varietal disease risk is taken from the multistate Peanut Rx which can be found on the internet at https://peanuts.caes.uga.edu/. Vegetatively, the growth habit of peanut varies from prostrate to upright with a continuum of types between these two extremes. Runner peanuts typically have a have a prostrate to spreading growth habit with lateral branches that are long and grow close to the ground. The bunch or more upright growth habit produces mostly erect stems and does not spread as much as the prostrate/spreading types. The vegetative growth habit of a peanut variety can impact digging and harvest operations because the large vines obscure the row middles and/or cause harvest operations to be slowed. Some varieties with large vine growth can benefit from application of growth regulators to help minimize excess vegetative growth. Excessive vine growth can occur when crops are fertilized with chicken litter or other nitrogen-containing fertilizers, or in soils with higher inherent fertility. Seed size affects the cost of planting and can vary significantly among varieties and seed lots. Seed are also mechanically sorted and sized by the industry, so the estimates in Table 1 are typical for the variety but may not reflect actual seed size in the seed bag due to mechanical sizing of seed lots. Maturity is also an important consideration in selecting varieties to plant. Table 1 lists the relative maturity of some common varieties; however, actual maturity will vary depending on the season and management practices. Therefore, it is important to conduct a maturity test as described in the section on maturity below. Regardless of the type or variety of peanut selected for production, it is important to confirm with the buying point that they can handle and process the variety you have chosen. Most buying points will receive runner types, but some will limit the oleic type to only normal or only high oleic.

Table 1. Disease risk points from the 2019 Peanut Rx, general vine habit, seed size, relative maturity, and oleic type of common runner varieties in the southeastern USA (higher points mean greater risk of disease loss; see the Disease Management Section below).

| Variety | Spotted Wilt | Leaf Spot | White mold | Vine growth | SMK Seed size (no./lb.) | Maturity (Days after planting) | Oleic type |
|---|---|---|---|---|---|---|---|
| FloRun™ '331 | 15 | 20 | 15 | Large | 625-675 | 135-145 | High |
| Georgia-06G | 10 | 20 | 20 | Moderate | 575-625 | 135-145 | Normal |
| Georgia-09B | 20 | 25 | 25 | Moderate | 600-650 | 130-140 | High |
| Georgia-12Y | 5 | 15 | 10 | Large | 625-675 | 150-160 | Normal |
| Georgia-14N | 10 | 15 | 15 | Moderate | 725-775 | 150-160 | High |
| Georgia-16HO | 10 | 25 | 20 | Large | 575-625 | 135-145 | High |
| Georgia-18RU | 10 | 25 | 20 | Moderate | 625-675 | 135-145 | Normal |
| Georgia Green | 30 | 20 | 25 | Small | 700-750 | 135-145 | Normal |
| Tifguard | 10 | 15 | 15 | Large | 575-625 | 135-145 | Normal |
| TifNV-High OL | 5 | 15 | 15 | Large | 575-625 | 135-145 | High |
| TUFRunner™ '297' | 10 | 25 | 20 | Large | 575-625 | 135-145 | High |
| TUFRunner™ '511' | 20 | 30 | 15 | Large | 575-625 | 135-145 | High |

## Peanut Types

There are four market types of peanuts in the United States: runner, Virginia, Spanish, and Valencia. Runners have an intermediate size seed and are the primary type grown in Florida, the Southeast, and Texas. Virginia peanuts have a large seed and are grown mostly in North Carolina, South Carolina, Virginia, and Texas. Spanish peanuts have small kernels and are grown mostly in Texas and Oklahoma because they are a short-season type, require less water, and because of their flavor and small kernel. Virginia peanuts are grown in Florida, but acreage is very minor in relation to runners. Valencia peanuts are usually about the same size as Spanish peanuts but are considered special-use peanuts, such as for boiling or roasting in-shell. Florida is a major producer of boiling peanuts, which are usually planted early and throughout the year (February–July) to maintain a continuous supply.

The peanut seed is called a *kernel* and is found inside pods or hulls. Peanuts flower above ground and then a "peg" or reproductive stem grows down from the flower and enters the soil. The peanut pod forms at the end of this peg. The peanut leaf is made up of four leaflets. Peanuts are harvested by digging pods from the ground with a digger-shaker-inverter, letting them partially dry in the field for three days and then combining them. As the peanuts are dug, the vines are shaken to remove excess dirt and the peanut vines are inverted in the digging process so that the peanuts are exposed to the sunlight for quick drying. After drying in the field, the nuts are removed from the vine with a peanut combine or picker. After combining, they are placed on trailers where heated air is passed through the peanuts to complete the drying process. Peanuts should be stored at a moisture content of 10% or less.

## Peanut Fertilization

Soil tests from soil samples taken immediately after harvest of crops in the fall should be used to determine lime and fertility requirements for crops for the coming year. If soil pH needs adjustment, fall is a good time of the year to apply since it may take as long as six months for complete soil reaction. However, some reaction does occur soon after application. Nitrogen-fixing bacteria do better and form more nodules with an adequate calcium (Ca) level and a pH of 6.0 or higher. Peanut is considered an excellent fertilizer scavenger. If the crop that precedes peanut is well-fertilized, there may be enough residual nutrients in the soil to make direct additional fertilization unnecessary. A soil test report will also indicate which nutrients are needed on a particular field. Calcium and magnesium (Mg) may be supplied using dolomitic limestone. If no lime is needed, Ca can be supplied by gypsum, and Mg can be included in the fertilizer. If phosphorus (P) is low, add P according to soil tests and incorporate P into the soil, since P does not move easily through the soil profile and can move to waterways via surface runoff. Potassium (K) and other nutrients should also be applied according to soil test reports. If nutrients are applied at planting according to soil test recommendations, foliar fertilization applications are unnecessary. Boron (B) and manganese (Mn) are commonly the most deficient micronutrients on sandy soils. Therefore, if peanuts are planted on a sandy soil, it is advisable to use B at the rate of 0.5–0.75 lb of elemental B per acre. Higher rates of B can be toxic to the plants. Applications of B should be split since it is a highly leachable, mobile nutrient. High application rates of other nutrients can make B deficiency more pronounced. The symptom most often associated with B deficiency is internal fruit damage called “hollow heart,” which reduces the quality and value of the crop. However, in more severe cases, B deficiency can result in split stems and roots on the lower part of the stem with shortened internodes, terminal death, and extensive secondary branching. Leaves may be dark green and mottled with few or no peanuts developing on stubbed pegs. Some fields have been observed with these symptoms recently, serving as a reminder that there is a reason to apply B even if few visual observations of deficiencies are seen. B may be applied early with herbicides or with fungicides to avoid making additional trips across the field. The crop may take up less than a tenth of a pound per acre, but it is still important for crop production.

A yellow cast of peanut plants during the growing season can have several causes including poor nodulation, micronutrient deficiencies, waterlogged soils, infection by tomato spotted wilt virus, or herbicide damage. Waterlogging results in poor nodulation and reduced nitrogen fixation. Nodules can be checked to see if they are actively fixing nitrogen by cutting the nodule and observing the interior color. If it is pink, the nodules are active. Plants usually grow out of waterlogging stress as soils dry. Iron and other micronutrients may be limiting in waterlogged soils too, and plants will grow out of it as soils dry out. Manganese deficiencies often occur in soils that have been limed for years and have a pH above 6.3. These symptoms can be seen as a light green to yellow cast to the peanut canopy and are usually more prevalent late in the season and on sandier sites. Manganese applications can be made to the crop or a base application may be made at planting. It is possible to lower the pH through acid forming fertilizers such as ammonium sulfate; however, foliar applications of a few pounds of micronutrient may be more cost effective and the response will be quicker than changing the soil pH. Zinc toxicity is commonly observed where pecan trees formerly existed due to zinc fertilization of orchards, resulting in splitting of the peanut stem and taproot, and purpling of stems and petioles. Stem splitting can also result from B deficiency.

Table 2. Common symptoms and causes of nutrient deficiency/toxicity in peanut.

| **Nutrient** | **Condition** | **Common cause** | **Symptoms** | **Sufficiency range in whole shoot tissue** |
|---|---|---|---|---|
| Nitrogen | Deficient | Waterlogging, poor nodulation. | Chlorosis | 3.5-4.5% |
| Phosphorus | Deficient | Cold soils. | Stunted plants, reddish leaf tips and margins | 0.2-0.5% |
| Potassium | Deficient | Inadequate soil K. | Chlorosis of leaf margins, often confused with leaf hopper damage. | 1.7-3.0% |
| Potassium | Excessive | Very high soil K. | Competes with Ca uptake, causing “pops,” pod rot, and low grades. | 1.7-3.0% |
| Calcium | Deficient | Dry soils. Inadequate soil Ca in pegging zone. | “Pops,” or unfilled pods. Pod rot. Low grades. | 1.25-2.0% |
| Magnesium | Deficient | Inadequate soil Mg. | Interveinal chlorosis. | 0.3-0.8% |
| Sulfur | Deficient | Inadequate soil S. | Chlorosis. Similar to N deficiency. | 0.2-0.35% |
| Iron | Deficient | Calcareous soils with pH near or above 8.0. Poorly drained soil. | Interveinal chlorosis or spotty chlorosis of leaves. | 60-300 ppm |
| Manganese | Deficient | Soil pH >7.5 or <4.5. | Interveinal chlorosis | 60-350 ppm |
| Boron | Deficient | Lacking in soil, did not apply boron as recommended | Spitting of stems, hollow heart of seed | 20-60 ppm |
| Copper | Deficient | Organic, calcareous or sandy soils. | Excessive soil P. | 5-50 ppm |
| Zinc | Toxic | Fungicide applications in former pecan orchards. | Split stems and taproots. Purple stems and petioles. | 20-60 ppm |
| Zinc | Deficient | Very high soil P. High soil pH. Cool, wet soils. Calcareous soil. | Chlorosis of leaflet margins on lower half of leaflet near petiole. | 20-60 ppm |
| Molybdenum | Deficient | Soil pH <4.5. Inactive nodules. | Stunting, chlorosis. | 0.1-5.0 ppm |

## Calcium, Liming, pH, and Gypsum

Lime should be added if the soil pH is below 5.8, with the target pH being 6.2–6.5. If lime is needed, either a dolomitic or calcitic lime can be used. If soil samples show only Ca to be low, then calcitic lime would be satisfactory. However, if both Ca and Mg are low, then dolomitic limestone should be used. Lime should be applied three to six months before planting peanuts but can be applied up to time of planting although it is recommended that lime should be applied in the fall to allow time to react with the soil. If Mg soil test is not low, use calcitic lime so that Mg will not compete with Ca for uptake by peanuts.

Soil calcium is needed in high levels by peanut for developing a viable seed. There are two major fertilizer amendments that add Ca to the soil. In addition to reducing soil acidity, calcitic lime supplies the plant nutrient Ca while dolomitic lime supplies both Ca and Mg. Lime should typically be used to supply Ca and Mg when the pH is low and liming is recommended. Gypsum, which does not alter soil pH, is the preferred material for increasing soil Ca. Ca is routinely applied as gypsum at the time of flowering and pegging on sandy soils for rapid replenishment of soil solution Ca. This is not as necessary on heavier soils or fields with irrigation that have higher diffusion gradients toward the pods. Since peanuts are often grown on sandy soils, which are drought prone, there is a limited ability of these soils to replenish the soil solution Ca. Heavier soils and irrigated soils are better able to supply needed Ca for proper uptake. The Ca needs are primarily for pod and seed development and not for growing a healthy plant. Test soils and apply needed amounts of Ca for good yields and quality. However, if the peanut crop is being produced for seed, gypsum application is always recommended to insure optimum germination of the resulting seeds. The amount of Ca taken up by the plant is dependent on the concentration in soil solution and on the amount of water moving into the plant. Calcium deficiency results in high incidence of pod rot and unfilled pods called “pops”. These peanuts also have lower germination if saved for seed. If liming is needed to raise soil pH, and to supply Ca to the developing peanuts, soil tillage should be carefully evaluated. Georgia research has shown that Ca applied as lime should not be turned under and that turned under lime had yields similar to no lime. In fact, any tillage that buries Ca below the 3-inch pegging zone in a Ca deficient soil could cause Ca deficiency in the peanuts. Even though peanut has a lower Ca requirement than soybean or cowpea for plant growth, peanut does have an exceptional need for Ca for seed maturation and quality. Lime should be applied to fields well in advance of planting and may be applied to strip tilled fields as a surface application. For those growers who use minimum tillage and strip tillage, surface applications are acceptable. We have long term plots that have not been turned or had lime incorporated for 35 years that are still producing good crop yields. A high Ca and P layer can develop in the top two to three inches after many years of surface applications of fertilizer and lime.

Research in Georgia showed that runner-type cultivars responded to gypsum application when residual soil test Ca levels were below 250 lbs/ac in the top three inches of soil. Larger seeded varieties such as Virginia type peanuts require more Ca; these varieties had a yield response to gypsum up to 1400 lbs Ca/ac in the top three inches. The critical period for Ca absorption begins about 20 days after pegs start entering into the soil and may extend for an additional 60 days. However, some researchers have reported that 69% of total Ca uptake occurred between day 20 and 30 after pegging begins. It is then a necessity that proper amounts of Ca are supplied for the first 30 days after pegging begins. Because of this, gypsum is often applied to peanuts at early bloom or pegging time (about 30 days after planting) so that peanuts will have an adequate Ca supply. Rates of 250 lb/A of dry gypsum in a band to 1000 lb/A of wet gypsum are should be applied to peanuts that are to be saved for seed or when the soil test shows a need. Soil test levels of about 500 lb/A of Ca result in maximum yields of runner type peanuts while levels almost double this are necessary for maximum yield of Virginia type peanut as noted from research in Florida and Georgia. Calcium is taken up directly by the pod. Therefore, larger peanuts, which have a smaller surface-to-weight ratio, require a higher concentration of soil solution Ca in order to provide adequate Ca to the pod. Recent research from Alabama over several SE locations has shown that non-irrigated peanuts may have proportional yield increases with gypsum applications up to 1500 lbs/A. In addition to considering soil Ca levels, the levels of K and Mg must be considered. If K is too high in the soil, it can inhibit uptake of Ca. The soil test recommendation should show a ratio of 3 times as much Ca as K, a 3:1 ratio of Ca to K. Even if there is sufficient soil Ca and a correct ratio of Ca:K, soil moisture affects Ca uptake. The problem occurs when limited soil moisture coincides with high Ca demand, since there is not enough Ca in the soil solution to meet uptake demand by peanut. Sandy soils in the peanut region have low moisture retention capacity which can lead to moisture deficit-induced Ca deficiency, regardless of soil test values.

As described in the previous section, besides Ca and B nutrition, peanut responds very little to direct fertilization of most nutrients. However, K fertilization on the deep, sandy soils of the Suwannee valley south to Levy County, Florida have shown to be beneficial to peanut production in those regions.

## Planting Peanuts: Date, Disease, and Depth considerations

Peanut seed have always been expensive and continue to be one of the highest cost production factors. Before spotted wilt (caused by tomato spotted wilt virus, or TSWV) became a problem, as few as 3 seeds/row-ft were planted with little difference in yield. After spotted wilt became a problem, it was found that seeding rates needed to be higher (5–6 seeds/row-ft.) to reduce disease incidence. The higher seeding rates are meant to increase plant population to about 3 to 5 plants per foot of row. This meant increasing seeding rates from 85–100 lb/A seed to 120–150 lb/A depending on seed size and variety.

When moving peanut seed bags, they should be handled gently and carefully because the seeds are prone to split. If seeds split, germination will be reduced and could result in a poor stand. Peanut seed should be planted in rows 30 to 36 inches apart. The distance between rows will be determined by the variety being planted and the equipment available. Many growers plant in "twin rows," which are two rows 7 to 9 inches apart, with row centers 30 to 36 inches in width. The desired plant population is 3 to 5 plants per linear foot of row whether in single or twin pattern. Seed should normally be placed 2 inches apart in the rows when planting single rows to achieve 6 seeds planted per foot of row and 4 inches apart in each of the twin rows when planting in the twin row pattern to achieve 6 seeds planted per foot of twin row bed. This seeding density should result in around 4 plants per linear foot of row. The seed should be placed 1½ to 3 inches deep in light-textured soils and 1½ to 2 inches deep in heavier-textured soils. After planting, the top of the seed rows should be level with or slightly raised above the middles. Many farmers prefer to plant peanuts on a bed in order to provide good water drainage away from the peanut seed. If the soil is well drained, it is not be necessary to plant on a bed. Irrigation may be applied ahead of planting in order to make the planting operation easier. If it is dry after planting, be sure to irrigate to achieve a good stand. Also, if certain herbicides are applied at or soon after planting and no rain or irrigation occurs, poor weed control results. Therefore, an irrigation to move the pesticides into the top 2 or 3 inches of soil is beneficial. However, be aware that irrigation can move the herbicide Valor® into contact with the germinating seedlings which could cause damage. When plant stands are not optimal, recent research has shown that it is better to replant into the existing crop (called "supplemental seeding") than to kill the existing crop and replant. Supplemental seeding is recommended when plant populations are <2.5 plants per foot of row.

There are several factors which are important to consider regarding appropriate timing to plant peanut. Most importantly these include soil temperature, spotted wilt pressure and soil moisture. Soil temperatures near 68°F is optimal for germination of peanut seeds. Soil moisture should be enough that it will not become dry in the seed zone before the seeds have fully germinated, which generally requires 5 to 7 days. Wet soils will also reduce germination and plant stand. Planting should be delayed in years with cool, wet soil conditions. Prior to spotted wilt problems, peanuts were traditionally planted in April. In the panhandle of Florida, this disease has delayed the planting window into mid-May, which reduces risk of losses from spotted wilt. Some varieties have sufficient tolerance to spotted wilt that they can be planted in mid- to late April with low- to moderate risk of losses, however, it is important to minimize other risk factors when planting in the high risk months of April and early May. The highest numbers of thrips (*F. fusca*) that vector TSWV occur on April planted peanuts, whereas peanuts planted in May are usually subjected to smaller populations. The population dynamics of thrips in non-crop plants or volunteer peanuts early in the season is a reason for these effects since these plants may serve as reservoirs for TSWV. Other risk factors for spotted wilt are discussed in the next section on spotted wilt disease control in peanut. In most of Florida, peanut can do well planted through the first week of June but will suffer yield loss if planted later than this. Early planted peanuts (any time in early- to mid-April) could suffer a yield loss from cool soils and/or spotted wilt disease, especially in the panhandle and northeastern Florida. However, planting peanut in Levy and Marion counties can be as early as mid-March because soils there warm sooner and there is less risk of spotted wilt.

Work with the PNUTGRO model indicated that the highest yield could be expected from a mid-April planting while planting later reduces the probability of high yield. However, the Gainesville area has not had the spotted wilt pressure that most of the other areas of the southeastern US have experienced and it is located further to the south than much of the peanut growing area. The Southeast Climate Consortium has a peanut model for Florida, showing potential yield according to climate predictions. The model can be found at http://agroclimate.org/tools/planting-date-planner/. If conditions are to be dry, cover crops can be killed early for those who strip till or land can be bedded early to have enough moisture to plant on time. Peanuts may be planted deeper than any of the other row crops. Peanut seedlings will emerge from two to three inches deep or deeper. However, like other seed with high oil content, seed should be planted into moisture for rapid germination.

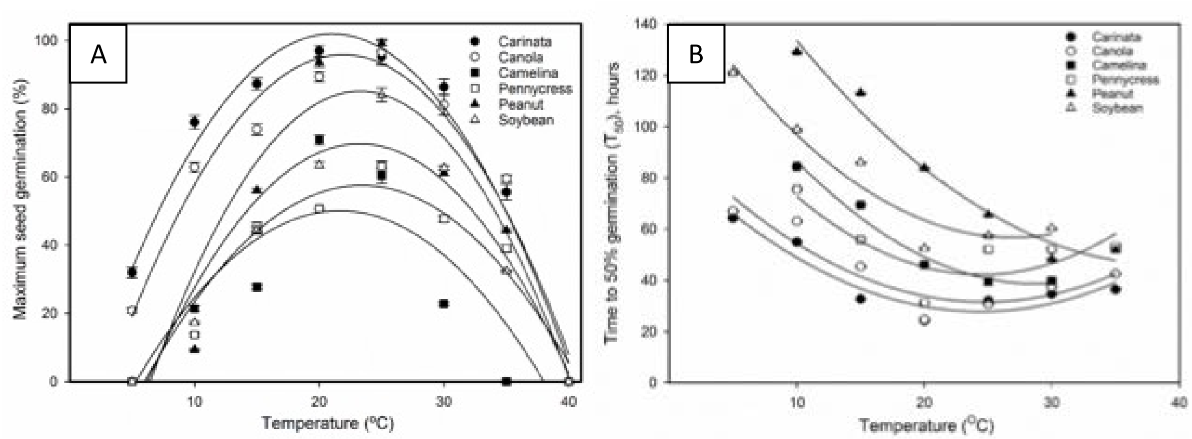


Figure 1. ***A***- Optimum germination temperature for several oilseed crops with peanut is 68°F and ***B***-Time to 50% germination with peanut being 50% at 3.5–4 days after planting at 68°F.

## Inoculating Peanuts

Peanuts may not always respond to rhizobium inoculation. The main reason for this is that there is an indigenous population of rhizobium called cowpea miscellany that is common to many native plants. These organisms are potentially able to nodulate a crop of peanuts grown for the first time in a field. Peanuts are only moderately efficient in fixing and translocating atmospheric nitrogen (N). With soybean, as much as 80% of the plant N comes from the atmosphere while about 55% of the plant N needs of peanut are from N fixation. Calcium is important to nodulation, and maximum peanut root growth occurs at a pH of about 7.3 while shoot growth, nodulation, and N fixation is best at a pH range of 5.9 to 6.3. An application of lime can improve the availability of Ca, Mg, and P and decrease aluminum toxicity. Inoculants may be applied to soils that have not had peanuts grown on them for several years or at all. In some cases inoculation can increase nodulation and in others little response may be noted. However, inoculants are cheap insurance in providing needed N for plant growth. Nitrogen fertilizer will not normally increase yields unless the N-fixing bacteria that live in nodules on the peanut roots are not present. If needed, a commercial inoculant can be applied in the seed furrow at planting to provide the needed bacteria.

### Weed Control

Weed control is very important to achieve high yields. Weed control programs should be implemented before planting peanut and not wait until later in the season. The general recommendation is to maintain the crop weed-free, or nearly weed-free, for six weeks after planting to minimize yield loss due to weeds. Depending on weed occurrence, tillage method, and irrigation capabilities, herbicide programs commonly recommended for peanut are a burndown program, preemergence (PRE), cracking treatment (EPOST), mid-postemergence (POST), and late postemergence (late-POST). Season-long weed control is necessary since weeds present at digging and harvest can disrupt operations, resulting in yield loss. Effective weed management can be achieved in peanut by integrating several weed control strategies and implementing them throughout the peanut growth phases. Information on peanut weed control can be found at http://edis.ifas.ufl.edu/wg008. Some problematic weeds, such as benghal dayflower and hairy indigo, require special considerations. Some specific herbicide programs are recommended for controlling benghal dayflower (https://edis.ifas.ufl.edu/ag230) and hairy indigo (https://edis.ifas.ufl.edu/ag391) under Florida conditions. In Florida, ALS herbicide (Group 2)-resistant Palmer amaranth are reported in multiple peanut growing counties. Cadre herbicide will not be effective for these Palmer amaranth populations. If there are resistant weed problems, using a residual herbicide program and maintaining that residual layer until later in the growing season is very important. Proper scouting and maintaining a record of the weed species present in the peanut field is also necessary for overall weed management. If there are weed escapes to any herbicides, then it is critical to consult with a county extension agent. Many growers have ceased to use tillage after planting even if tillage was done to prepare a seedbed. Researchers have reported that each cultivation can result in the loss of one inch of soil moisture, which can have a major impact on peanuts in a dry year without irrigation. Proper use of herbicide programs may eliminate the need for cultivation.

Table 3. Herbicide products for various application timings during peanut production (Please refer to each herbicide product label for complete information).

| Herbicide compound | Commercial products | Rate | Optimum application timing | Comments |
|---|---|---|---|---|
| ***A. Preplant Burndown Herbicides*** | | | | |
| 2,4-D | 2,4-D ester (and others) | 1 to 2 pt/A | 15 days prior to peanut planting | These products can be tank-mixed for controlling broader weed spectrum. PRE herbicide can be included for residual weed control before peanut planting. |
| glyphosate | Various products | 22 - 32 fl oz/A | 2 wks prior to peanut planting | |
| paraquat | Gramoxone (and others) | 8 - 12 fl oz/A | 1 wk prior to peanut planting | |
| ***B. Preplant Incorporated (PPI) Herbicides*** | | | | |
| pendimethalin | Prowl, Framework (and others) | 1.8 - 2.4 pt/A | Up to 60 days before planting | Incorporate within 2 - 3 days after application. |
| ethalfluralin | Sonalan | 1.5 - 2.5 pt/A | Up to 7 days before planting | |
| diclosulam | Strongarm | 0.45 oz/A | At or just prior to planting. No more than 4 weeks before planting. | |
| ***C. Preemergence (PRE) Herbicides*** | | | | |
| pendimethalin | Prowl, Framework (and others) | 1.8 - 2.4 pt/A | Within 2 days after peanut planting | These products can be tank-mixed for controlling broader weed spectrum. |
| ethalfluralin | Sonalan | 1.5 - 2.5 pt/A | Within 2 days after peanut planting | |
| flumioxazin | Valor | 2 - 3 oz/A | Within 3 days after peanut planting or prior to cracking | |
| diclosulam | Strongarm | 0.45 oz/A | Within 5 days after peanut planting or prior to cracking | |
| s-metolachlor | Dual Magnum (and others) | 1 - 1.33 pt/A | Within 5 days after peanut planting or prior to cracking | These products have similar mode of action. Do not tank-mix these products. |
| dimethanamid | Outlook | 12 - 18 fl oz/A | Within 5 days after peanut planting or prior to cracking | |
| ***D. Early Postemergence (EPOST) Herbicides*** | | | | |
| paraquat | Gramoxone (and others) | 8 - 12 fl oz/A | Up to 21 days after peanut cracking | |
| s-metolachlor | Dual Magnum (and others) | 1.33 pt/A | Up to 90 days of peanut harvest | Tank-mix paraquat with any one of these products for tropical spiderwort control. Bentazon or Storm is needed to prevent excessive peanut injury. |
| dimethanamid | Outlook | 12 - 18 fl oz/A | Up to 80 days of peanut harvest | |
| pyraxasulfone | Zidua | 3 fl oz/a | At cracking/first true leaf stage through beginning of pod development | |

| Table 3. Continued …….. | | | | |
|---|---|---|---|---|
| **Herbicide compound** | **Commercial products** | **Rate** | **Optimum application timing** | **Comments** |
| 2,4-DB | 2,4-DB, Butyrac (and others) | 8 - 16 fl oz/A | At least 14 days after peanut cracking | |
| bentazon | Basagran | 4 - 16 fl oz/A | Peanut cracking through pegging | |
| acifluorfen | Ultra Blazer | 0.5 - 1.5 pt/A | Cracking through 75 days before harvest | |
| bentazon plus acifluorfen | Storm | 1.5 pt/A | Cracking through 75 days before harvest | |
| imazapic | Cadre or Impose | 4 fl oz/A | Up to 30-35 days after peanut emergence | Do not apply within 90 days of harvest |
| lactofen | Cobra | 8 - 12.5 fl oz/A | After 6 true leaf stage of peanut | Do not apply within 90 days of harvest |
| sethoxydim | Poast, Poast Plus (and others) | 1 - 2.5 pt/A | | Only for grass weeds control |
| clethodim | Select Max (and others) | 6 - 24 fl oz/A | | |
| ***D. Postemergence (POST) Herbicides*** | | | | |
| chlorimuron | Classic | 0.5 oz/A | 60 days after peanut emergence | Do not apply within 45 days of harvest |
| bentazon | Basagran | 4 - 16 fl oz/A | Peanut cracking through pegging | Do not apply after pegging |
| acifluorfen | Ultra Blazer | 0.5 - 1.5 pt/A | Cracking through 75 days before harvest | Do not apply within 75 days of harvest |
| bentazon plus acifluorfen | Storm | 1.5 pt/A | Cracking through 75 days before harvest | Do not apply within 75 days of harvest |
| 2,4-DB | 2,4-DB, Butyrac (and others) | 8 - 16 fl oz/A | 2 – 12 weeks after planting | Do not apply within 60 days of harvest |
| sethoxydim | Poast, Poast Plus (and others) | 1 - 2.5 pt/A | | Do not apply within 40 days of harvest |
| clethodim | Select Max (and others) | 6 - 24 fl oz/A | | |

## Peanut Production and TSWV

Peanut production has changed dramatically since tomato spotted wilt (TSWV) became endemic in the late 1990's. Because of the relatively recent appearance of the disease, its general unpredictability, the lack of in-season management measures, and the potential for severe yield loss, TSWV merits a stand-alone section.  The disease is minimized by several management factors that can help reduce risk of losses. Factors affecting spotted wilt incidence and severity are shown below in approximate order of importance:

- Cultivar
- Planting date
- Plant population
- Insecticide use
- Row pattern
- Conservation/conventional tillage
- Cover crops
- Herbicide Classic®

There are dramatic differences among years in the amount and severity of spotted wilt. The factors contributing to this variation are not well understood, but are associated with weather, thrips populations, and other host plants. While these factors are outside of grower control, the factors listed above are controllable and have been assigned risk points for spotted wilt, leaf spot and white mold. These risk points are evaluated and updated annually in the *Peanut Rx®,* which can be found by contacting your county agent, or on the internet through the University of Georgia extension service (https://peanuts.caes.uga.edu/)*.* The 2020 Version of the *Peanut Rx®* is detailed in the "Disease Management" section below. Among these factors, cultivar tolerance is one of the most important tools available for growers to minimize risk of losses from spotted wilt. Since the varieties and risk points can change annually, it is best to consult the most recent version of the *Peanut Rx®*, however, information from the 2020 version is presented in Table 1. In addition to cultivar selection, planting date is a major factor in spotted wilt risk. Optimum planting dates have shifted over the years. Prior to spotted wilt, peanut planting began in mid to late April and would end by mid-May or until peanuts were planted. Research showed that planting in April and early May as well as late- May and early June caused higher risk of spotted wilt compared to planting between May 11 and May 25. This is likely because the highest numbers of thrips (*F. fusca*) that vector the TSW virus occurred on April planted peanuts, whereas peanuts planted in May had smaller populations. The population dynamics of thrips in non-crop plants or volunteer peanuts early in the season is a reason for these effects since these plants may serve as reservoirs for TSWV. Research with some of the more tolerant varieties has shown no yield advantage or penalty from April 25 to June 1 plantings. Adequate plant stand is critical for minimizing spotted wilt incidence and severity regardless of cultivar used and should be 3 to 4 or more plants per linear foot of row for best results. Although most insecticides have little, if any, effect on spotted wilt incidence, use of phorate (Thimet or Phorate) in-furrow at planting will reduce thrips damage and has been shown to reduce the severity of spotted wilt as well. On the other hand, the insecticides containing imidacloprid have been implicated in increased spotted wilt severity even though they reduce thrips feeding injury. Twin row planting pattern, strip tillage, and rotation with bahiagrass have provided consistent suppression of spotted wilt as well as higher grades due to more uniform maturity. Use of Classic® herbicide tends to increase severity of spotted wilt. Research in Florida has shown not only that strip tillage reduces spotted wilt as compared to conventional tillage but that perennial grasses as the crop prior to peanut reduces spotted wilt even further.

## Disease Management

General recommendations for fungicide programs:

1) Prior to the start of the season, assess each field's risk of disease development by considering history of disease and by using the *Peanut Rx®* index below to plan for fungicide needs.
2) Prevention is key! Initiate sprays for leaf spot control no later than 45 days after planting (DAP)
3) Under high risk situations (see Peanut Rx index), sprays may need to be initiated as early as 30 DAP.
4) To prevent white mold, start applying sprays targeting soil-borne diseases at 60 DAP or just prior to canopy closure.
5) Sprays targeting soil-borne diseases, such as white mold, must be followed by rain or irrigation to redistribute the fungicide down to the soil and crown of the plants in order to be effective against white mold. If irrigating to move the fungicide to the soil, wait a day or two after application to gain some foliar disease control before washing the fungicide off the foliage.
6) Do not make consecutive applications of fungicides with the same mode of action (MOA). Alternating MOA will help to reduce the risk of the pathogens developing resistance. Chlorothalonil (Bravo) is an exception since it has multiple MOA which has allowed continued use without resistance development.
7) Alternating or tank-mixing fungicides provides some protection in case one product alone is not effective against a disease that is developing in the field.
8) Never apply tebuconazole, strobilurin (Abound, Headline), or thiophanate-methyl (Topsin) alone and do not apply more than two tank-mixed applications of Topsin per season.
9) Scout fields to check for disease development and efficacy of your spray program. The most critical period to monitor is from 60 DAP to the end of the season.

10) Do not neglect disease management at the end of the season. Around 105 DAP, if some leaf spot is present (5% on leaves in the lower canopy) and conditions are favorable for leaf spot development consider applying a fungicide application to prevent premature defoliation. An application of chlorothalonil should be effective at preventing leaf spot. If harvest will be delayed, maintain sprays every two weeks until harvest.
11) From studies with researchers from South Carolina and other states in the Southeast, runner-types that are not yet mature can tolerate at least 50% defoliation at digging time before yield loss increases. Harvest decisions should take all factors into consideration, including soil type, weather and digging conditions.

For a list of fungicide options, modes of action and information on the relative efficacy of various products against key diseases see the "Guide to peanut fungicides" and the "Disease response chart for peanut fungicides" from the Clemson peanut production guide (toward the end of the document) https://www.clemson.edu/extension/agronomy/peanuts/docs/moneymaker/disease.pdf

**The 2020 Version of the Peanut Disease Risk Index – *Peanut Rx*®**

The *Peanut Rx*® is a tool that assigns risk of disease to various production practices. The full index can be found at https://nfrec.ifas.ufl.edu/media/nfrecifasufledu/docs/pdf/2020-Peanut-Rx-Disease-Risk-Index.pdf. To calculate risk for a field, the total points for each production practice are summed and compared to the overall risk which is summarized in the last table below. For ease of calculating risk, a risk calculator is available online here: https://nfrec.ifas.ufl.edu/media/nfrecifasufledu/docs/excel/Peanut-Rx-Risk-Calculator.xlsm.

**Peanut Variety**

| **Variety[1]** | **Spotted Wilt Points** | **Leaf Spot Points** | **White mold Points** |
|---|---|---|---|
| AU NPL 17[2] | 10 | 15 | 15 |
| Bailey[3] | 10 | 25 | 10 |
| Florida Fancy[2] | 25 | 20 | 20 |
| FloRun™ '331'[2] | 15 | 20 | 15 |
| Georgia-06G | 10 | 20 | 20 |
| Georgia-07W | 10 | 20 | 15 |
| Georgia-09B[2] | 20 | 25 | 25 |
| Georgia-12Y[5] | 5 | 15 | 10 |
| Georgia-14N[2,4] | 5 | 15 | 15 |
| Georgia-16HO[2] | 10 | 25 | 20 |
| Georgia-18RU[1] | 10 | 25 | 20 |
| Georgia Green | 30 | 20 | 25 |
| Sullivan[2] | 10 | 25 | 15 |
| Tifguard[4] | 10 | 15 | 15 |
| TifNV-HiOL[2,4] | 5 | 15 | 15 |
| TUFRunner™ '297'[2] | 10 | 25 | 20 |
| TUFRunner™ '511'[2] | 20 | 30 | 15 |

[1]*Adequate research data is not available for all varieties with regards to all diseases. Additional varieties will be included as data to support the assignment of an index value are available.*
[2]*High oleic variety.*
[3]*Variety Bailey have increased resistance to Cylindrocladium black rot (CBR) than do other varieties commonly planted in Georgia.*
[4]*Tifguard, TifNV-HiOL and Georgia 14-N have excellent resistance to the peanut root-knot nematode.*
[5]*Georgia-12Y appears to have increased risk to Rhizoctonia limb rot and precautions should be taken to protect against this disease.*

**Planting Date***

| Peanuts are planted: | Spotted Wilt Points[1] | Leaf Spot Points | Soilborne Disease Points | |
|---|---|---|---|---|
| | | | White mold | Limb rot |
| Prior to May 1 | 30 | 0 | 10 | 0 |
| May 1 to May 10 | 15 | 5 | 5 | 0 |
| May 11-May 25 | 5 | 10 | 0 | 0 |
| May 26-June 10 | 10 | 15 | 0 | 5 |
| After June 10 | 15 | 15 | 0 | 5 |

***Impact of planting date on tomato spotted wilt is an important consideration, but can be variable across the peanut production region of the southeastern United States.*

**Plant Population (final stand, not seeding rate)**

| Plant stand: | Spotted Wilt Points[1] | Leaf Spot Points | Soilborne Disease Points | |
|---|---|---|---|---|
| | | | White mold[2] | Limb rot |
| Less than 3 plants/ft | 25 | NA | 0 | NA |
| 3 to 4 plants/ft[3] | 15 | NA | 0 | NA |
| 3 to 4 plants/ft[4] | 10 | NA | 0 | NA |
| More than 4 plants/ ft | 5 | NA | 5 | NA |

[1]*Only plant during conditions conducive to rapid, uniform emergence. Less than optimum conditions at planting can result in poor stands or delayed, staggered emergence, both of which can contribute to increased spotted wilt. Note: a twin row is considered to be one row for purposes of determining number of plants per foot of row.*
[2]*It is known that closer planted peanuts tend to have an increased risk to white mold.*
[3]*This category (15 risk points for spotted wilt) is only for varieties with a risk to spotted wilt of MORE THAN 25 points.*
[4]*This category (10 risk points for spotted wilt) is for varieties with 25 point or less for risk to spotted wilt.*

**At-Plant Insecticide**

| Insecticide used: | Spotted Wilt Points[1] | Leaf Spot Points[2] | Soilborne Disease Points | |
|---|---|---|---|---|
| | | | White mold | Limb rot |
| None | 15 | 5 | NA | NA |
| Other than Thimet 20G | 15 | 5 | NA | NA |
| Velum Total | 15 | 0 | NA | NA |
| Thimet 20G | 5 | 0 | NA | NA |

[1]*An insecticide's influence on the incidence of TSWV is only one factor among many to consider when making an insecticide selection. In a given field, nematode problems may overshadow spotted wilt concerns and decisions should be made accordingly.*
[2]*Use of Thimet 20G or Velum Total provides a slight reduction in risk to leaf spot versus use of other products for early-season insect control.*
***Notes:** While Thimet is the only insecticide documented to reduce the risk of TSWV, other insecticides may offer good-to-excellent control of early season thrips. Note also that according to the chemical labels, some formulations of imidicloprid products may actually increase risk to tomato spotted wilt. Check product labels for further information.*

**Row Pattern**

| Peanuts are planted in: | Spotted Wilt Points | Leaf Spot Points | Soilborne Disease Points | |
|---|---|---|---|---|
| | | | White mold | Limb rot |
| Single rows | 10 | 0 | 5 | 0 |
| Twin rows | 5 | 0 | 0 | 0 |

**Tillage**

| Tillage | Spotted Wilt Points | Leaf Spot Points | Soilborne Disease Points | |
|---|---|---|---|---|
| | | | White mold | Limb rot |
| Conventional | 15 | 10 | 0 | 0 |
| Reduced* | 5 | 0 | 5 | 5 |

** For fungal diseases, this is does not apply for reduced tillage situations where peanut is following directly behind peanut in a rotation sequence. Limb rot can exist on some types of crop debris and use the organic matter as a bridge to the next peanut crop.*

***"Funky" or "irregular" leaf spot tends to be more severe in conservation tillage than in conventional tillage, though this malady is not typically associated with yield losses.*

**Classic® Herbicide***

| | Spotted Wilt Points | Leaf Spot Points | Soilborne Disease Points | |
|---|---|---|---|---|
| | | | White mold | Limb rot |
| Classic Applied | 5 | NA | NA | NA |
| No Classic Applied | 0 | NA | NA | NA |

**Use of Classic is not recommended for fields planted to Georgia-06G. Research has documented a slight yet consistent yield reduction when Classic herbicide is applied specifically to Georgia-06G.*

**Crop Rotation with a Non-Legume Crop.**

| Years Between Peanut Crops* | Spotted Wilt Points | Leaf Spot Points | Soilborne Disease Points | |
|---|---|---|---|---|
| | | | White mold | Limb rot |
| 0 | NA | 25 | 25 | 20 |
| 1 | NA | 15 | 20 | 15 |
| 2 | NA | 10 | 10 | 10 |
| 3 or more | NA | 5 | 5 | 5 |

**All crops other than peanut are acceptable in a rotation to reduce leaf spot. Cotton and grass crops will reduce the severity of white mold. Cotton is an excellent crop to reduce risk to the peanut root-knot nematode; however corn is a host for this pest. Rhizoctonia limb rot can still be a significant problem, especially with cotton, under a longer rotation with favorable conditions, e.g. heavy vine growth & irrigation/ rainfall. Rotation with soybeans can increase risk to white mold, Rhizoctonia limb rot, peanut root-knot nematode and CBR. Rotation with grass crops will decrease the potential risk of limb rot; tobacco and vegetables will not.*

**Field History**

| Previous disease problems in the field?* | Spotted Wilt Points | Leaf Spot Points | Soilborne Disease Points | |
|---|---|---|---|---|
| | | | White mold | Limb rot |
| No | NA | 0 | 0 | 0 |
| Yes | NA | 10 | 15 | 10 |

** "YES" would be appropriate in fields where leaf spot and/or soilborne diseases were a problem in the field despite use of a good fungicide program.*

**Irrigation**

| Does the field receive irrigation? | Spotted Wilt Points | Leaf Spot Points | Soilborne Disease Points | |
|---|---|---|---|---|
| | | | White mold | Limb rot |
| No | NA | 0 | 0 | 0 |
| Yes | NA | 10 | 5[1,2] | 10 |

[1]*Irrigation has a greater effect on Rhizoctonia limb rot than on southern stem rot (white mold) or Cylindrocladium black rot.*

[2]***Special note:*** *There are times when peanuts grown in non-irrigated fields are at greater risk to white mold than are peanuts planted in irrigated fields. Although (as discussed earlier) irrigation may produce the environmental conditions more favorable for white mold to develop, efficacy of fungicides may be reduced in non-irrigated fields where the water from irrigation could have facilitated relocation of the fungicide to the crown of the plant*

**Overall risk of disease after summing each risk component for each disease.**

| Overall Risk | Spotted Wilt | Leaf Spot | White mold |
|---|---|---|---|
| **High Risk** | **≥115** | **65-105** | **55-80** |
| High Risk for fungal diseases: Growers should always use full fungicide input program in a high-risk situation. | | | |
| **Medium Risk** | **70-110** | **40-60** | **30-50** |
| Medium Risk for fungal diseases: Growers can expect better performance from standard fungicide programs. Reduced fungicide programs in research studies have been successfully implemented when conditions are not favorable for disease spread. | | | |
| **Low Risk** | **≤65** | **10-35** | **10-25** |
| Low Risk for fungal diseases: These fields are likely to have the least impact from fungal disease. Growers have made the management decisions which offer maximum benefit in reducing the potential for severe disease; these fields are strong candidates for modified disease management programs that require a reduced number of fungicide applications. | | | |

## Pest Management and Monitoring

After planting, peanuts should be monitored routinely for proper growth and pest problems. Usually, the first visible insect damage is from thrips as the peanut seedlings emerge. Thrips feed in the emerging leaflets while they are still folded in the whorl often causing stunted, twisted and sometimes blackened leaflets as the leaf emerges. High populations and heavy feeding can cause significant whole-plant stunting and delay row closure. Thrips are often controlled by seed treatment or an in-furrow application of insecticide at planting. Common active ingredients used to control thrips damage include imidicloprid and phorate, which are applied in-furrow at planting and acephate which can be applied foliarly. Many of these materials are systemic and will provide several weeks of control. Thrips also transmit tomato spotted wilt virus, but insecticides that control thrips feeding injury have proven ineffective in reducing the incidence or severity of tomato spotted wilt. Only phorate has been shown to reduce the risk of tomato spotted wilt in peanut, but this is unrelated to its control of thrips. Rather, phorate is postulated to induce plant defense mechanisms that help the plant tolerate spotted wilt.

Other insect pests of peanuts include caterpillars that eat leaves, bore into stems, and feed on pods and seeds. Control is usually accomplished by insecticidal sprays based on scouting for threshold populations. Florida currently has no state specific thresholds for foliage feeders but the common threshold used when evaluating population pressure is 4-8 caterpillars per row foot. The size and stress level of plants helps determine where on this threshold your plants fall. Small plants that have not lapped would be on the lower end (4-5 caterpillars per row foot, while lapped plants would be on the higher end of 7-8). Weekly scouting can identify these pests so that proper control measure can be taken.

There are four peanut pests that thrive under hot, dry conditions: spider mites, lesser cornstalk borer, burrower bug, and red-necked peanut worm. It is important to note that many caterpillar controlling products are pyrethroids, which can flare spider mite populations. Caution should be exercised in dryland situations when contemplating the use of pyrethroids for control, especially if it has been dry and no rain is forecasted. Pyrethroids can be identified from their active ingredient, the name will end in 'thrin' or 'ate'.

Tables 4 and 5 summarize the insecticides, use rates, re-entry and post-harvest intervals as well as the insect pests targeted. As always, consult the product label for final authority since product formulations can change from year to year.

Table 4. Insecticide options labeled for management of various pests in Florida peanut production (refer to product labels for complete information).

| MOA | Trade name (active ingredient) | Maximum rate/acre | REI /PHI (hours or days) | Comments |
|---|---|---|---|---|
| 3 | **Baythroid XL EC*** (*beta-cyfluthrin*) | 8.4 fl oz | 12 H / 14 D | 2.8 fl oz max allowed/10 day interval |
| 3A | **Brigade 2EC*** (*bifenthrin)* | 32 fl oz | 12 H / 14 D | Use minimum of 10 GPA with ground equipment |
| 28 | **Prevathon** (*chlorantraniliprole*) | 60 fl oz | 4 H / 1 D | 4 max apps/year. Long residual. |
| 1B | **Lorsban 15G** (*chloropyrifos*) | Max single application rate is 15 oz/1000 ft of row. Do not exceed 26.4 lb/season. | 24 H / 21 D | Do not feed peanut forage or hay to meat or dairy animals. For banded applications use a 10-18" band. Needs water for activation. |
| 3A | **Tombstone*** **(***cyfluthrin*) | 8.4 fl oz | 12 H / 14 D | 2.8 fl oz max allowed/10 day interval |
| 15 | **Dimilin 2L** (*diflubenzuron)* | 24 fl oz | 12 H / 28 D | Do not make more than 3 applications/season. (Growth regulator) |
| 3A | **Asana XL*** (*esfenvalerate*) | .15 lb ai | 12 H /21 D | Do not feed or graze livestock on treated vines. |
| 4A | **Admire Pro 4.6F** (*imidacloprid*) | 10.5 fl oz | 12 H / 14 D | Apply in-furrow at planting, do not apply to Virginia varieties. |
| 22 | **Steward EC** (*indoxacarb)* | 45 fl oz | 12 H / 14 D | Minimum of 5 days between treatments. Great on Armyworms. |
| 3A | **Warrior II Zeon*** (*lambda-cyhalothrin*) | 7.6 fl oz | 24 H /14 D | Do not graze livestock in treated areas or use treated vines for animal feed. |
| 3A+28 | **Besiege*** (*lambda-cyhalothrin + chlorantraniliprole*) | 31 fl oz | 24 H / 14 D | 10 GPA; 7-day interval, 4 max applications/crop |
| 1A | **Lannate SP**<br>**Lannate LV**<br>(*methomyl)* | 4 lb<br>12 pt | 48 H /21 D | Do not feed treated vines to livestock |
| 18 | **Intrepid 2F** (*methoxyfenozide)* | 64 fl oz | 4 H / 7 D | 10 GPA by ground equipment; 3 applications max per acre/season |
| 18 + 5 | **Intrepid Edge** **(**spinetoram + *methoxyfenozide)* | 24 fl | 4 H / 7 D | 10 GPA by ground equipment; 3 applications max per acre/season; do not graze peanut hay |
| 15 | **Diamond .083EC** (*novaluron)* | 36 fl oz | 12 H / 28 D | Do not feed treated peanut hay or vines to livestock. |
| 1B | **Thimet 20 G** (*phorate*) | In furrow for single rows use 5.5 oz of 20G/1000 ft of row. Do not exceed 7.5 lbs/A for twin rows. | 48 H / 1 D | Apply in-furrow at planting. Do not graze or feed treated hay or forage to livestock. Young seedlings may exhibit varying degrees of leaf damage. |
| 12C | **Comite** (*propargite*) | 64 fl oz | 48 H / 14 D | Do not apply more than twice per season. Do not graze or feed livestock on treated areas or cut treated forage for hay. |
| 12C | **Comite** II 6EC (*propargite*) | 72 fl oz | 48 H / 14 D | Do not apply more than twice a season. Do not graze or feed livestock on treated areas or cut treated forage for hay. |
| 5 | **Radiant SC** (*spinetoram)* | 24 fl oz | 4 H / 3 D | Do not allow grazing of peanut hay. |
| 3A | **Mustang Maxx EC*** (*zeta-cypermethrin*) | 24 fl oz | 12 H / 7 D | Do not graze livestock in treated areas or use treated vines for feed. |

Table 5. Trade names, active ingredients, and use rates for common insecticides labeled for control of peanut insect pests.

| Trade name (active ingredient) | Beet Armyworm | Burrower Bug | Corn Earworm | Cutworm | Fall Armyworm | Lesser Cornstalk Borer | Southern Armyworm | Southern Corn Rootworm | Soybean Looper | Spider Mites | Thrips | Tobacco Budworm | Velvetbean Caterpillar |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ---------------------- Rates are in **fluid ounces** of product per acre unless otherwise specified ------------------------ | | | | | | | | | | | | |
| **Baythroid XL EC*** (*beta-cyfluthrin*) | | | 1.8-2.4 | 1.0-1.8 | | | | | | | | | 1.8-2.4 |
| **Brigade 2EC*** (*bifenthrin*) | 2.1-6.4 | | 2.1-6.4 | 2.1-6.4 | 2.1-6.4 | | 2.1-6.4 | | | | 5.12-6.4 | | 2.1-6.4 |
| **Prevathon** (*chlorantraniliprole*) | 14-20 | | 14-20 | | 14-20 | 14-20 | | | 20 | | | 14-20 | |
| **Lorsban 15G** (*chloropyrifos*) | | 13.6 lb | | | | 13.6 lb | | 13.6 lb | | | | | |
| **Tombstone*** (*cyfluthrin*) | | | 1.8-2.4 | 1-1.8 | | | | | | | | | 1.8-2.4 |
| **Dimilin 2L** (*diflubenzuron*) | 4-8 | | | | 4-8 | | 4-8 | | 4-8 | | | | 2-4 |
| **Asana XL*** (*esfenvalerate*) | | | 2.9-5.8 | 9.6 | | | | | | | | | 2.9-5.8 |
| **Admire Pro 4.6F** (*imidacloprid*) | | | | | | | | | | | 7-10.5 | | |
| **Steward EC** (*indoxacarb*) | 9.2-11.3 | | 6.7-11.3 | 9.2-11.3 | 9.2-11.3 | | | | | | | 9.2-11.3 | |
| **Warrior II Zeon*** (*lambda-cyhalothrin*) | | | 1.28-1.92 | .96-1.60 | | | | | | | 1.28-1.92 | | 0.96-1.60 |
| **Besiege*** (*lambda-cyhalothrin + chlorantraniliprole*) | 10 | | 6-10 | 5-8 | 6-10 | | | | | | | | 5-8 |
| **Lannate SP** **Lannate LV** (*methomyl*) | 3/8-1 lb 1.5-3 pt | | 0.25-1 lb 0.75-3 pt | 0.5-1 lb 1.5-3 pt | 0.25-1 lb 0.75-3 pt | | | | | | | | .5-1 lb 1.5-3 pt |
| **Intrepid 2F** (*methoxyfenozide*) | 6-10 | | | | | | | | 6-10 | | | | 6-10 |
| **Intrepid Edge** (spinetoram + *methoxyfenozide*) | 4-8 | | | | | | | | 4-8 | | | | 4-8 |

**Table 4. Continued ………………**

| **Trade name** (active ingredient) | **Beet Armyworm** | **Burrower Bug** | **Corn Earworm** | **Cutworm** | **Fall Armyworm** | **Lesser Cornstalk Borer** | **Southern Armyworm** | **Southern Corn Rootworm** | **Soybean Looper** | **Spider Mites** | **Thrips** | **Tobacco Budworm** | **Velvetbean Caterpillar** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Diamond .083EC** (*novaluron)* | 6-12 | | | | 6-12 | 6-12 | 6-12 | | 6-12 | | | | 6-8 |
| **Thimet 20 G** (*phorate*) | | | | | | | | | | | 5-7.5 lb | | |
| **Comite** (*propargite*) | | | | | | | | | | 2 pt | | | |
| **Comite** II 6EC (*propargite*) | | | | | | | | | | 2.25 pt | | | |
| **Radiant SC** (*spinetoram)* | 3-8 | | 3-8 | | 3-8 | | 3-8 | | 3-8 | | | 3-8 | 3.8 |
| **Mustang Maxx EC*** (*zeta-cypermethrin*) | | | 3.2-4 | 1.28-4 | | | | | | | 3.2-4 | | 1.28-4 |

## Nematode Management

Nematodes are a major pest in peanut production. The major nematodes of concern in Florida peanut production are peanut root-knot nematode, sting nematode, lesion nematode, and ring nematode. Sampling to diagnose which nematodes, if any, are present in your field is the first step to choosing an effective nematode management practice. Detailed information about how to collect and submit soil and root samples for nematode diagnosis can be found at the UF/IFAS Nematode Assay Lab website (http://entnemdept.ufl.edu/nematology-assay-lab/). Nematodes are managed primarily by crop rotation, use of resistant cultivars, and nematicide application. Effective crop rotation for managing nematodes requires rotating to a crop that is not a host of the nematodes in your peanut field. Peanut, soybean, and vegetables are poor choices, whereas cotton and bahiagrass are good choices, for managing peanut root-knot nematode. Peanut and grasses are especially poor rotation crops when sting, lesion, and ring nematodes are present. Weed control is also an important component of nematode management as many weeds serve as hsots for nematodes. Peanut cultivars that are highly resistant to root-knot nematodes are available, including 'Georgia 14N', 'Tifguard', and 'TifNV High O/L' (Figure 3). No resistant cultivars are available for sting, lesion, or ring nematodes. Nematicides available include fumigants and non-fumigants. Fumigant nematicides, such as Telone II move through the soil as a gas and are applied with specialized equipment before planting (Table 3). Metam sodium and Metam potassium fumigants are also available for peanut production, but are unlikely to provide nematode control at application rates that are economical in peanut production. Non-fumigant nematicides are applied in liquid (Velum Total and Vydate C-LV) or granular formulation (AgLogic 15GG) as in-furrow applications or foliar applications. See the UF/IFAS EDIS on nematode management in Florida peanuts for further information (https://edis.ifas.ufl.edu/sr023).

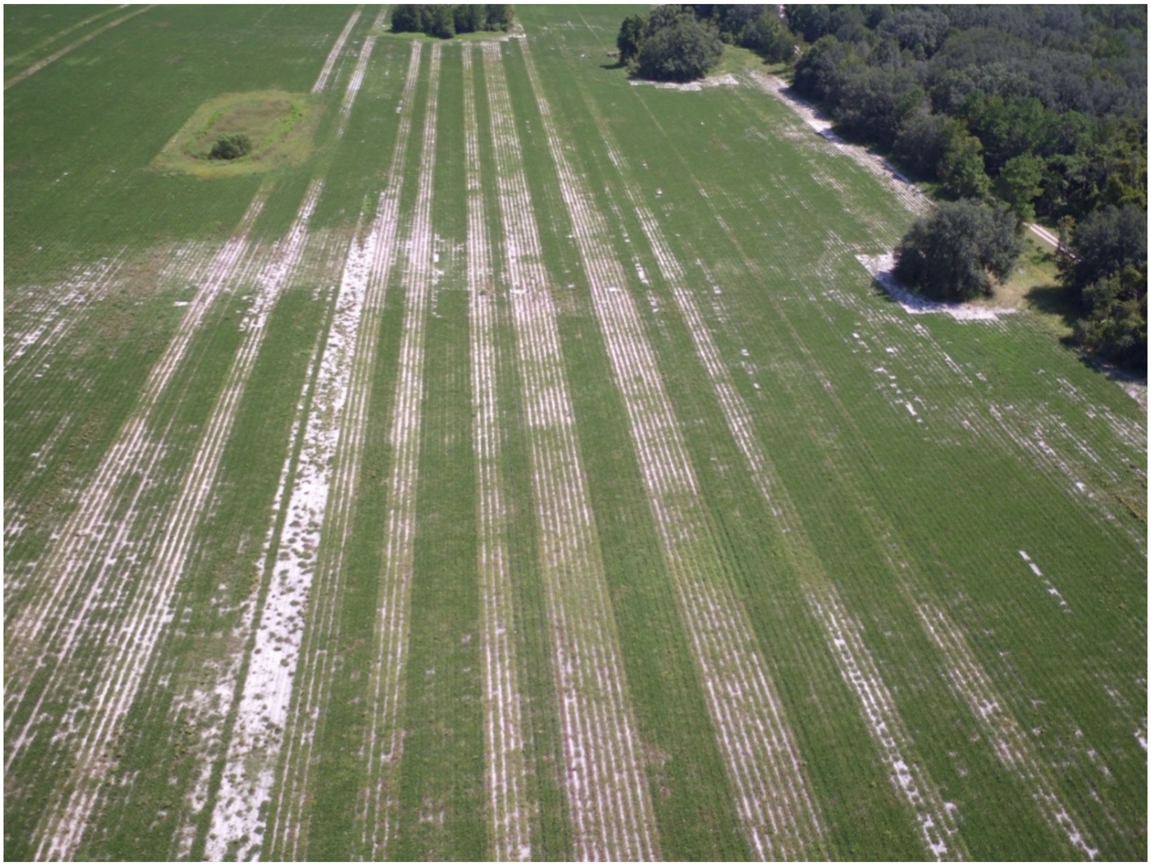

**Figure 3.** Aerial image demonstrating damage from peanut root-knot nematode in a susceptible cultivar compared with root-knot nematode-resistant cultivars. Strips with lighter green vegetation, reduced growth, and increased bare ground have the susceptible cultivar 06G. The rest of the field with darker green vegetation and increased canopy coverage have the resistant cultivar TifNV High O/L. Photo credit: Darren Raj, AgriBugs Inc.

## Irrigation

Peanuts grow well on sandy soils and are somewhat drought tolerant at certain growth stages. Optimal irrigation scheduling of peanut is an area of active research. Research has shown that sensor-based irrigation scheduling produces the most consistent and highest yields during dry years. For those with tensiometric sensors, triggering irrigation at -40 kPa at the 6-inch soil depth is a good starting point, though growers should adjust this with experience. Growers with volumetric (capacitance) soil moisture sensors will learn the values to trigger irrigation events with experience, since volumetric trigger points are dependent on soil texture. Many county Extension faculty are gaining experience with soil moisture sensors in North Florida and can be sought out as a resource for soil moisture sensor guidance.

There are critical stages of growth that require more water in order to protect yield and maintain high quality and grade. The UF Checkbook Method (Figure 4) shows the amount of water used by peanut daily based on recently updated recommendations by Dr. Charles Barrett at NFREC - Suwannee Valley. Recent on farm demonstrations and research have revised the recommended seasonal water requirement for peanut down from 23 inches to 20 inches. Other tools to schedule peanut irrigation include the UGA Easypan, the USDA IrrigatorPro, and PeanutFARM.

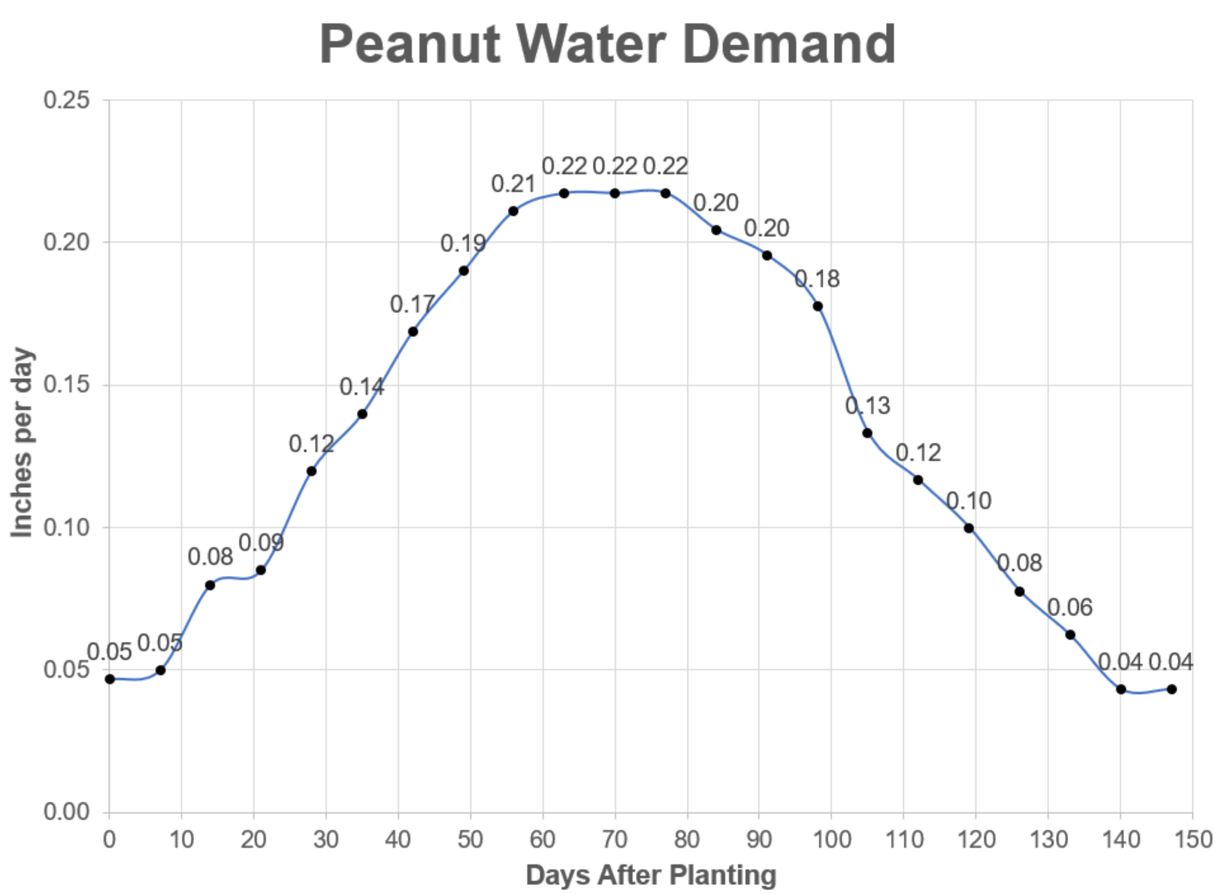


**Figure 4**. Daily water use by peanut for Florida assuming an April-May planting date. This irrigation schedule was developed by Charles Barrett in coordination with local county Extension agents and verified using soil moisture sensors in the Suwannee Valley region.

Peanuts are the least susceptible of any of the row crops in the Southeast to drought at planting since they will emerge from two to three inches deep if necessary. However adequate moisture is necessary for good, uniform stands. Mid-season nut development is the most critical time for irrigation if there is a shortage of rainfall since it is the stage of maximum water use by the plant. In the Southeast, the critical part of the development/fruiting period includes the latter part of July, August, and the first week or so of September. Irrigation during the first two months after planting is usually not needed unless extremely dry conditions persist, because excess moisture can trigger excessive vine growth. Irrigation in late September may result in excessive moisture during the peanut maturity stage and can increase the severity of CBR, white mold, and leaf-spot diseases. In dry years, irrigation can suppress the outbreak of spider mites and lesser corn stalk borers, make digging operations easier and reducing the risk of aflatoxin contamination.

## Determining Maturity

One of the most critical aspects of growing peanuts is timing of harvest to make maximum grade and yield (https://edis.ifas.ufl.edu/pdffiles/AG/AG41100.pdf). Determining optimum peanut maturity can be done in several ways but high pressure pod blasters that strip away the outer pod layer to expose colors indicative of the stage of pod maturity has become one of the primary methods. A high pressure washer and wire basket can serve as an inexpensive, quick, simple alternative to blasters that use glass beads, water, and compressed air (https://athenaeum.libs.uga.edu/bitstream/handle/10724/33345/A%20Blaster%20Bulletin.pdf?sequence=1). The key to the pressure washer effectiveness for blasting peanuts is a rotating turbo nozzle. A turbo nozzle takes a zero-degree jet stream which has the highest stripping power of any nozzle, rotates it, and spreads it out over a wide area. It provides superior stripping action compared to a flat fan nozzle at a pressure low enough to minimize damage to the pods. An electric pressure washer providing 1.5 gpm at 1300 psi is quite adequate and fast. In higher capacity, engine-driven models, pressure should be reduced to approximately 1000 psi with the pressure regulator or by throttling down the engine. Place picked pods in a basket (pick all pods off plants to make about 200 pods from each location in the field with different maturities due to soil type, variety differences or other variables). Place the basket in a five-gallon bucket to prevent splashing. The bucket should be equipped with a drain to prevent water build-up. Hold the pressure washer nozzle approximately 12 inches away and blast while vigorously shaking the basket. Watch the pods carefully. Stop after approximately 30 seconds and remove the immatures (yellows) before they disintegrate. Place the more advanced pods (orange to black) back into the basket and blast until the entire outer pod layer has been removed. The entire process should be completed within three minutes or less. Blasted pods can be put on a chart in order to classify and rank the fields for time to harvest. PeanutFARM can also assist with harvest decisions.

## Peanut Harvest and Grades

When a load of peanuts (farmer stock) is delivered to a buying point, a representative sample is taken by employees of the Federal-State Inspection Service. Two measurements are made from a sample taken directly out of the drying wagon. **FM** or foreign matter denotes the percent or amount of plant material, rocks, or soil that is in a load of peanuts. Foreign matter is increased by digging when soil is too wet or dry or peanuts vines not properly cured. Peanut combines can be adjusted to some extent to blow more or less air to help reduce the trash along with having the vines in the proper condition when harvesting. **LSK** or loose shelled kernels is the percent of peanuts shelled during the harvest process, which may be caused by high a picker speed, too much air blowing peanuts against something sharp in the combine, or the picker fingers being set too aggressively. Since the vast majority of peanuts grown in Florida are runner types, this discussion focuses on the runner type grading process exclusively.

After the LSK and FM are removed from the sample, the remaining pods are shelled and the following are determined on a percentage basis. During the process of grading, the peanuts are inspected visually for damage and contamination by *Aspergillus flavus*. The grading process determines the SMK, SS, OK, DK, and ELK as described here. The **SMK** (sound mature kernels) is the percentage of those peanuts that are shelled for grading and determined to be mature and which ride a screen with ½ inch by ¼ inch slots (for runner peanuts; the screen sizes differ for Virginia, Spanish and Valencia types). The **SS** (sound splits) is the percentage that are good peanuts but are split. The **OK** is the percentage of other kernels that may be immature or very small such that they fall through the ½ inch by ¼ inch screen. The **ELK** is the percentage of extra large kernels that ride over a 21.5/64 inch slotted screen. These ELK may be used by manufacturers for special purposes. Certain peanuts have a tendency to have larger seed than others but growers seldom are paid for this. The **DK** are kernels that are damaged due to rancidity, mold, decay, or other factors. Grade values are based mostly on TSMK or the total sound mature kernels which is a sum of the SMK and SS. The gross value of the peanut load is determined by the TSMK. Each percentage point of TSMK is worth about $4.81 per ton although this value is updated each year. For example, if the TSMK is 75%, the USDA loan value of one ton of peanuts is 75 x $4.81= $360.75. This is the gross value of the TSMK. Discounts are applied when the SS are over 4%, the DK are over 1%, and/or FM is over 4%. The LSK have a value of around $140 per ton ($0.07 per pound). Grades in the mid 70%s are considered good and the grower probably did a good job timing the digging and harvesting and the peanuts were dried properly.

Depending on the level of damaged kernels, and presence of visible *Aspergillus flavus* (the fungus that produces aflatoxin), peanuts are classified as Segregation 1, 2 or 3. By USDA definition, Segregation 1 farmer stock peanuts are those with "not more than 3.49 percent damaged kernels no more than 1.00 percent concealed damage caused by rancidity, mold, or decay and which are free from visible *Aspergillus flavus".* Segregation 2 farmer stock peanuts are those with "more than 3.49 percent damaged kernels or more than 1.00 percent concealed damage caused by rancidity, mold, or decay and which are free from visible *Aspergillus flavus".* Segregation 3 farmer stock peanuts are "peanuts with visible *Aspergillus flavus".* The value of Segregation 1 farmer stock peanuts is explained below, but both Segregation 2 and 3 runner peanuts were valued by USDA at $124.07 in 2018. This is about 1/3 the value of Segregation 1 peanuts, so farmers should do as much as possible to avoid DK and potential for colonization by *Aspergillus flavus.*

If a peanut grade were 73% SMK and 2% SS for a 75% TSMK grade, the other 25% would be shells and other kernels. Some peanut varieties have thicker shells and will have lower grades than other varieties. Many growers may start digging too soon if they have large acreages and the first few loads of peanuts will grade in the upper 60s or low 70s. Low grades can be caused by digging too early or having periods of drought when pegs did not set and there are "two" crops of peanuts, one set early and one set later when moisture returned. This makes it difficult to determine when to dig since there will be some very mature peanuts along with some very immature peanuts that were set later. Irrigated peanuts are usually easier to determine proper digging date since moisture can be supplied for a continuous set of peanuts. However, other factors like disease control and weather conditions can determine digging date and these often cause yield losses. Vines should be kept disease free as much as possible in case weather forces delayed digging by a week or more and healthy vines will retain mature peanuts better than dying, diseased vines. A week early or late digging peanuts can make 500 lbs/A difference or more in pod yield and several points in grade. Five hundred pounds of peanuts are worth about $88/A and the difference between a grade of 69% and 75% on a 4000 lb/A peanut crop is worth about $57/A. Therefore, one key for high yields and profit is to keep vines healthy and dig on time.

## Ten Recommendations for Sustainable Peanut Production

1) Crop Rotation: Rotate the peanut crop with another crop such as cotton, corn, or bahiagrass, for at least two years.
2) Tillage: Whether conventional or strip tillage, make sure there is a good seedbed for planting that is weed-free. See: https://edis.ifas.ufl.edu/ag187
3) Variety: Chose a variety that best fits the needs for marketing, disease, nematode, irrigation, and soil type on a particular farm or in a particular region.
4) Planting: Plant peanut seeds 1½ to 2 inches deep when soil temperature is at least 68$^{o}$F to achieve a plant stand of 4 plants per foot of row.

5) Disease: Follow the Peanut Rx® guidelines to minimize risk of spotted wilt, leaf spots and white mold and develop an appropriate preventative fungicide program based on the level of disease risk (using the Peanut Rx point system) that includes at least three modes of action.
6) Nematodes: Test the field for nematode populations and develop control strategies including long-term crop rotation, variety selection, and nematicide use. See: https://edis.ifas.ufl.edu/sr023
7) Weeds: Develop a herbicide program to maintain nearly weed-free conditions for at least the first 6 weeks after planting and scout to monitor weed control needs thereafter. See: http://edis.ifas.ufl.edu/wg008
8) Soil fertility: Test soils and follow soil test recommendations to insure adequate pH, macro- and micronutrient fertility. Apply ½ pound of B per acre. Apply gypsum if the pegging soil test is below 500 lbs./A, seed peanuts are being produced, or Virginia peanuts are being grown.
9) Maturity: Collect representative samples, pod-blast them to determine maturity, and plan to dig the crop accordingly. Use PeanutFARM adjusted growing degree days as a guide to harvest maturity. See: https://edis.ifas.ufl.edu/ag411
10) Harvest: Harvest peanuts when the kernel moisture is between 15% and 18% for best quality and grade.

## Management Tips

- Since growing peanuts involves a high level of management, many decisions are required in growing the crop. Fortunately, most of these decisions can be made prior to planting. For example, land selection, variety, and crop rotation are of vital importance in preventing many weed, insect, disease, and nematode problems. If all pest problems in a field are monitored for the crop grown each year, then the selection of pesticides is much easier and many problems can be averted.
- Whether or not to irrigate is a major decision because good yields cannot be maintained during dry years. However, for the small acreage producer, costs for irrigation equipment may make the practice uneconomical. If irrigation is utilized, a grower must be knowledgeable and judicious in use of supplemental water. White mold and pod rots are diseases that can be made more severe with poor irrigation management.
- Gypsum can be used to supply calcium to peanuts. Calcium is needed by the peanuts to ensure well-filled pods, reduce pod rots caused by imbalances of other nutrients, and to improve germination of peanuts produced for seed. The need for gypsum can be determined by soil tests and, if needed, the gypsum should be applied no later than early flowering. Gypsum should be considered on all non-irrigated fields.
- Insecticide applications to the peanut foliage should be determined by scouting procedures that include insect counts of various species. Other insect pests, such as lesser corn stalk borers and cutworms, may attack below-ground peanut parts and thus require scouting techniques peculiar to peanuts.
- Fungicide applications are generally required for high yields of peanuts. Leafspot is usually the major disease of the crop in Florida. Information is available on selecting fungicide programs for peanuts. Normally, fungicide applications must be made on 7–14 day intervals, but it is recommended that growers consider information from disease-risk models and weather-based disease forecasts. The decision on which fungicides to use should be based on the disease history of the field, cultivar being grown, crop rotation history, prevailing weather, as well as several other factors.
- Most weed problems in the growing crop can be controlled by herbicide applications. Timing is of critical importance in these herbicide applications. In some instances, cultivation, hoeing, and/or hand pulling would be the preferred means of weed control on herbicide resistant weeds. If cultivating, it is important not to throw dirt on the peanut vines because white mold problems can be made more severe if the vines are partially covered with soil.
- Because all pods do not mature at the same time, one of the most difficult problems in producing peanuts is determining when to harvest. Runner peanuts normally mature in approximately 135–155 days after planting. However, if Valencia peanuts are grown for boiling purposes, they may mature in as little as 75 days from planting in mid-summer. The same variety may take from 15 to 30 days longer to mature when planted in early or late season. Therefore, it is not possible to accurately

predict at planting when a peanut crop will be ready to harvest. There are reliable and objective procedures that can be used to determine peanut maturity and the best time to harvest. For the commercial grower, the peanut maturity profile is preferred while others may pull vines occasionally to check pod maturity. There are many locations where pod blasters are available and charts to determine proper digging dates. Years of experience on a particular variety will also help growers determine when to start looking for maturity.

- After harvest, peanuts must be dried unless they are for consumption as boiled or green peanuts. Most peanuts are dried in the field for 3 days prior to picking and then artificial drying is normally used overnight to finish drying peanut to about 8% moisture. It is important to use care in harvesting and drying peanuts as the fungus that causes aflatoxin development is favored by poor drying techniques.
- Storage of peanuts should be in an insect-free area. An insecticide is normally sprayed on the stored peanuts to prevent insect infestations. The moisture content of the peanuts should be below 10% for safe, long-term storage. The storage facility should be one that prevents moisture accumulation in or around the peanuts.