Conservation Tillage Peanut Production[1]

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Peanuts are a very important part of the row crop economy in Florida. There has been a significant increase in acreage in new areas of Florida since the current farm bill eliminated the quota system. While peanuts are a high management, high input crop and the costs of inputs have steadily increased, peanut farmers are competing in a global market and prices have remained low. Yields have remained at historic averages for a number of years, even with new varieties and technology. To remain competitive, farmers must find ways to improve production efficiency or increase yields. Therefore, major trends in U. S. agriculture over the past 10 years have included a move to genetically modified crops, reduced tillage, and precision application of inputs. Peanut production has traditionally been a tillage intensive operation, but conservation tillage (or strip-tillage, as it is known by producers in the southeast) has become a widely-accepted practice for most row crops and is gaining acceptance among peanut farmers.

The mid-to-late 1970s saw the first commercial production of strip-till soybeans and corn in Florida. No-till without subsoiling had not been successful because the compacted soil layer prevented deep root growth, limiting rooting to the top 6-8 inches of soil. This restricted root system resulted in very low yields when rainfall was inadequate or irrigation was not available or limited. There was also little planting equipment available to make strip tillage work, less equipment to control weeds, and fewer weed control options. Many of the equipment limitations and weed control options have been worked out over the last 25 years. Most conservation tillage planting units used now include in-row subsoil shanks that break the soil compaction layer while leaving the row middle undisturbed. Beginning in 1995, transgenic or Roundup Ready soybeans and cotton came on the market, which allowed Roundup to be applied over the crop for weed control. In recent years, much of the corn crop is glyphosate tolerant. This has led to widespread adoption of strip-till planting of these crops, since weed control was no longer the major concern of strip-till farmers. Many of the new cotton growers or those expanding their acreage started farming all of their cotton using strip-tillage. Yet peanut farmers have been slow to move to conservation tillage, partially due to the belief that plant residue left on the soil surface causes increased disease problems on peanut or that digging will be harder. Growers had little incentive to change a program that had not only worked successfully for

many years but often supported other parts of the farming operation. However, many studies over the past 25 years have shown that disease pressure is the same or less when planting into a cover crop, as compared to the plow/plant method of peanut production. This has also been the case with tomato spotted wilt virus (TSWV), which has become the most limiting disease to peanut production in the southeast. Other factors such as fuel costs have led many growers to switch to conservation tillage. This situation, along with years of success planting corn, cotton, and soybean using conservation tillage techniques, has led to the spread of strip tillage production of peanuts.

Getting Started

Implementing new farming practices creates new challenges and risks. Preparing fields a year in advance, land selection, crop rotation, type of cover crop, pest management, soil fertility, and type of equipment are all decisions that are necessary to ensure a successful crop. County agents and the Natural Resource Conservation Service personnel can help provide a management plan for successful conversion to strip-till production of peanut and can provide references to those who are already involved in strip-till production.

In spite of preplanning and talks with experienced strip-till farmers, weather is the biggest uncontrolled factor that puts the crop at risk. Irrigation can take some of the uncertainty out of the equation, but poor weather at harvest can still cause major crop losses. Although strip-tillage cannot overcome all of the stresses that weather might bring, strip-tillage can help reduce erosion and conserve moisture. Advantages associated with strip-tilling peanuts, besides moisture preservation, include less sandblasting and erosion;a reduction in labor, fuel, and equipment repairs; more time for management; and less tomato spotted wilt virus disease and other diseases. The total benefit to using strip tillage for a 1,000-acre farm in Florida has been calculated to be $18,000 if yields are the same for both systems. Some of our strip-tillage/conventional tillage research with cotton has shown as much as a $75/A advantage to strip-tillage with yield increases where over-the-top herbicides can be used. Many farmers who have been in strip-till crop production for several years have said they would quit farming before going back to plowing and using conventional tillage practices.

There are many steps to follow to ensure successful production of strip-till peanuts. These are no different from any other crop using strip-till planting. Growing peanuts by any method should have a well-planned approach to production and marketing. After all of the equipment is in place, planning for strip tillage normally starts the previous year with selection of fertilizers, fields, and cover crops.

Fertilization

Direct fertilization of peanuts and soybeans is not as critical as for some crops and is not different for strip-tilled than for conventional-till peanuts. However, special attention should be paid to calcium (Ca), boron (B), and pH in either tillage system. More can be found on fertilization of peanuts at SS-AGR-74 "Management and Cultural Practices for Peanuts" (http://edis.ifas.ufl.edu/AA258) . Research in Georgia has shown that lime should not be turned under before planting peanuts. Although pH adjustment will occur, it will have little or no effect on Ca uptake by pods. With strip tillage, lime should be applied well in

advance of planting if the subsoil is very acid, or it should be incorporated prior to planting cover crops in the fall. Peanuts grow best at a pH of 6.2 or higher. Availability of soil nutrients and nitrogen fixation are optimized in this range. Zinc toxicities can occur when the pH is below 5.5. Manganese deficiency may occur when the pH is above 6.2. The liming program should be based on a soil test and dolomitic or calcitic limestone should be used to obtain the target pH range. Peanuts have a high Ca requirement and samples for soil tests should be from both the top 2-3 inches and 6 inches to ensure that adequate Ca is available in the pegging zone of strip-till peanuts. There should be at least 250 ppm of Ca and a 3:1 Ca:K ratio or higher for runner peanuts. All Virginia-type or large-seeded peanuts, or those grown for seed, should receive additional Ca regardless of soil test levels. Apply 200-250 lbs/A of dry gypsum at early bloom to meet this additional Ca need. Gypsum contains about 20% Ca and about 16% sulfur. Boron is critical to flowering, pod development and nut quality. Usually a half pound of B is adequate to meet the needs of a peanut crop. This may be applied with preplant fertilizer or with an early fungicide application. Boron should be applied prior to early bloom, since it may interfere with pollination.

Peanuts are very good at using residual nutrients from the previous crop or cover crop. Seldom do peanuts respond to direct fertilization of phosphorus or potassium. Therefore, if peanuts are in rotation with crops that are fertilized adequately, no phosphorus or potassium will be needed.

Variety Selection

Many new runner-type peanut varieties are being introduced that have resistance to TSWV, leaf spot, *cylindrocladium* black rot (CBR) and also have other unique oil and maturity characteristics. In variety trials across the southeast, no differences have been noted in variety response to tillage. Therefore, varieties should be chosen on the basis of yield, grade, and pest resistance, and then on the basis of the maturity that best fits the farming operation. Varieties range in maturity from about 125 days to almost 150 days. Variety trials are conducted each year at multiple locations with results being published in EDIS fact sheet SS-AGR-247 "Peanut Variety Performance in Florida 2002-2005" (http://edis.ifas.ufl.edu/AG247). Careful attention should be paid to those varieties that perform best in multiple years and locations.

Rotations and Cover Crops

Good rotations increase crop yields, reduce pests, and recycle nutrients. Grass crops benefit from nitrogen produced by previous legume crops, and peanuts usually do best after grass crops--especially after bahiagrass. Growers have always tilled up bahiagrass when planting peanuts in those fields. However, recent research has shown that peanuts can be strip tilled into bahiagrass if it is killed in the fall and allowed to decompose over the winter (Table 1). If bahiagrass is killed in the spring, it should have some tillage to attain highest yields.

Rotations also help growers plan labor needs for planting and harvesting. Not only do crops have different planting and maturity dates, but also different water requirements. Rotations decrease the risk of a total crop loss if severe drought occurs at a critical growth period for one crop but not for another. Much is known about rotating peanuts with grass crops. Crops like perennial grasses, corn, grain sorghum, millet, cotton, and small grains have been shown to benefit

peanuts when they are planted as the preceding crop. Some of the benefits are use of residual fertility, less disease, and better weed control due to different modes of action of herbicides. If peanuts follow peanuts, leaf spot starts earlier and takes more fungicide for disease control than when peanuts follow one of the grass crops. Peanut root knot nematode and soilborne diseases such as stem rot (white mold) can become serious if peanuts follow peanuts. Initially, yields may not always be a great deal lower, but the expense of growing the crop will be higher due to the need for extra pest management. Figure 1 below shows peanut plants grown in the greenhouse with the same soil type but with bahiagrass roots mixed in the soil with the plant on the right.

Many growers begin to strip-till by planting into the previous crop's residue. They may do this because they are not accustomed to planting cover crops and/or do not know the value a good cover crop can contribute to the primary crop. However, plant residue can create problems if not managed properly or if equipment has not been set properly to cut through the residue. Strip tillage can be successful without a cover crop, but many of the benefits of a good mulch residue are not obtained. Some of the benefits of a good cover crop versus previous crop residue include:

- less soil erosion;
- increased moisture retention during periods of high rainfall;
- increased organic matter when managed for high residue production;
- reduction in sand blasting on the emerging crop; and
- higher levels of water infiltration.

A good cover crop has to be planned in much the same manner as the main crop. Small grain cover crops or perennial grasses are better at building organic matter than are legume cover crops. Legume cover crops have very little fiber in the plant tissue and decompose rapidly. They will release most of the N from the plant tissue in the first 30 days after being killed. Most legumes mature later in the spring than small grains and therefore have to be killed before much dry matter is produced. In addition, most legumes are susceptible to root knot nematode and may have similar diseases to peanut. Therefore, legumes are not recommended to plant prior to peanut production. Small grains (wheat, oats, rye) can be planted over a wide period of time on more infertile soils than many of the legumes. Small grain should be killed 4-5 weeks ahead of planting to keep from depleting soil moisture, to reduce cutworm, southern corn rootworm and other soil pests, and to reduce and minimize potential phytotoxic effects from the cover crop. Small grain cover crops planted in November can be top-dressed with about 30 lbs N/A of liquid nitrogen and 2,4-D in late January or early February. The application of 2,4-D will kill many of the winter broadleaf weeds and make the small grain cover

crop and weeds easier to kill in late March when the small grain is headed out. Nitrogen will stimulate growth of the small grain for better cover. Peanut seed germination may be slower with early planting in conservation tillage than in conventional tillage because of lower soil temperatures. However, pegging may be better because of cooler soils. Our data have shown that soil temperatures can be 25 degrees cooler on the soil surface with straw mulch as compared to bare soil between peanut rows on plowed fields during the summer month. Canopy temperatures have been measured to be about 5 degrees cooler in strip till as compared to conventional tilled peanuts (96°F vs. 101°F). Likewise, available soil moisture was 30% higher during periods of hot, dry weather. Bahiagrass or bermudagrass provide the best rotation crop for peanut because they result in a significant yield increase due to reducing nematodes, increasing organic matter and soil tilth, and grass roots that penetrate the compaction layer, leaving channels for the peanut roots to follow into the subsoil. Systems research is now showing that bahiagrass can economically be used in crop rotations with profits being double that of a continuous row crop system. The model can be found at http://nfrec.ifas.ufl.edu/marois/index.html .

Planting and Management

Farmers who begin strip tilling for the first time should talk to growers who have had experience with strip tillage so they can plan prior to the season -- preferably the year before, when management of the cover crop can be taken into account. Since tillage operations are eliminated, the planting operation should be timely, but you need to be aware of problems that may occur controlling the cover crop or killing winter weeds or with some other practice. Some of the winter weeds can be very difficult to control in the growing crop if not controlled before planting. Glyphosate alone will not control several broadleaf weeds and therefore other herbicides need to be used in combination or in sequence. After successfully killing the cover crop, 4-5 weeks are required for the weeds or cover crop to become brittle so that planting can be done with ease.

Proper adjustment of strip till equipment is essential to adequately prepare a seedbed and plant in the same pass. One of the main problems encountered by new growers is "blowout", where big patches of the cover crop will be pulled up, leaving a rough seedbed for the planter. The main cause of "blowout" is that the cutting coulter in front of the subsoil foot is not cutting deep enough and the subsoil foot pulls the plants out by the root, leaving an uneven planting surface. This can usually be overcome by tightening up on the top link of the tractor or letting the lift lower, causing the coulters of the strip-till rig to cut deeper into the cover crop. Generally, if the toolbar of the strip-till rig is level, this will not be a problem. Another cause of "blowout" is that the cover crop has not been killed far enough ahead of planting and stems are still tough and the coulters cannot cut through the residue, causing dragging and poor seedbeds. This can be solved by going to another field that was killed earlier or making sure that you have 4-5 weeks between killing the cover crop and planting. It is normally easier to plant through completely green cover crops or those that have been killed 4-5 weeks; however, green cover crops can harbor insects and can dry out the soil for the crop being planted. After a few years, the coulter on the strip-till rig will wear until it becomes too small to adequately cut through the cover crop and poor seedbeds may result in spite of all of the adjustments that are made. At this time, replace the cutting coulter with the largest one that can be mounted on the strip-till rig.

Data from Florida, Georgia, and Alabama have shown a yield advantage of about 400-500 lbs/A, as well as a reduction in tomato spotted wilt virus, with twin row peanuts as compared to single-row planting. Other advantages with twin rows include the lapping of row middles as much as two weeks earlier, which aids in weed control and gives higher grades, since peanut tends to put on more of a taproot crop and less of a limb crop. These factors result in more value for the grower. But can strip-till peanut be planted in twin rows? Yes, but it is a little more difficult, since both rows need to be planted over a single subsoil slot. Most strip-till rigs will tear up a strip through the cover crop about 8-10 inches wide. This is enough to allow twin rows to be planted on either side of the slot. However, it is often necessary to apply more down pressure on the planting coulters to make sure that seed depth can be sustained. Also, the sets of twin rows being plowed up with the same plow should be 36 inches to the outside of the twin rows. This may mean moving in the subsoil feet on those rows by 7 to 9 inches to ensure that the rows are planted on either side of the subsoil slot. However, in heavy residue, there is often straw that may interfere with planter operation and seed are often left on the surface when planting through a thick mat of straw. Most planters can be equipped with row cleaners which will physically remove straw in front of the double disk of the planters. Even with these, plant populations are often slightly less in twin-row strip-tilled peanuts as compared to twin-row conventional-tilled planted peanuts, though yields are often similar. Six seed per foot of row is recommended in single rows and three seed in each of the double rows for the same seeding rate on an acre basis. A stand of 4 plants per foot of row is critical for those areas where tomato spotted wilt is a problem.

In-Season Management and Pest Control

Cover crops, insects, and weed management are the first problems encountered with strip-till peanuts. A good kill of the cover crop and weeds present before planting is essential to successful peanut production. If peanuts are given a competitive advantage early on, they will spread and lap sooner, making weed control less expensive and resulting in higher yields. Generally, weed control options in strip-till peanuts are the same as for those in conventional till systems. Refer to EDIS fact sheet SS-AGR-03 "Weeds in the Sunshine: Weed Management in Peanuts" (http://edis.ifas.ufl.edu/WG008) for a complete list of materials and weeds controlled. Cover crops are killed by herbicides prior to planting strip-till, and herbicides replace plowing in conventional tillage at a fraction of the cost. Some weeds like Florida pusley can be controlled with preemergence residual herbicides. However, if Florida pusley escapes due to poor herbicide activation, little can be done chemically for control during the season. Cultivation of peanut should be avoided during the growing season if weeds can be controlled by chemicals. If peanuts are planted into a high-residue cover crop, residue will decay during the growing season, leaving a mellow surface for peg penetration and good water infiltration. If there are weed escapes that cannot be chemically controlled, high-residue cultivators do a very good job of cutting weed roots while maintaining surface residue. Plowing depth of high-residue cultivators is slightly deeper than in conventional cultivation. Therefore, care must be taken to not prune peanut roots. With the wide array of herbicides on the market, farmers rarely plow peanuts after planting, and conventional tilled peanuts normally have the same weed control program as strip-tilled peanuts after planting.

Insect control in strip-tillage differs little from conventional tillage, except in a few

instances. If peanuts are planted within a couple of weeks of killing the cover crop, cutworms can be more of a problem. However, if the cover crop is killed 4-5 weeks ahead of planting, cutworms offer no more problem than with conventional tillage. Lesser cornstalk borers prefer loose, dry, sandy soils and are less of a problem in strip till crops than with conventional tillage. Extended hot, dry conditions can lead to outbreaks of lesser corn stalk borer in all types of plantings, but damage will be less for strip-tilled peanuts than peanuts planted into tilled fields. Thrips numbers have been shown to be fewer in strip-tillage fields and therefore show a reduction in tomato spotted wilt. Strip-tillage is a factor in the Tomato Spotted Wilt Virus Index developed by the University of Georgia. Reduced tillage is thought to increase the number and diversity of beneficial insects. However, insect problems are not the major consideration for growers in deciding whether to use strip-tillage on peanuts.

Disease and nematode control is usually no different for strip-tilled or conventionally tilled peanuts. As previously mentioned, strip-till peanuts consistently have less TSWV than do conventionally-till peanuts, and recent research in both Georgia and Florida show that severity of leaf spot is also reduced with strip-tillage. Control measures can be found in EDIS fact sheets ENY-002 "Peanut Nematode Management" (http://edis.ifas.ufl.edu/NG016) and PDMG-V1-10 "Disease Management in Peanuts" (http://edis.ifas.ufl.edu/PG031). Rotation has much more influence on the number and frequency of fungicide applications than does tillage. There are several new peanut varieties that have more leaf spot resistance that may allow growers to reduce the number of fungicide applications, while making as good or better yields if proper rotations are used.

Harvesting

No difference in harvesting is noted between strip-tilled and conventionally tilled peanuts. Frequently asked questions by new strip-till peanut farmers are: 1) will the residue from the previous crop interfere with digging and, 2) will there be more foreign material in the harvested peanuts? The answer to both is no. When peanuts are strip-tilled into cotton residue, stalks tend to decay slowly due to their high fiber content. However, with a cover crop on top of cotton stalks, no impediments to digging or harvesting have been noted due to rapid decay. Peanuts have been strip-till planted into bahiagrass that was killed in the fall, as well as in corn, sorghum, cotton, and soybean residue, without any problem during digging and harvest. Generally, if the strip-till rig will plant into the residue without any problems, the peanut plow will not have a problem in digging. Dry weather can cause a problem in digging both strip-till and conventionally planted peanuts. Actively growing weeds in the crop at digging and weather conditions cause more problems for both strip till and conventional planted peanuts than at planting due to knocking nuts off vines.

Summary

The decision to strip-till plant peanuts can bring many benefits to the farming operation. These benefits include advantages to the soil, reduction in environmental impact, savings in fuel, labor, and equipment repairs, and ultimately more profit. Regardless of the method of planting, it is important to plan and evaluate each production step and to perform the operation in a precise and timely manner. Conservation compliance standards to further reduce environmental

impact and to qualify for farm payments may make it more important to look at reduced tillage as a part of the farming operation.

Table 1. Tillage influence on peanut yield in fall killed bahiagrass, either turned or striptilled (AL).

	Yield lb/A	TSWV Incidence	White Mold
Turned Bahia	5,950 a	22.2 a	4.6 ab
Striptill Bahia	5,830 a	10.0 b	3.8 b
Turned Cotton	5,320 b	20.4 a	3.2 b
Striptill Cotton	5,160 b	10.2 b	6.6 a
LSD	271	7.7	2.6

Footnotes

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Copyright Information

Peanut Nematode Management[1]

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Nematodes That Attack Peanut

The most serious nematode pest of peanut is *Meloidogyne arenaria* race 1, the peanut root-knot nematode. It can be expected to occur wherever peanuts are grown in Florida. Pod rot, white mold, and other soil-borne diseases may increase when the peanut plant is infected with this root-knot nematode. The lesion nematode, *Pratylenchus brachyurus*, is less troublesome, but it can reduce yields and seriously disfigure the peanut hulls with unattractive brown lesions that lead to pod rotting.

Diagnosis

The presence or potential for nematode problems in peanut is suggested by one or more of the following: 1) Cropping history of the field, e.g. two or more years production of peanut or equally nematode-susceptible crops; 2) Above-ground symptoms including off-color and/or stunted peanut in spots or large areas of a field; 3) Below-ground symptoms such as small knots on roots or root lesions.

Foliar Symptoms

Areas of root-knot nematode infected peanuts are usually round to oblong in shape. The plants are stunted, less green, and will wilt more readily in the heat of the day than plants in less infested areas of the field. Rows of infected plants may never, or not so quickly, meet as those of healthy plants. Above-ground symptoms in a lesion nematode-infected crop are exhibited as a dull yellowing in oval spots in the field. These symptoms may be similar to nutrient deficiencies so care must be taken in diagnosis. Above-ground symptoms of suspected nematode problems on peanut should be verified by soil, root, and pod assays to properly identify a nematode causal agent.

Figure 1. Root-knot nematode damage, note oval symptom patterns.

Figure 2. Lesion nematode damage in peanut, a dull yellowing appearance.

Root Symptoms

All nematodes affecting peanut reduce feeder roots and produce root stunting, but nematodes differ in specific symptoms on roots and pods. Roots should not be pulled but rather carefully dug with a shovel for examination of nematode damage symptoms. Symptoms of peanut root-knot nematodes include galls (knots) on both roots and pods. The presence of galls on the pods appear as single or multiple wart-like growths that may or may not be discolored. As root-knot nematode infection progresses, secondary root and pod rotting causes further damage and eventual death of the plants.

Lesion nematode damage is most easily seen on pods, which show distinct light brown lesions. As infection and disease progresses, the lesions become less distinct and turn black in color. Presence of high numbers of lesion nematodes result in extensive root and pod rotting.

Figure 3. These few remaining pods are heavily galled by root-knot nematodes.

Figure 4. Small light brown lesions caused by lesion nematodes on peanut.

Nematode Assay

Nematode problems of peanut can be accurately determined only by examining soil and root samples. Prior to taking samples, contact your county extension agent for information concerning available sampling tools, shipment bags and proper procedures for submitting samples. Samples should not be taken when the soil is dusty dry or soggy wet. Two sampling strategies may be employed. A general survey should be performed every two to three years, and soil samples should be taken soon after the peanut crop has been harvested. A soil core (1-inch wide by 8-10-inches deep) should be taken for every acre in a 10-acre block containing a uniform soil type and cropping history. The cores should be thoroughly mixed and a 1-pint sample extracted and placed in a sealed plastic bag and kept cool (not frozen) before immediate shipment to an advisory laboratory. As possible, send peanut roots and pods with the soil sample. Do not allow

As possible, send peanut roots and pods with the soil sample. Do not allow samples to be exposed to the sun at any time.

Where a nematode problem is suspected, several soil cores from within and immediately around a poor growth site should be taken while the crop is still growing. Include roots and pods with the soil sample. These samples should be handled as described above.

Management

Crop Rotation

Where practical, crop rotation is an excellent practice for managing plant-parasitic nematodes. Rotation of a peanut crop with non-hosts, or less susceptible hosts, to root-knot nematodes is recommended. Grasses such as bahiagrass, bermudagrass, millet, and sorghum are among the most effective crops in reducing soil populations of peanut root-knot nematodes and should be grown for at least one year, preferably two years, before planting fields to peanut. Though some root-knot nematode reproduction could be expected on field corn, this crop is considerably less susceptible than peanut and is generally effective in the reduction of root-knot nematode soil populations. It is a suitable crop to grow in a year following a root-knot nematode-infected peanut crop. Cotton is not a host for peanut root-knot nematodes and is a very good rotational crop with peanut. Favorably, peanut is not a host for the southern root-knot nematode that infects cotton. Thus a two-year monoculture of peanut and cotton is helpful in maintaining the root-knot nematode pests of both crops at manageable population levels. Peanut should not be grown in years following root-knot susceptible crops such as lupine or other winter legumes nor following summer legumes as soybean or cowpea which are highly susceptible to root-knot nematodes.

Unfortunately, rotations are of little value for reducing lesion nematode soil populations as this nematode has a very wide host range. Lesion nematodes increase rapidly on grass crops and can cause damage on a following peanut crop. In most peanut fields, however, the root-knot nematode is the most damaging and should be given priority for management purposes.

Volunteer Peanut and Weed Management

Volunteer peanut and weed growth after harvest and the following year maintain and sometimes increase nematode populations in the soil. In years when there is a delay in the onset of cool fall soil temperatures (<59°F), nematodes can feed and reproduce on these peanut and weed roots. This increases nematode soil population densities surviving through to the next planting season. Then when soils warm in the spring, weeds and volunteer peanuts may allow nematode soil population densities to increase prior to planting a rotation crop or another peanut crop. The use of winter cover crops is helpful to provide competition against volunteer peanuts and spring weeds and also the cover crop planting process helps destroy those plants growing in the fall. Cover crops, however, must be a poor or non-host of the problem nematode. Winter cereals are most suitable for managing root-knot nematode in this regard but are less effective for soils infested with lesion nematodes.

Use of crop rotation systems that include bahiagrass have been increasing, and this perennial grass is a non-host for nematodes affecting peanut. However, weeds must be managed in the bahiagrass or nematode populations will be maintained in

must be managed in the bahiagrass or nematode populations will be maintained in such a system resulting in damage to the following peanut crop. A two-year bahiagrass rotation is sufficient to manage plant-parasitic nematodes in a future peanut crop providing weeds are controlled early and regularly in the first year bahiagrass and this continued through the life of the rotation.

Nematicides

Nematicides approved for use in peanut production are listed in Table 1 . Before using nematicides, growers should determine that problem nematodes are present to justify the expense of treatment. This can only be achieved by submission of soil samples for nematode analysis or prior year field diagnosis.

The soil fumigant, Telone II, has been shown to be the single most effective nematicide for managing root-knot and lesion nematodes in peanut. To avoid delayed peanut emergence, early stunting, or stand reduction, growers should apply this fumigant at least one week prior to planting. Unlike non-fumigant nematicides, Telone II can also be applied two to three months or more before planting. Caution, however, is needed so as not to mix treated and non-treated soil during field operations prior to or at planting. Telone II is applied in the row with single or dual injection chisels to a depth of at least 12 inches beneath the row. Deeper application is acceptable but Telone II should not be injected into a clay subsoil. Applications shallower than 12 inches have sometimes led to poor nematode management. Following soil treatment the chisel slits should be immediately sealed, and the soil surface packed with suitable bedding equipment, disc harrows, or rollers. Telone II should not be applied when the soil is dusty dry or wet.

The non-fumigant nematicide, Temik 15G, has been approved for use to manage nematodes on peanut. In heavily root-knot nematode-infested fields, a broadcast application of Telone II may be followed by an application of Temik 15G at peg initiation. In addition, a split application of Temik 15G with a band or in-furrow application at planting followed by a band application at peg initiation is acceptable usage in Florida under a State Label. Irrespective of the mode of application growers must be aware of several use restrictions governing Temik 15G:

- Temik should not be used in more than one application per crop.
- Application must not exceed 20 pounds per acre.
- Peanut must not be harvested within 90 days of application.
- Forage must not be fed to livestock and livestock must not be allowed to graze in treated areas before harvest nor should treated areas be hogged-off.

In addition there are restrictions on planting any crops not listed on the Temik label in soil treated with Temik within ten months after the last application.

The following are required by the Florida Department of Agriculture and Consumer Services governing the use of Temik:

- A report of intended application of Temik shall be posted to FDAC at least 30 days before application.

- Temik cannot be applied closer than 300 feet from a drinking water well.
- Any wells within 300 feet of or in a treated area shall be posted to be unfit for human consumption.

Fields to be treated with Temik shall be so posted conspicuously at least 24 hours before application and for a minimum of 30 days afterwards.

Tables

Table 1. Nematicides that may be used for nematode management of peanut in Florida.

Nematicide	Rate	Application[1]
Telone II	5.9-7.8 gal. / acre	Single chisel injection per row. (52-70 fl. oz. / 1000 ft row / outlet). Apply 7-10 days before planting.
	5.9-7.8 gal. / acre	Two chisels set 10-12 inches apart per row. (26-35 fl. oz. / 1000 ft. row / outlet). Apply 7-10 days before planting.
	6-9 gal. / acre	Broadcast applications may be made in fall or winter, or in spring but at least 7 days before planting. (17-26 fl. oz. / 1000 ft. / outlet). Apply 7-10 days before planting.
Nemacur 15G[2]	10-17 lb. / acre	Apply in 12-in. band at planting (11-18.7 oz. / 1000 ft. row in 36 in. spacing).
Nemacur 3	2-3.3 qt. / acre	Apply in 6-12 in. band at planting. (4.5-7.3 fl. oz. / 1000 ft. row in 36 in. spacing).
Temik 15G	10 lb. / acre	Apply in a 6-12 in. band or in furrow at planting. (11 oz. / 1000 ft. row in 36 in. spacing).
	10 + 10	Split application with first applied in 6-12 in. band or furrow at planting (11 oz. / 1000 ft. row) and second

	lb. / acre	in 12-18 in. band at peg initiation (11 oz. / 1000 ft. row).[3]
Vydate L	1-2 qt. / acre	Apply twice in 20-40 gallons of water as foliar spray 3 and 6 weeks after emergence as a supplement to one of the recommended initial soil treatments.

[1] Please consult labels for handling and use restrictions.

[2] All Nemacur products are scheduled for voluntary cancellation for all uses in May, 2007.

[3] Allowed in Florida by a "State Label" which grower must possess for application.

Footnotes

1. This document is ENY-002 (NG016), one of a series of the entomology & Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Revised: December 2005. For more publications related to agronomy/agriculture, please visit the EDIS Website at **http://edis.ifas.ufl.edu/**.

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