Integrated Pest Management
Peanut Scouting Manual

North Carolina Cooperative Extension Service
North Carolina State University

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Contents

Note: This scouting manual will help growers identify peanut pests and determine whether the number of pests is likely to decrease yield and cause profit losses greater than the cost of treatment. No agricultural chemicals are mentioned in this publication. for current control recommendations, consult the annual *North Carolina Agricutural Chemicals Manual* or *Virginia Pest Management Guide.*

Peanut Scouting Manual

Integrated Pest Management

In the competitive global peanut market, you need to lower production costs. At the same time, you also need to keep pesticide residues in peanuts to a minimum; protect rivers, streams, and lakes from runoff; and prevent chemicals from leaching through the soil to groundwater. Using IPM to protect crops only from pests that are likely to cause economic losses is a good way to meet these goals.

The Three Keys to IPM

1. Scout the crop regularly and systematically to identify pests.
2. Use control measures only when monitoring shows that a pest is likely to reach economically damaging levels.
3. Apply the lowest effective amount of pesticide using equipment that is correctly calibrated.

In the fall, look over the field where you plan to plant peanuts to see what weeds are going to be problems and, if necessary, collect soil samples for nematode assay. Draw maps of the field, indicating the location and severity of disease, weed, and nematode problems. If there are peanut varieties with resistance to the diseases and nematodes found in the field, consider planting a resistant variety.

Scouting

Peanut pest populations will vary from field to field and will also vary within a single field. Scouting regularly and systematically will help you make sure that any treatment is applied only when and where it is needed to prevent profit losses.

Try to identify any pest accurately so that you can select the exact treatment likely to be most effective against the specific weed, disease, and insect present.

Making a Diagnosis

When a crop does poorly, collect the information necessary to answer these questions:

1. Is the entire field affected or only certain areas?

2. Was the crop planted on time at the right depth?

3. What part of the plant is affected–the whole plant or the leaves, stem, pods, or roots?

4. What is the history of this field? What was the last crop and what chemicals were used here?

5. Have weather conditions been very wet, very dry, or very hot?

Table 1. Trouble-shooting.

Symptom	Possible Causes
Stand failure.	Poor seed quality; poor seed storage conditions; seed rot related to weather after planting; improper use of pesticides.
Plants stunted, yellow, or dead 3 to 4 weeks after planting; root pruning and swollen hypocotyls.	Uniform damage: Carryover herbicide. Patchy damage: herbicide leaching into root zone or interacting with other pesticides; sprayer problems related to nozzles, calibration, or application overlap; use of chemicals not labelled for peanut; drift. Nematodes also cause patchy damage, particularly on sandy ridges and during dry weather.
Yellowing leaves.	Nitrogen deficiency and poor nodulation, especially following heavy rains.
Leaves yellow between veins.	Manganese deficiency; high pH; carryover herbicide.
Foliage burn.	Foliar spray of boron or manganese – often combined with other chemicals or when applied at high humidity and temperature.
Split stems near crown, leaflets fail to unfold during the day, plants die.	Zinc toxicity may occur on sites used for sludge disposal; where buildings had galvanized tin roofs; or where excessive amounts of poultry litter have been applied.

Figure 1. A uniformly poor stand related to poor seed.

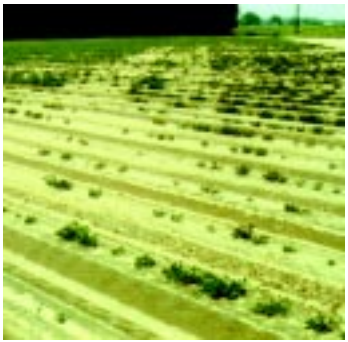

Figure 2. Nematode damage on sandy ridges.

Figure 3. Herbicide leaching into root zone may cause patchy-looking stand failure.

Figure 4. Stem splitting may be related to zinc toxicity.

Thresholds

The hardest part of IPM is knowing that a pest is in the field and then waiting to see if it is likely to become a problem that will cost you more in lost yield than the cost of treatment. Many pests never reach damaging levels. The crop may grow fast enough to shade out weeds or compensate for insect damage. Beneficial predators are sometimes able to control pest insects. If a pest is not going to reach a damaging level, treatment is unnecessary.

The thresholds for various pests mentioned in this publication are set to trigger action **before** a pest can cause yield (and profit) losses greater than the cost of treatment. Following an IPM program will help you to know whether a pest has crossed the action "threshold" or whether to continue watching and waiting. In other words, you will have a better idea when to take action.

The thresholds suggested in this guide were developed for average growing conditions. When plants are stressed by drought or under attack from several different pests at the same time, you may decide to take action at a lower threshold. It may be wise to get advice from a consultant, Extension staff member, or other expert.

Scouting for Weeds

Peanuts need good weed control. Fast-growing weeds can outcompete low-growing peanuts for light, water, and nutrients, and harvesting is difficult when the field is infested with weeds. Use a good weed manual to identify weeds correctly. Some weeds are more successful than others in competing with peanut plants.

Weed Scouting Checklist

1. Survey peanut fields for weeds in the fall. Match preplant or preemergence herbicides to the weed seeds likely to be germinating in the spring.
2. Scout for weeds frequently during the first 6 to 8 weeks after planting.
3. Use the weed-rating table to calculate the competitive weed load and decide if postemergence treatment is economically justified.

How to Scout for Weeds

1. Check at least 2 sites per acre and a minimum of 10 sites per field.

2. At each scouting stop, mark off about 30 feet of row (10 strides). Scout the area from the center of one row to the center of the next.

3. At each stop record the weed species, the number of each species, and the average size of each species. If 10 or more weeds of the same species are found, stop counting and record the number as 10+. In addition to records from the scouting stops, make general observations of the weed level of the whole field.

Calculating the Action Threshold for Weeds

Add the counts for each weed species for the field and divide by the number of stops. If the average number of any species is greater than the threshold value listed in Table 2, consider post-emergence treatment when the weed reaches the appropriate size. Consult Extension staff members to find out about the availability of a computer program that uses weed thresholds to assist with herbicide selection based on economics. It is important to select the right herbicide, apply it at the right

time, and use correct application methods. For herbicide selection, application rate and method, and proper weed size to treat, consult the most recent Extension peanut production guide for your area (*Peanut Information Guide*, North Carolina Extension Publication AG-331, or *Virginia Peanut Production Guide*, Virginia Cooperative Extension Publication, Tidewater AREC Information Series).

Table 2. Weed rating values.

Weed	Action threshold*
Cocklebur	0.2
Jimsonweed, smartweed, velvetleaf	0.3
Lambsquarters, morningglory, pigweed, ragweed, spurred anoda	0.5
Broadleaf signalgrass, fall panicum, sicklepod	1
Crabgrass, goosegrass, prickly sida	2-3
Nutsedge	5

* Average weed count in 30 linear feet between two rows.

Scouting for Leaf-eating Insects

Thrips

Thrips are tiny insects that feed in the unfolded, developing new leaves by rasping off the upper layer and sucking out the juice. They are often controlled by systemic insecticide applications either at planting or "as needed" if scouting reveals damaging populations. If conditions such as cool or dry weather or chemical burn cause plant stress and slow growth, thrips populations may become large enough to stunt plants. This rarely happens, and foliar treatment for thrips is seldom needed in peanuts treated at planting. Foliar treatment is more frequently needed in peanuts not treated at planting. Because of the somewhat shorter growing season, peanuts in Virginia can suffer more damage and potential yield loss if thrips are not controlled.

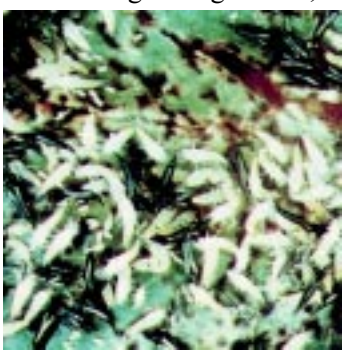

Figure 5. Adult thrips.

Problems with thrips are most often seen in the first 8 weeks after planting.

To check for an active thrips infestation, pick a leaf

and slap it on a white index card and watch to see if the tiny specks move around. Thrips are also attracted to flowers. If damage appears to be significant, take samples from 10 sites. At each site, check 10 unfolded leaves and record the number damaged. If 25 percent of the leaves are damaged prior to mid-June and live thrips are found, consider treatment. Plants that are growing well are likely to outgrow the damage. Treatment is more likely to be needed if growth is slow. Treatment for thrips after early-to-mid June is not recommended since thrips will feed on spider mite eggs later in the season and are important as biological control agents of those pests.

Figure 6. Thrips damage.

Signs of thrips damage are poor overall appearance, abnormal growth, browning or death of the edges of new leaves, and curled or misshapen older leaves.

Leafhoppers

Leafhoppers are small insects that migrate into North Carolina and Virginia and feed on a variety of crops including peanuts. Both the young nymphs and the adults cause damage by inserting their needlelike mouthparts into the leaflet midvein, injecting a toxic substance, and feeding. The yellowing of the leaflet above the feeding point is called hopper burn, and it develops 5 to 10 days after the feeding.

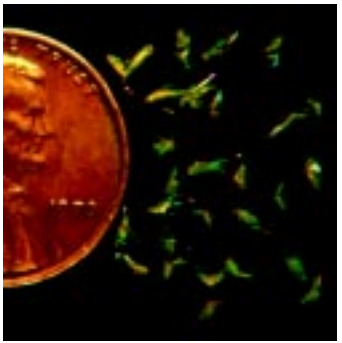

Figure 7. Potato leafhopper adults.

To check for an active leafhopper infestation, begin scouting in late June and estimate the percent of leaves affected by hopper burn. Since damage appears only after feeding, check to see if leafhoppers are still present by brushing the foliage and watching for adults and nymphs to jump and fly from plant to plant. If leafhoppers are no longer present, there is no need to treat even a heavily damaged field.

Figure 8. Hopper burn shows up after leafhopper feeding.

The action threshold is damage to 25 percent of the leaves *with leafhoppers still present*. If the field is to be sprayed with fungicide, a 15-percent threshold can be used, and the two treatments can be applied together. If treatment for southern corn rootworm is planned, rootworm insecticides will also control leafhoppers.

Spider Mites

Spider mites feed on the underside of the uppermost leaves and are hard to find because of their tiny size. When spider mites reach high numbers, webbing can be seen around infested leaves.

Spider mites can be very serious pests during extended dry periods. Mite problems are most likely to occur next to hedgerows, field borders, and corn fields where populations of these tiny pests build up and move to peanuts after reaching high levels. Certain pesticides also increase spider mite problems. Ask Extension experts which pesticides are associated with spider mite problems.

Spider mites are usually controlled by thrips, predatory mites, and fungal diseases, but in hot, dry weather, they can outpace these natural controls. When fields that have a history of mite problems are treated with a rootworm insecticide or a foliar insecticide, they are at high risk for more mite problems, as are fields on a calendar leafspot spray program. These fields should be monitored carefully.

Figure 9. Mite webbing.

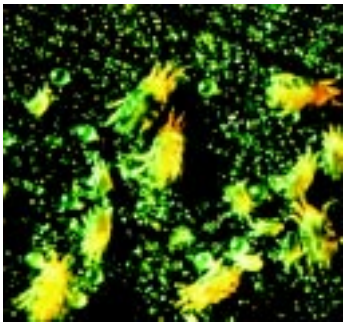

Figure 10. Twospotted spider mites.

Figure 11. Severe mite damage along field edge.

To check for an active spider mite infestation, look for areas of light-colored (chlorotic) plants, especially along field edges. Look under the top leaves to see if mites are present.

Record the number and the degree of infestation. Be careful not to spread spider mites from site to site and field to field. Stand back from plants and brush off pant legs and boots before moving on.

No action threshold has been set for spider mites. Treatment decisions depend on judgment and expectations of changing weather conditions. If hot, dry weather continues, consider control measures. Recent research indicates that the best control is achieved if treatments are applied early in the infestation cycle before a multitude of eggs have been deposited. Rainfall and more humid conditions are likely to lower mite numbers. Check regularly to monitor changes.

Corn Earworm and Fall Armyworm

Corn earworm and fall armyworm larvae are found in most fields. However, many fields **do not** need treatment, and scouting to determine the number and size of larvae is a good idea. Both insects can cause severe defoliation if not detected early. They can be especially damaging in August and early September.

Figure 12. Corn earworm.

Generally, corn earworm causes more damage and is easier to control than fall armyworm, so count the species separately. The fall armyworm has a distinctive upside-down Y on the head.

Figure 13. Inverted Y on head marks fall armyworm.

To check for an active infestation, sample by reaching halfway across plants along 2 feet of row with a dowel rod and shaking the foliage vigorously for 5 to 8 seconds toward the row middle. Do this on both sides (for a total of 4 row feet). Using the dowel, push the foliage back so that you can see the soil under the plant. Carefully identify and count the larvae and note their size in inches.

Up until September, treatment is justified by an average of 16 larvae per sample (4 larvae per row-foot). For the first two weeks in September, the action threshold is 12 larvae per sample; after mid-September, it is 20 larvae per sample.

Scouting for Pod-feeding Insects

Southern corn rootworms, cutworms, wireworms and the lesser cornstalk borer feed on peanut pods, especially in July and August. The damage caused by each one is slightly different, so the best way to identify a pod-feeding pest is to find the larvae, which is often difficult to do. Holes made by rootworms are always very small.

Southern corn rootworm larvae usually bore a small hole on one end of the pod and neatly eat the nuts (Fig 14A). Cutworm larvae are large and usually bore a large hole in the middle of the pod and remove all the nuts (Fig. 14B). Wireworms bore two or more holes in the pod and bore holes in the nuts (Fig. 14C). Lesser cornstalk borers feed along the outside of the pod and then bore a hole and feed on the nuts (Fig. 14D). Their feeding is messier than that of southern corn rootworm, and they construct a sand cocoon on the pod at the entry hole.

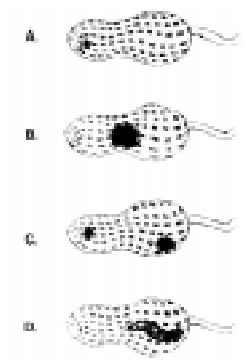

Figure 14. Typical damage by pod-feeding insects. Location of holes made by pod-feeders will vary from pod to pod.

Southern Corn Rootworm

Southern corn rootworm (SCR) larvae are light colored with soft bodies, a dark head, and a small dark spot at the rear. Adults are small greenish-yellow beetles with 12 black spots. They prefer soils high in organic matter (over 1 percent) and have higher survival rates when soil is moist. Wet weather in July increases egg survival and the likelihood of problems. Early-planted fields are at less risk from damage.

Not every field needs treatment, and control decisions should be based on scouting, soil type, planting date, and field history. The “Risk Index” developed for SCR may be helpful in making control choices (see pages 10-11).

Figures 15 and 16. Southern corn rootworm. Larva (left) and the cucumber beetle adult stage (right).

A Risk Index for Southern Corn Rootworm

An indexing system that helps identify fields at risk to pod damage should allow you to decrease preventive insecticide treatments for southern corn rootworm. By assigning a number value to factors that correlate with pod damage, you will have a more accurate estimate of risk for a particular field. These factors include cultivar resistance, planting date, field history of rootworm damage, soil texture, and soil drainage.

From 1989 to 1999, this index was tested on 198 commercial peanut fields in Virginia and North Carolina. At the end of each season, levels of pod damage predicted by using the index were compared to actual percent of damage. The index accurately predicted damage in 55 percent of the fields, overestimated damage in 41 percent of the fields, and underestimated it in 4 percent of the fields. An overestimate of damage may result in some unnecessary insecticide applications, but would also minimize the possibility of pod losses. Widespread adoption of this index should reduce production costs by more efficient use of rootworm insecticides.

Index Factors

Cultivar resistance. Varieties that mature quickly, such as VA 98R, often develop mature pods which are not as susceptible to rootworm attack during the peak period of pest pressure in late July-early August. NC6 provides good rootworm resistance and greatly reduces risk to pod damage.

Soil texture and soil moisture. Survival of rootworm larvae is highly dependent on soil moisture. Peanuts grown in soils with greater loam content and poor drainage experience more pod damage than peanuts grown in sandy, well-drained soils.

Field history of rootworm damage. Base this estimate on experience in previous years with damage levels in areas of the field not treated with insecticide. If fields have always been treated, estimate a low level of damage.

Planting date. Early planting reduces risk as pods tend to mature before rootworm feeding.

The index assigns a value to each risk factor. Individual factor values add up to a total Risk Index score for each field. A total score of 50 or less indicates low risk, 55-65 indicates moderate risk, and a score over 65 indicates high risk.

Recommendations

Low-risk fields do not need insecticide treatment. Treat high-risk fields with rootworm insecticides from about June 20 to July 10. Treatment decisions for moderate risk fields depend on additional factors such as weather and land-lease

requirements. In many moderate-risk fields, especially those at the low end of the range, rootworm damage does not reach economically damaging levels. In most years, these fields will not need treatment. In wet years, pod damage in moderate-risk fields is more likely, so that treatment, even in late July, may still provide protection from severe pod losses.

Factor Values

Cultivar resistance	Value
NC 6	5
VA 98R	10
Other	20
Soil texture	
Loamy sand	5
Fine-sandy loam	10
Loam	15
Drainage class	
Well drained	5
Moderately well drained	10
Somewhat poorly drained	15
Poorly drained	20

Field history of rootworm damage	
None	0
Low	5
Moderate	10
High	15
Planting date	
Before April 25	5
April 25-May 15	10
After May 15	15
Total score	
50 or less	Low risk
55 to 65	Moderate risk
Over 65	High risk

Index information adapted from *A New Risk Index for Southern Corn Rootworm in Peanut*. Ames Herbert and William Petka. Virginia Cooperative Extension, Tidewater Info. Series No. 388.

To check for an active infestation, begin looking for SCR just after pegging (no later than July 15). Use a hand trowel or small spade to unearth the nuts under 2 to 3 row feet of plants (without digging up the plants themselves). Sample random sites, but also check low, moist spots or areas of heavier soil where plants are most likely to show signs of SCR damage. Examine the pegs and pods for small holes and signs of boring. Look closely since these larvae are very hard to see. Record fresh damage even if no larvae are seen. Dark damage is not fresh.

No threshold has been established for SCR. However, if 10 percent of samples show live larvae or fresh damage, treatment may be warranted. Scouting for SCR and timing treatment to be effective are both difficult. Many growers use a preventive treatment in fields most prone to attack.

Cutworms

Cutworms feed on peanut leaves as well as pods. When uncovered, the large, grayish-black larvae curl into the shape of a C. If cutworms are feeding only on leaves, a fairly high number may be tolerated. Pod feeding may be more common during dry weather.

Cutworms often turn up during scouting for other soil insects. When cutworms are found, check pods carefully for damage, especially after dry weather. Treatment is justified if you find cutworms or fresh damage in 10 percent of the samples taken.

Lesser Cornstalk Borer

The lesser cornstalk borer (LCSB) rarely causes problems in North Carolina or Virginia except when extremely hot, dry weather lasts longer than 3 or 4 weeks.

The adult LCSB is a small, light tan or dark brown moth that can fly quickly. The larvae have brown and blue (or tan) alternating rings down the body. When disturbed, they wiggle vigorously. They feed on peanut pegs and pods and also bore into stems and lateral limbs resting on the soil. They construct a cocoon of sand attached to the pod or stem at the point of penetration.

LCSB prefer drier soils with low organic matter. If hot, dry weather develops before pegging, check stems and lateral limbs for webbing and live larvae. When scouting, check higher, drier parts of the field, plants on the end of rows, and those without adjacent plants. If LCSB are not

Figure 17. Lesser cornstalk borer larva.

Figure 18. Damage from lesser cornstalk borer.

Figure 19. Lesser cornstalk borer adults.

found in these locations, they are unlikely to be found in other areas.

Record fresh damage and live larvae. Treatment is suggested if 10 percent of the samples are affected.

Wireworms

Wireworms are very hard, slender, brown larvae. Adults are the "click" beetles often found in foliage. An abundance of adults is not necessarily a sign of damaging levels of larvae. This pest occurs sporadically, but high levels left untreated can cause severe damage. A peanut crop that follows a tobacco or grass crop is more likely to have wireworm problems.

Look for wireworms when sampling for other soil insects and consider treatment if 10 percent of the samples have live larvae or fresh damage.

Figure 20. Wireworm and damage.

Scouting for Leaf Diseases

Spots, blotches, spiderweb patterns, defoliation, pod shedding, dark lesions, scorch symptoms, and deadspots are symptoms that are usually caused by disease organisms, but they may be due to *phytotoxicity* (plant sensitivity to chemicals) caused by systemic insecticides applied at planting or by postemergence herbicides.

Systemic insecticides are taken up by the roots and move through the stem to the leaves where high concentrations can accumulate at the leaf edge and kill small circular areas. These symptoms are most likely to occur in May or June and may be confused with symptoms of early leafspot.

Postemergence herbicides often cause yellow (chlorotic) or dead (necrotic) spots on leaves. However, these symptoms of phytotoxicity do not spread or form spores. They are blotchy and irregular rather than round and are often numerous. In general, spots found before mid-June are likely to be caused by phytotoxicity.

Long rotations and resistant varieties are the most economical defense against most common leafspots.

Early Leafspot and Late Leafspot

Both early leafspot and late leafspot occur in North Carolina and Virginia. Although early leafspot is more common, it is often difficult to tell them apart, and symptoms vary with the maturity and variety of the plant.

Figure 21. Early leafspot.

Early leafspot usually has tan-to-brown lesions surrounded by a yellow halo. It may occur as early as June 1. Late leafspot lesions have darker spots, usually without a halo, and appear later in the season. The silvery, hairlike spores of early leafspot are produced mostly on the upper surface of the leaf, whereas the brown, velvety spores of late leafspot are produced mostly on the bottom of the leaf. It is a good idea to use partially resistant peanut varieties and to rotate at least 2 years without peanuts.

Figure 22. Late leafspot.

Pepper spot

Pepper spot is present every year in all fields. In very wet seasons, this disease may cause severe defoliation and pod shedding. Symptoms are small dark lesions that "pepper" a leaf and occasionally grow together and kill large areas, resulting in a scorch symptom.

Figure 23. Pepper spot (left) and scorch symptom (right).

Web Blotch

Web blotch occurs sporadically in North Carolina and Virginia, but it can be a serious late-season disease. Symptoms may be either a brown spiderweb pattern of dead cells or charcoal-colored blotch on the upper surface of the leaf. Severe defoliation often occurs in portions of a field, but it can spread over the entire field in a short time.

Figure 24. Web blotch.

How to Scout for Leaf Diseases

Beginning in late June, monitor leaf diseases every week. Look for areas showing leaf symptoms or leaf losses. Often one part of a field will have more disease than another, especially if it borders a field where peanuts were grown the previous year.

Evaluate the disease level by estimating the percentage of leaflets with symptoms in the most heavily damaged locations. While standing still, look down two rows on each side of you as far as you can clearly see. Record of the type of disease and the percentage of leaflets with symptoms.

To calibrate your eye, first estimate the percentage of diseased leaflets, then pick 25 leaves (100 leaflets) and count the actual number with symptoms. If your estimate of the disease percentage is off by more than 5 percent, repeat this calibration practice until your estimate is accurate within 5 percent.

Action Threshold

If 20 percent or more of the leaflets are infected, and if leafspot treatments have not started, begin immediately and maintain a 10- to 14-day schedule. If treatments have begun, a shorter interval between sprays or an increase in fungicide application rate may be useful. **Make sure that the fungicide you use is effective against the diseases present**. If late leafspot, web blotch, or heavy pepper spot is identified, revert to a 10- to 14-day spray schedule.

The Peanut Leafspot Advisory System

Leafspot Advisory programs in North Carolina (beginning on July 10) and Virginia (beginning on June 20 or 50 days after planting) will tell you when weather conditions are favorable for early leafspot so that spray applications can be timed to provide the most benefit. In some years, weather conditions will favor leafspot, and five or six sprays

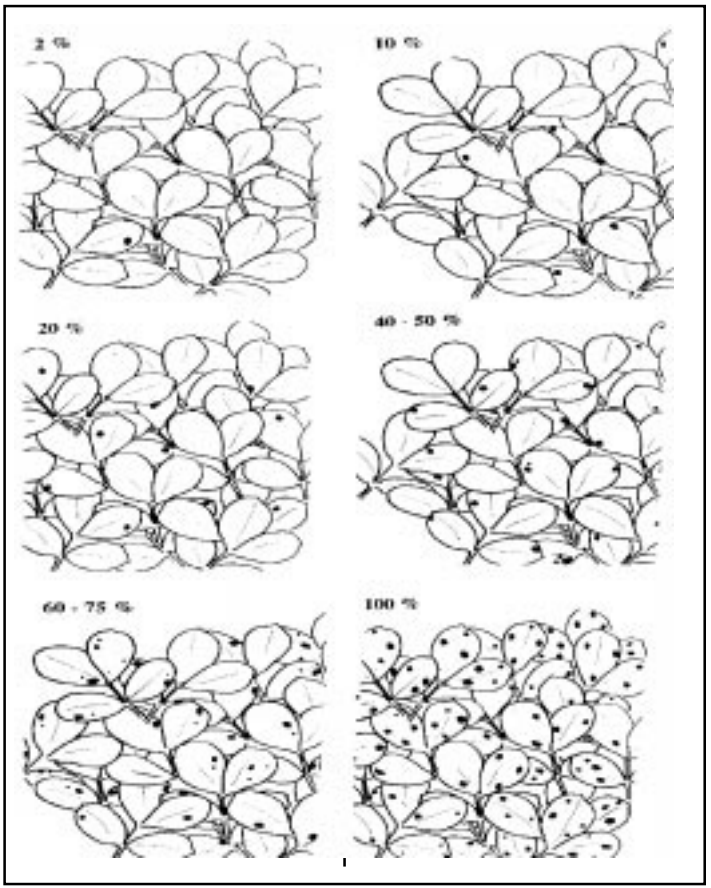

Figure 25. Learn to estimate leafspot damage accurately.

will be needed. In other years, three or four sprays will be enough. Using IPM to manage disease means adjusting control measures for the conditions actually present, rather than following an arbitrary calendar schedule. To make the best use of the Leafspot Advisory Programs:

1. Begin listening to the Advisory on June 20 (VA) or July 10 (NC) and spray when the first advisories are issued.

2. When a spray is needed, apply it as soon as possible after conditions become favorable, but not within 10 to 14 days of the last spray.

3. Try to spray before heavy rain (if it has been 10 to 14 days or more since the last spray).

4. Scout all fields at least once a week. If any place in the field has over 20 percent leafspot (one leaflet out of every five), revert to spraying every 10 to 14 days.

5. If your work schedule prevents spraying within three days of the advisory, spray preventively on a 10- to 14-day schedule.

The Leafspot Advisory is just one factor to consider in deciding whether to spray. Base your decision on all available information.

Diseases of Roots, Limbs, and Pods

Soilborne diseases cause root, pod, and stem rots. Most soilborne disease organisms can easily survive many years in sufficient numbers to infect a susceptible crop the next spring. Therefore, mapping the location and intensity of soilborne diseases is a useful tool for deciding where to plant and what type of disease-management methods to use next season.

Use of long rotations and resistant varieties is the most effective and desirable way to control soilborne diseases. When long rotations are used, many disease organisms eventually reach such low levels that little or no disease or loss occurs. High-yielding resistant varieties are now available for the most serious soilborne diseases.

Southern Stem Rot

Southern stem rot (white mold) is found in all peanut-producing counties of North Carolina and Virginia. White, stringy fungus growth and very small white, yellow-to-brown balls (sclerotia) develop from the white mold on lower stems and leaf litter. Southern stem rot is most active during the hottest part of the season, especially following rain, and can cause wilting and sometimes death. The disease is often found in fields along with black root rot.

Figure 26. Southern stem rot.

Sclerotinia Blight

Sclerotinia blight is most common in Virginia and the northern North Carolina peanut-growing counties. This disease starts by killing individual limbs rather than causing an overall wilt. Only after the disease has been present for several days will the plant be visibly wilted. On humid mornings, Sclerotinia blight shows up as cottony mold growth on straw-colored stem lesions. Small, irregular, black sclerotia can be seen both on and inside of infected tissues.

Sclerotinia Blight Advisories are issued from June 20 until harvest in North Carolina and Virginia. Use these advisories, along with weekly scouting, to determine when fungicide treatments are needed.

The Sclerotinia Blight Advisory System

When vines are approximately 6 inches from touching in the row middles, begin to use the Sclerotinia Blight Advisory as an important part of scouting for disease. This advisory service will tell you when weather conditions are favorable for sclerotinia blight so that fungicide applications can be timed to provide the most benefit.

In some years weather conditions will favor sclerotinia blight and two or three sprays will be needed. In other years, no sprays may be needed, or only one spray may be enough. Using IPM to manage disease means adjusting control measures for conditions actually present, rather than following an arbitrary calendar schedule.

To make the best use of the Sclerotinia Blight Advisory Programs:

1. Wait until vines are 6 inches from touching in the row middles before using the weather advisory.

Figure 27. Sclerotinia blight. Fuzzy growth in middle of stem is fungus growth of *Sclerotinia minor.* Right side of stem is brown lesion. Green stem on left is not infected.

2. Scout fields once a week, parting the vines to check for stem lesions.

3. Spray as soon as possible after conditions become favorable or if disease is seen in the field, but not within 21 days of the last spray.

4. If it has been 21 days or more since the last spray, try to spray before a heavy rain (greater than 1 inch).

The Sclerotinia Blight Advisory is just one factor to consider in deciding whether to spray. Base your decision on all available information.

Cylindrocladium Black Root Rot

Figure 28. Cylindrocladium black rot (CBR).

CBR (black root rot) is found in all peanut-growing counties in North Carolina and Virginia. Plants become pale green and die as a whole rather than one limb at a time. A blackened, rotting root system that allows plants to be easily pulled from the ground is characteristic of this disease. Red, pinhead-size, fruiting bodies of the fungus may be found on dead tissue near the ground following moist weather.

CBR can be confused with tomato spotted wilt virus (TSWV) which can also cause a root rot and yellowing. Cinnamon-colored speckles on the seed coat are the most diagnostic feature of CBR. See Table 4 (page 23) for a comparison of these diseases.

Rhizoctonia Limb and Pod Rot

Rhizoctonia limb and pod rot is commonly found in North Carolina and Virginia. It infects limbs, pegs, pods, and occasionally leaves. Young seedlings can also be affected by this disease on stem tissues just below the soil surface. Typically, small sunken lesions, light to dark brown with banded zones (target effect), form on stems at the soil surface. This disease is most common in moist fields or where the vines are thick. Irrigated fields are most severely attacked. Significant yield loss can occur, mostly due to pod rotting.

Scouting

Effective management for these diseases requires early detection. In early July begin checking for soil diseases by randomly stopping at as many locations as practical. Make sure to look in areas where disease was severe in previous years (use disease map). Check at least 20 locations. At each location, use a 2-foot dowel to push plant foliage out of the line of sight to the soil surface so that you can see the lower stems and any disease symptoms.

Once a disease has been detected, estimate the percentage of disease in the area by stepping off 100 feet and counting how many 1-foot sections had symptoms. Repeat

in as many areas as necessary to determine percentage of the field infested.

If you have any doubt about the identity of the disease, collect one or two diseased plants (including roots and some soil) and take them to the county Cooperative Extension Center for identification. Recheck areas where disease is found on the next scouting trip.

Action Thresholds

Deciding if and when to take action to control soilborne diseases is difficult. Factors to consider include the current level of disease, the history of disease in the field, the crop rotation, and the weather. Table 3 gives some rough guidelines to follow in making treatment decisions.

For black root rot (CBR), base your control decisions on the disease percentage and distribution recorded the last time peanuts were grown in the field. If the percentage was less than 10 percent, plant a resistant variety and extend the rotation period. If the previous infestation was 10 percent or higher, plant a resistant variety, extend the rotation period, and fumigate.

CBR is seed transmitted. Always use certified seed to minimize the likelihood of seed transmission.

Table 3. Decision key for beginning a spray program to control Southern Stem Rot (White Mold)[a], Rhizoctonia Limb Rot[b], and Sclerotinia Blight.[b]

History of severe disease? (over 10%)	Is weather favorable for disease?	Is the disease present in the field?	Recommended action?
Y	Y	Y	Spray
Y	Y	N	Spray
Y	N	Y	Spray
Y	N	N	Scout
N	Y	Y	Spray
N	Y	N	Scout
N	N	Y	Spray
N	N	N	Scout

[a] Favorable weather for these diseases is similar to that favoring leafspot. Use the Leafspot Spray Advisory to time applications.
[b]Use the Sclerotinia Blight Advisory to time sprays.

Scouting for Seed and Seedling Rots

Seed and seedling rots are caused by many different diseases. Seeds infected with seed rot may not germinate. Preemergence damping off causes seeds to fail to penetrate the soil surface after germination. Postemergence damping off is associated with seedling death shortly after emergence.

The result of these conditions is a poor stand with skips. Often the primary problem may be due to poor seedbed conditions or poor seed quality rather than disease. No treatment is available, but if the stand won't produce a profitable crop, replanting may be worthwhile.

Scouting

After plants emerge, look for problem areas where the stand appears thin. Count several 100-foot lengths of row to determine the number of healthy seedlings.

Action Threshold

Up to mid-May, an average of 100 plants or more per 100 feet of row is usually sufficient to produce a good crop. If plant populations are below these levels, the only solution is to replant.

Scouting for Nematodes

Nematodes that attack peanuts include the northern root knot, peanut root knot, lesion, ring, and sting. These pests cause plants to be stunted, wilted, off-color, and more susceptible to other diseases, such as black root rot (CBR).

Scouting

Fields that will be planted with peanuts should be sampled for nematode populations in the fall prior to planting (September through November). Samples will be more representative if the field is disked before the samples are taken. An accurate count of nematodes depends on a good, representative soil sample.

For each sample, take 20 soil probes (1 inch in diameter and 8 inches deep) in the root zone. Collect one sample for every 4 to 5 acres. Take samples in a zigzag pattern across the field.

After samples are taken, keep them cool (50 to 60° F.) and send to the Nematode Advisory Service as soon as possible. Time mailing to arrive on a weekday. Nematodes are often found in small areas of the field, and it will save money to treat only the fields or parts of fields where

nematodes are found. Fields requiring more than one sample should be divided according to the row direction so that noninfested areas are separated from infested areas that may require nematicide treatment.

If root knot nematodes are present when peanuts are harvested, damage on the roots and pods may show up either as star-shaped galls about the size of a pinhead on roots or as larger swellings or galls on pods. Observing pods or roots for galls after digging may give a good indication of where root knot problems have occurred.

Poor growth or stunting during the growing season may be due to nematode damage. Sample "good" and "bad" areas of the field for nematodes to diagnose problem areas. Record sampling results on disease maps so small areas within fields can be treated before the next crop if necessary.

Action Thresholds

In North Carolina, send samples to the Nematode Advisory Service of the North Carolina Department of Agriculture (4300 Reedy Creek Rd., Raleigh, NC 27607).

In Virginia, deliver the samples with completed paperwork to the local county Extension Service office.

The number and types of nematodes found will be reported to you by mail, and fields will be rated as A, B, or C. Fields in category A are below threshold levels and need no control procedures. Fields in category B are borderline–treatment may or may not be cost effective. Fields in category C are above threshold levels and should be treated.

Scouting for Tomato Spotted Wilt Virus

Symptoms of tomato spotted wilt virus (TSWV) vary considerably. They may begin to appear as early as one month after seedling emergence. Early symptoms include stunting of the whole plant or of new leaves. Yellow or brown speckling may occur on leaves with yellow-to-chlorotic ringspots. Limbs and terminal growth may die. Older plants decline in vigor, and stunting may affect all plant parts, including pods. Seed may be misshapen and red. Root systems may have some rot. At this stage, the disease can be confused with black root rot (CBR). Dam-

Figure 29. Symptoms of tomato spotted wilt virus vary.

Table 4. Comparison of TSWV and CBR symptoms.

Symptoms	TSWV	CBR
Rings on leaves	Sometimes	No
Twisted yellowing petioles	Usually	No
Root rot	Sometimes	Yes
Overall yellowing	Sometimes	Yes
Dead terminals	Sometimes	No
Red fruiting bodies	No	Sometimes
Stunted seeds, limbs, whole plant	Sometimes	No
Red seeds	Sometimes	No
Scattered in field	Yes	Sometimes
Clumped in low areas	No	Often
Time of clearest symptoms	Early-mid	Late season
Cracked seed coats	Yes	No
Cinnamon speckles on seed	No	Yes

age is most severe in young plants. Yield reductions may be slight if the infection occurs after midseason. Symptoms are often scattered across the field.

Scouting

Scout fields for TSWV beginning in mid-June.Follow the procedure described for root and limb disease scouting (pages 17-20). In the early-to-mid season, TSWV is fairly easy to diagnose with foliar symptoms. Late in the season, the foliar symptoms are usually replaced with an overall yellowing and root rot, almost indistinguishable from CBR. By shelling a few symptomatic pods, a positive ID can be made by the seed symptoms.

Action Threshold

There is no effective remedial treatment. Selection of a resistant variety and a heavy seeding rate are moderately effective at reducing losses caused by this disease.

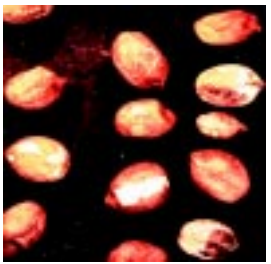

Figure 30. Seed from plants with TSWV are usually small and somewhat misshapen. The seed coats can have a pink color that is not evenly distributed. Seed coats are usually cracked.

Figure 31. Seed infested with CBR (bottom row) have numerous cinnamon-colored speckles on the seed coat. The seed are normal to slightly smaller than usual, and the seed coats are often lighter tan in color.

Notes

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