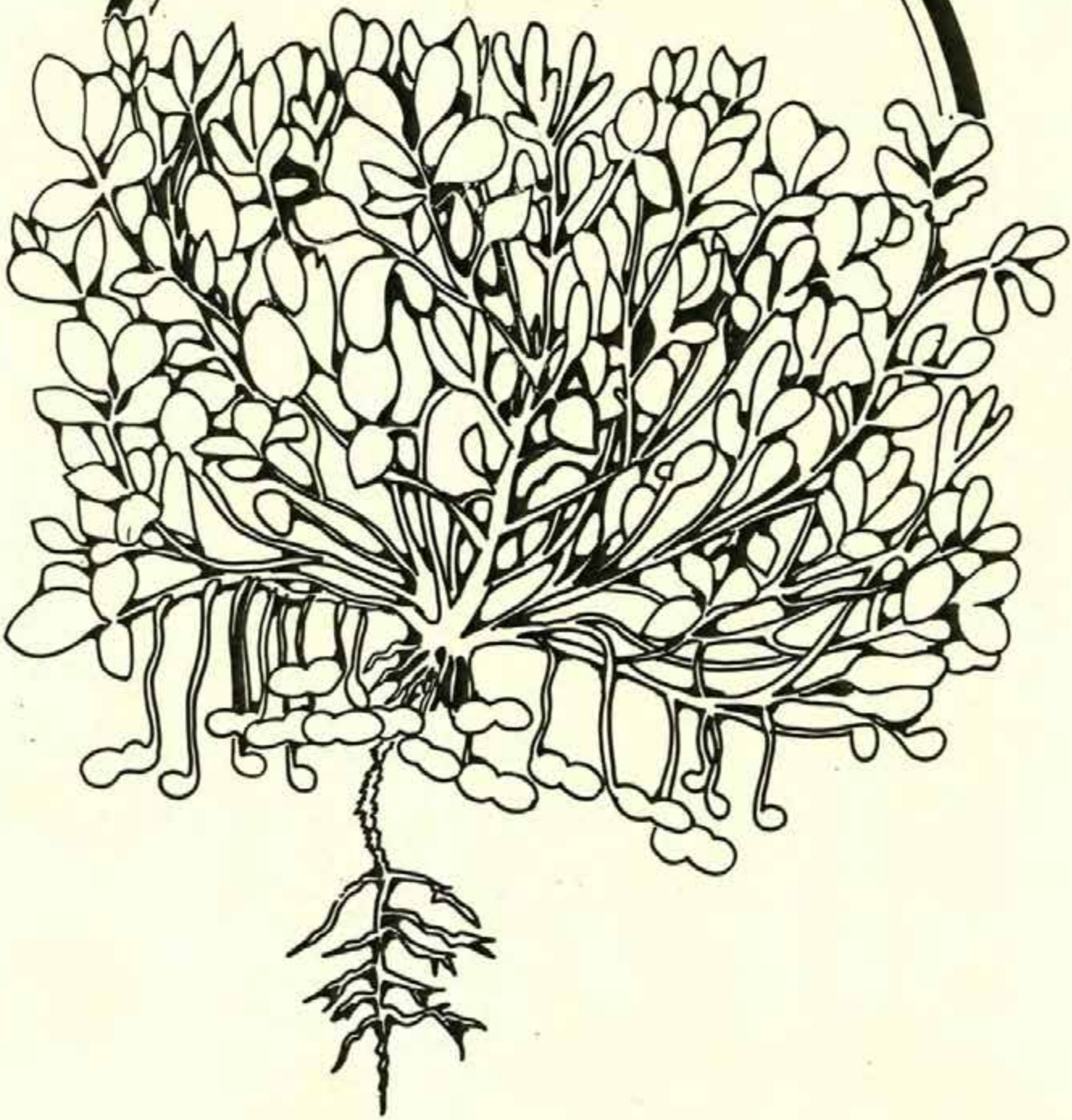
# PEANUT SCOUT HANDBOOK

The University of Georgia

Cooperative Extension Service
College of Agriculture



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Cooperative Extension Service, The University of Georgia
College of Agricultural and Environmental Sciences

Edited by:

Steve L. Brown
Extension Entomologist

Contributors

John Beasley, Extension Agronomist
Steve L. Brown, Extension Entomologist
G. Boyd Padgett, Extension Plant Pathologist
Steve M. Brown, Extension Agronomist - Weed Science

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# INTRODUCTION

The peanut, Arachnis hypogaea L., is a native South American legume related to the pea and bean. Although it has been grown in Georgia since colonial days, farmers did not use peanuts extensively as a cash crop until about 1915 when the boll weevil began to severely damage cotton. Since that time, peanuts have occupied a place of permanent importance in Georgia's economy. In Georgia, peanuts led all other crops in dollar value since 1965. Georgia produces more peanuts than any other state and approximately 40 percent of all the peanuts grown in this country every year.

The primary goal in any sound crop production system is to maximize profits through the use of management practices which are ecologically, socially, and economically acceptable. Achievement of this goal is complicated by the presence of insects, plant diseases, nematodes, and weeds. When the presence of these pests reach or exceed certain levels, they become economically important and must be controlled. Monitoring or scouting a peanut field is the primary method for detecting and quantifying pest problems.

As a peanut scout you must be able to find and identify pests and their damage, determine infestation levels, and report this information in a timely and understandable fashion. The information a scout provides could make hundreds of thousands of dollars difference to a peanut farmer. You should never take this responsibility lightly.

Scouting requires diligence and dedication to accuracy.

However, even the most experienced scouts will sometimes make mistakes. If you know how to scout, your observant and you don't get in too big of a hurry, your mistakes will be minor and infrequent. If you are not sure your scouting results are accurate, get help from your county agent or a more experience scout.

The purpose of this handbook is to provide the peanut scout with the basic information that will be needed to monitor peanut fields for pests. This handbook should be supplemented with classroom and field instruction which is available from the University of Georgia through the County Extension office. Remember, **the key to successful peanut pest management is the accuracy and dependability of the peanut scout.**

# PHYSIOLOGY OF PEANUT CROP GROWTH

John Beasley, Extension Agronomist

Understanding how a plant grows and develops helps you make crop management decisions. Knowing how seed germinate and emerge and the processes of flower initiation, fruit development and maturation helps peanut producers make production decisions that increase the yield and quality of their crops.

## Seed Structure and Seedling Development

The peanut seed is made up of two cotyledons or seed leaves and an embryo. The peanut embryo consists of a plumule, hypocotyl and primary root. The plumule becomes the stems and leaves above the cotyledon leaves. The hypocotyl is the stem below the cotyledon leaves and above the primary root. At germination and emergence, the hypocotyl and primary root are known collectively as the radicle.

The germination process begins when the peanut seed absorbs water. The water intake is uniform around the seed surface, and increases as temperature increases. When the seed moisture level reaches 35 percent, germination can occur, resulting in metabolic activity, cell division and elongation. Peanut seed will germinate in soil temperatures of 41° to 104°F, but germinates best at 68° to 95°F. As the embryo grows, the seed coat (testa) ruptures and the young plant emerges.

The first visible sign of germination is emergence of the

radicle, which takes 1-1/2 to two days, depending on soil moisture levels and temperature. The seedling uses food reserves in the cotyledons during the first days of growth, and after five to 10 days, the newly developed root is able to absorb minerals and the emerged leaves will eventually begin supplying photosynthate for sustained growth. After about five days, the tap root is four to five inches long and lateral roots begin to develop. Lateral roots are arranged in four distinct positions off the primary root (Figure 1). Secondary roots then develop from the lateral roots.

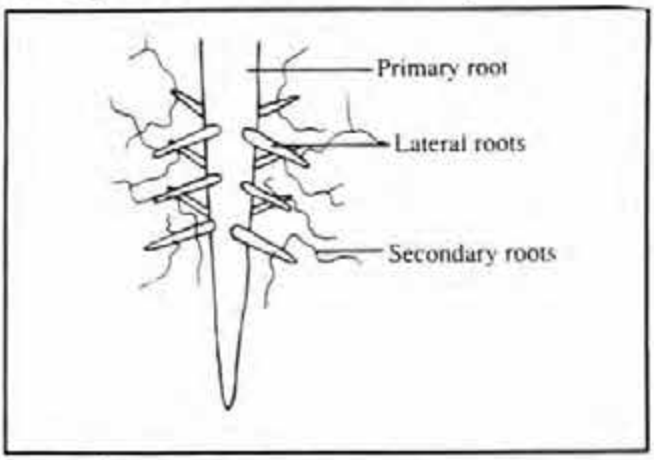



Figure 1. Peanut Root System.

Emergence through the soil, or "cracking", begins seven to 10 days after sowing. The time interval for germination and emergence depends on environmental factors, including planting depth. Dry or cool soils can slow germination and emergence for up to three weeks. Seed that have not germinated or emerged in three weeks has probably been killed by seedling pathogens.

## Plant Development: Emergence To Bloom

As the plant grows, the root develops faster than the shoot, helping the plant to survive. The plumule pushes upward, causing the soil surface to crack and form an opening for plant emergence. Although small plants can exert tremendous pressure to move large chunks of soil, a crust can form after a rain and make emergence difficult.

After emergence, the plumule is called a shoot and consists of a main axis (main stem) and two cotyledonary lateral branches. At emergence, the main stem has at least four immature leaves and the cotyledonary lateral branches have one or two. These young leaves are susceptible to some herbicides, so it is important that "cracking time" herbicides be applied according to label instructions. The seedling develops slowly, showing as few as eight to 10 fully expanded leaves 20 days after planting, all of which were present in the embryonic state of dormant seed. The hypocotyl and root system develop rapidly.

Leaves are attached to the main stem at joints, or nodes (Figure 2). There is a distinct pattern by which these leaves are attached. There are five leaves for every two rotations around the main stem, with the first and fifth leaves located one above the other. Leaves attached to the cotyledonary laterals and other lateral branches are two-ranked, so there is one leaf at each node, alternately occurring on opposite sides of the stem.

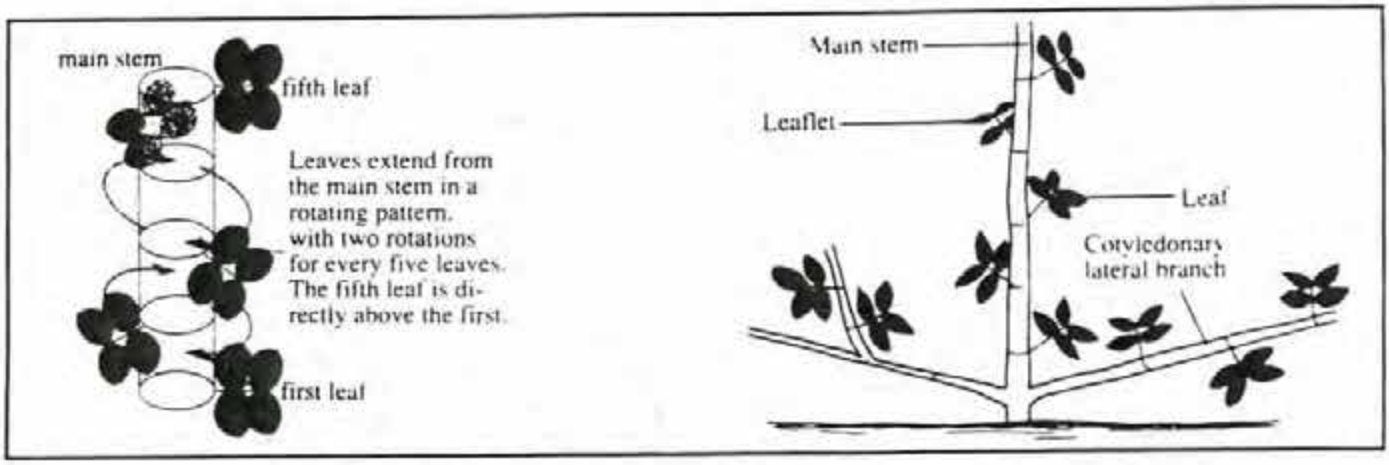



Figure 2. Peanut leaf arrangement on the main stem.

Peanut leaves have four leaflets per leaf, and the leaflets are pinnately compound (they grow from both sides of the leaf stem). Leaflets are elliptical, with a hairy appearance and a prominent midvein. Terminal leaflets are usually longer and wider than lateral leaflets.

The main stem and cotyledonary laterals determine the basic branching pattern of the shoot. The main stem develops first, and in runner-type plants, the cotyledonary laterals eventually are longer than the main stem. Additional branches arise from nodes (joints from which leaves, stems and pegs develop) on the main and lateral stems.

The growth habit of peanut foliage is described as bunch, decumbent or runner (Figure 3). Branches on bunch, or erect, plants such as the spanish and valencia market types grow upright. Branches on runner or prostrate plants, such as several virginia varieties, grow flat. Decumbent growth exhibits a combination of bunch and runner characteristics. Runner type plants have suppressed branching from the main stem and a strong tendency for

continued branching of the cotyledonary laterals.

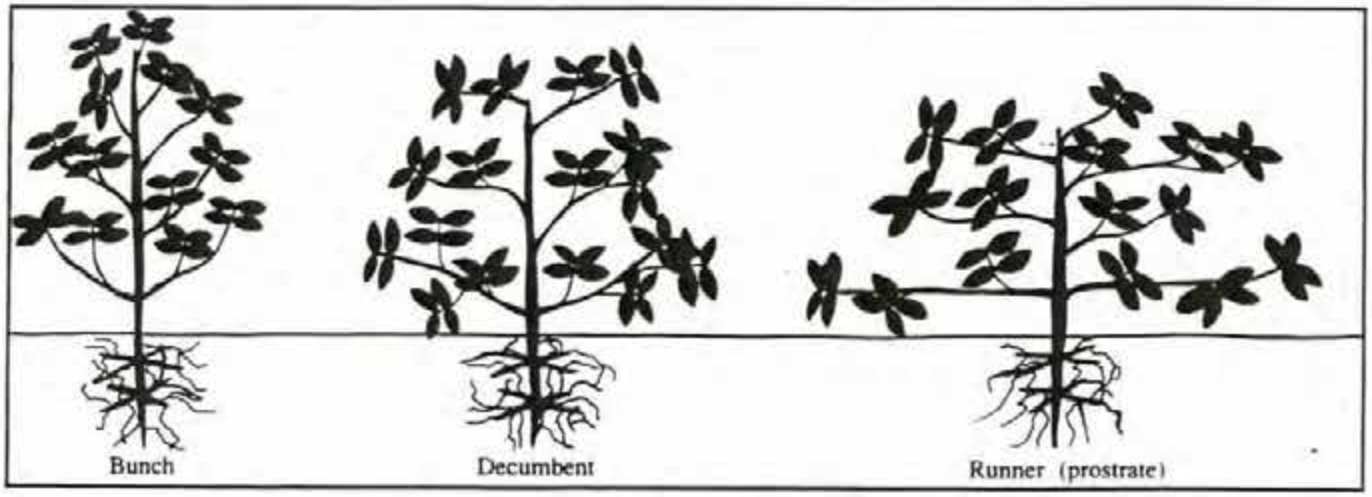



Figure 3. Peanut growth habits.

The amount of vegetative growth between emergence and first bloom is largely dependent upon genetics, environmental conditions and cultural practices. Rainfall, temperature, fertility levels, pest control and seeding practices influence vegetative growth before first bloom. Peanuts are indeterminate in vegetative and reproductive development, so vegetative growth continues after the plant flowers and begins to set fruit (pods).

Plant Development: Bloom To Pod Maturity

Approximately 30 days after emergence, peanut plants begin to produce flowers. The number of flowers per day peaks two to four weeks after floral initiation and declines during late pod fill (Figure 4). Environmental conditions such as drought or high temperatures will reduce the number of flowers produced. Flowers initiate within individual axils at each node and several flowers can develop at a single node.

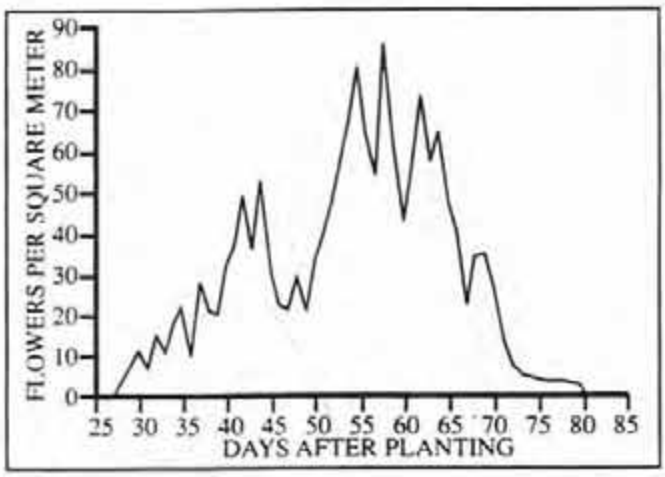



Figure 4. Normal distribution of floral initiation by a peanut plant. Source: J. Williams, Crop Systems Research Unit, USDA, Tifton, GA.

The peanut flower is a perfect flower, meaning male and female structures are present in the same flower (Figure 5), allowing self-pollination. The peanut flower has a showy yellow bloom that is papilionaceous (butterfly-shaped). The flower has standard petals, which are the larger petals that spread open, and two wing petals, which are the smaller petals that enclose the reproductive structures. The keel, a thin tissue wrapped around the male and female parts, is between the wing petals.

The female structures are collectively called the pistil and include the stigma, style and ovary. The stigma is the receptive and germination surface for pollen grains. The style is the tissue column that connects the ovaries to the stigma and through which the pollen tube grows. In peanuts, the style, or hypanthium, is also the flower stem. The ovaries are at the base of the style and are fertilized by the pollen tubes that travel down the style.

The male structures are collectively called the stamen and include the anthers and filaments. The anthers bear pollen grains and the filament is the stalk that holds the anthers.

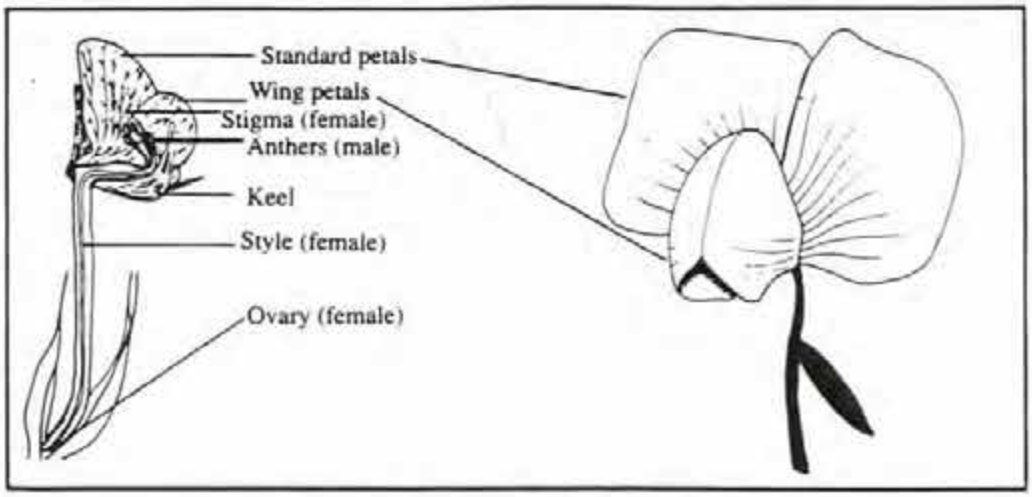



Figure 5. The peanut flower.

When the peanut flower first emerges, the petals are folded together. In the early morning of the following day, the standard petals unfold and the pollen is shed and attached to the stigma. The first fertile pollen grains that germinate and produce pollen tubes travel down the style and fertilize the ovaries.

The fertilized ovary begins to elongate and, because of geotropism (growth induced by gravity), bends toward the soil surface and extends downward from the reproductive node of branches (Figure 6). This structure is called the peg, or gynophore, and is first visible about one week after fertilization. The deteriorated flower remains attached to the tip of the peg for several days before falling off. Pegs enter the soil eight to 12 days after the flower is pollinated.

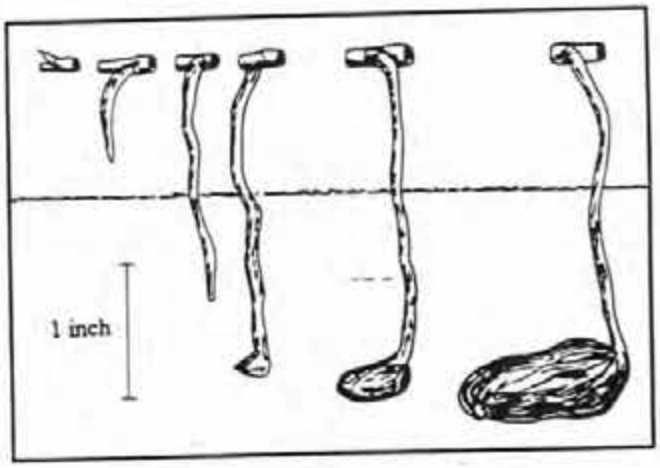



Figure 6. Peg growth and development.

The tip of a peg is sharp, allowing it to penetrate the soil easily. The developing peanut fruit is on the tip of the peg and begins to enlarge soon after entering the soil if water and calcium are present. Several pegs can develop at a single node. After pegs enlarge, the fruit is referred to as a pod. Because of the indeterminate fruiting habit of peanuts, pods of various maturities and sizes can be present on a single node at harvest.

During the period 30 to 60 days after emergence, the plant's energy is used for vegetative growth and the beginning of flowering and fruit production. From 60 to 110 days after emergence, the peanut plant undergoes flower production, pegging, pod formation and pod fill. During the early stages of formation, the pod tissue is soft and watery. As the pod develops, the hull and seed begin to differentiate. The cell layer (mesocarp) just below the outer cell layer (exocarp) of the pod changes from white to yellow to orange to brown to black as it matures, providing a color indication of optimum harvest time. The inner pod tissue separates from the seed and darkens as the seed grows and presses against the

hard layer of the hull.

Water and nutrients are absorbed by the pod and enter the developing seed by diffusion. The seed is attached to the inner hull layer be the funiculus (stalk) as the pod matures. The funiculus functions as an umbilical cord, transporting water and nutrients to the kernel. Physiological maturity or late-season stress may cause the funiculus to shrivel and the seed to separate from the pod, ending water and nutrient transport to the seed.

## Water Requirements

Pre-bloom: Water is the most common limiting factor in peanut production. Figure 7 shows the average water requirement of peanuts during the growing season. Before initial bloom, the requirement is low, because adequate moisture is needed only for germination and emergence. Full-sized plants require more water. Some peanuts, especially those irrigated, have excessive vegetative growth because of excess moisture late in the season.

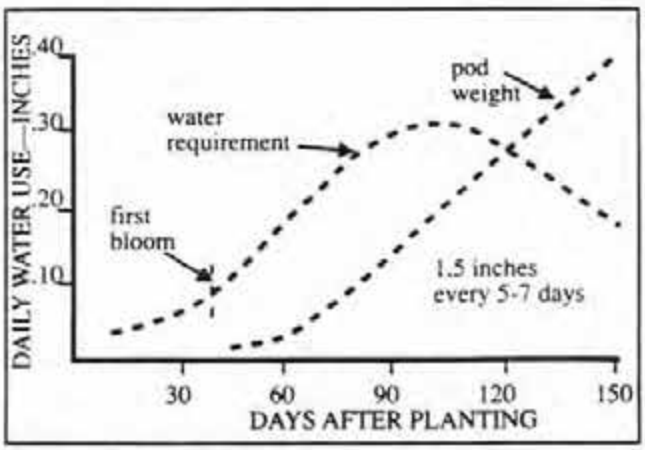



Figure 7. Daily water use for peanut plants.

Post-bloom: Once peanuts reach the reproductive stage, the daily water requirement increases. During the flowering, pegging, pod formation and pod fill stage, the peanut requires 1-1/2 to two inches of water a week. Water deficits during this stage can reduce yield dramatically (Table 1). Water is also important for the movement of calcium into the peanut pod. Additional calcium is usually added at the early bloom stage.

Water requirement decreases during the 30 days prior to optimum crop maturity, and drought stress during this period creates optimum conditions for aflatoxin development. Drought stress in the absence of high soil temperatures usually does not result in increased aflatoxin development. The fungus that produces aflatoxin grows rapidly when the moisture content of the peanut seed is between 14 and 35 percent. Moisture content is between 40 and 50 percent at maturity under normal growing conditions. Drought stress for 20 days or more just prior to harvest can cause seed moisture to drop below 35 percent.

**Table 1. Effect of drought period on yield and grade of peanuts, 1987-88***

| Stress Period (days after planting) | Yield (lbs/acre) | Grade (%TSMK) |
|---|---|---|
| No drought | 4540 | 74 |
| 30-65 | 3960 | 75 |
| 65-100 | 2900 | 71 |
| 100-135 | 4120 | 76 |

* Coastal Plain Experiment Station, Tifton, GA
Source: C.S. Kvien, Research Agronomist, UGA CPES, Tifton, GA

## Application to Improved Peanut Yield and Quality

Maximum yield and quality are dependent upon developing and maintaining a healthy, viable plant. Care should be exercised to prevent damage from cultural practices to the cotyledonary lateral branches where most of the peanuts originate.

Vegetative growth is most rapid between 40 and 100 days after planting, with little or no growth after 100 days. During this period new leaves are unfolding at each branch terminal every 3-5 days. Therefore, foliage diseases and insect control programs should be intensified during this period to insure a full canopy of healthy leaves to furnish food for pod development later in the season. This is especially important since the plant photosynthesis process declines rapidly after plants reach 100 days of age. Therefore, late set pods may be more dependent upon food stored in leaves and stems.

Most harvestable pods are set between 50 and 100 days after planting for the runner type. This fact suggests that "intensive" irrigation, if available, will benefit yield and quality most if applied during this 40-50 day period and on an "as needed" basis from 100 days until harvest.

Scouting for soil insects which attack peanut pods should be emphasized during the period from 50 days after planting until harvest.

# INSECT IDENTIFICATION AND SCOUTING PROCEDURES

Steve L. Brown, Extension Entomologist

Recognition of the different insects in a peanut field and the damage they cause is necessary for effective insect management. Some insects are harmful and can reduce the yield and quality of peanuts by feeding on the roots, stems, foliage and pods of the peanut plant. It is necessary that you be familiar with their appearance and feeding habits if you are to accurately identify the pest and its damage.

Insect pests of peanuts can be broadly categorized into those which feed on below-ground plant parts (subterranean feeders), those that damage plants by consuming foliage (foliage feeders) and those that damage plants by other means. Scouting procedures vary depending upon the type of damage they cause.

## SUBTERRANEAN FEEDERS

There are several different species of insects which feed on below ground plant parts such as roots, pegs and pods. Lateral stems lying on top of the ground may also be attacked.

### Lesser Cornstalk Borer

The lesser cornstalk borer is probably the most economically important insect pest of peanuts. It is usually a problem during

hot, dry weather, and is more often a problem on coarse sandy soils than on heavier soils.

Description of Insect

The larva of the lesser cornstalk borer is dark, blue-green and ranges from 1/2 to 3/4 inch long. It has brown or purple bands around its body. When disturbed it flips about very rapidly. Larvae live in tube-shaped webs attached to the plant where it is feeding. Soil particles adhere to the webs making them appear much larger than they really are. The female moth is charcoal gray with brown markings toward the head. The male is a light buff color with a dark charcoal gray line down the middle of the back and along the rear border of the wings. When at rest both male and female moths are about 1/2 inch long and slender, not fan-shaped like some moths.

Description of Damage

Since the lesser cornstalk borer feeds near the soil surface, it is sometimes characterized as a semi-subterranean pest. In addition to feeding on underground pegs and pods, larvae will tunnel into any above ground part of the plant that contacts the surface of the soil (Plate 1). During the early stages of plant development, tunnelling into the hypocotyl will stunt, and sometimes kill, young plants.

How to Scout

Observe plants closely for larvae and damage. If wilted leaves are seen, check for entrance holes in the stems of the plants at ground level. Look for silken tubes that may be attached near the entrance hole. The larva may be in these tubes or in the stems. To scout, check for lesser cornstalk borers and damage at several locations in each field. The best way to find lesser cornstalk borers is to pull up a plant at each location and carefully check the crown, limbs, pegs and pods. Some farmers may object to you pulling up plants. If so, you will have to do the best you can checking all plant parts that touch the soil surface. Record the percentage of locations that borers and damage are found. Lesser cornstalk borers typically are a problem in hot, dry weather and on light sandy soils. However, all fields should be checked for infestations even when conditions don't appear to be ideal. Infestations may begin on higer elevations in individual fields so be sure to include these areas in your sampling.

## Wireworms

Wireworms are the immature stages of "click" beetles. There are many species that damage plants by feeding on the underground parts. The "worm" stage is always found in the soil.

Description of Insect

Wireworms are slender-bodied larvae that vary from yellowish to brown in color. Their bodies are distinctly segmented, hard and shiny. They have three pairs of legs attached to the underside of the body just behind the head.

Description of Damage

Since wireworms are difficult to find in the soil, infestations are often first noticed as the result of damage to pods. Depending on the size of the wireworm, damage can vary from small clean holes to large irregular holes.

How to Scout

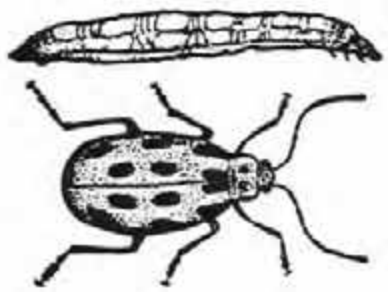
Pull up a few plants at randomly selected sites in the field. Examine the pods for damage. If damage is found, examine adjacent soil for the presence of wireworms. Also, crack open a few damaged pods. Wireworms may be found inside. Record the percentage of infested sites.

## Southern Corn Rootworm

The southern corn rootworm is the larva of the spotted cucumber beetle. Adult beetles do not damage peanuts. Southern corn rootworms are more often a problem on heavy soils that are

poorly drained. However, during extremely wet weather they may become a problem even on sandy soils. Damage may vary from slight decrease in yields and grade to almost complete destruction of the crop.

Description of the Insect



The southern corn rootworm larva is slender, white to cream colored, and reaches a length of 1/2 to 3/4 inch when mature. It has a very fragile, wrinkled body with three pairs of inconspicuous legs. The head and the last segment of the body are dark brown to black. At first glance it may appear to have a head at both ends. The adult is a greenish-yellow beetle, approximately 1/4 inch long, with 12 irregular black spots on its back (Plate 2).

Description of Damage

This pest is strictly a subterranean feeder. It may feed on the roots of peanuts plants to some extent, but its most important damage is due to peg and pod feeding (Plate 2). Usually the holes cut into pegs and pods will be almost cylindrical, as if they were made by a tiny drill bit. In contrast to lesser cornstalk borer feeding, there is no webbing associated with this pest.

How to Scout

Look closely for the larvae and damage during periods of wet

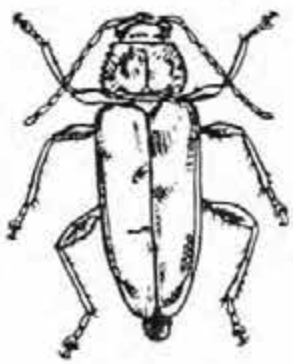
weather and especially in areas with heavy soils. The larvae may chew canals along the outside of the peanut hull. To check for southern corn rootworms, pull up a plant at several locations. If damage is found, break open some damaged pods and dig in the soil in search of the larvae. Record the percentage of plants that have larvae and pod or peg damage.

## Bahiagrass Borer

The bahiagrass borer is only an occasional pest of peanuts. This insect may cause damage to peanuts when they are planted after Bahiagrass. Stands have been reduced by as much as 50 percent when this insect is present.

### Description of Insect

The adult Bahiagrass borer is a long-horned beetle (named for their long antennae). Larvae are legless and about 2 inches long with the head wider that the rear.



### Description of Damage

The larva is the damaging stage of the Bahiagrass borer. Larvae apparently do not feed to any extent on the peanut plant.

They simply cut the tap root, causing the plant to die (Plate 1).

How to Scout

Examine the roots from a plant at several locations. Examine the soil around the roots as well. Record the number of bahiagrass borers found in the comments section. Don't spend a lot of time looking for this insect unless dead or dying plants are present.

## Whitefringed Beetles

Whitefringed beetles are important but sporadic pests of peanuts. Both larvae and adults feed on peanuts but only the larvae cause economic damage. Male whitefringed beetles are not known to exist. Reproduction is by parthenogenisis (development of eggs without fertilization).

Description of the Insect

Larvae are white, legless grubs that are up to 1/2 inch long. The head of the larva is not conspicuous and only the dark colored mandibles (jaws) are apparent at the forward end of the abdomen. Adult beetles are up to 1/2 inch long and vary in color from light to dark gray. There are faint white stripes on the edge of the wing covers (hence the name).

Description of Damage

The most important damage by these pest is caused by larval feeding on underground parts of young plants (Plate 1). They often cut the tap root causing the plant to die. Damaged plants may be stunted for the remainder of the growing season. Damage is often spotty within a field.

How to Scout

During field examinations look for dead or dying plants and examine the roots for the presence of whitefringed beetle larvae. Report their presence in the comments section of the report form. Report the presence of large numbers of adults in the comments section.

## White Grubs

White grubs are the larvae of May or June beetles. There are more than 100 species of insects that are collectively referred to as white grubs. The life cycle of white grubs may last from one to four years depending on the species. White grubs are not a major problem in peanut production in Georgia. However, losses due to this insect may be substantial in individual problem fields.

Description of Insect

Most mature white grubs vary from 1/2 to 1 inch in length. When uncovered in the soil they curl into a typical "C" shape. They are white with brown heads and have three pairs of prominent legs attached to the underside of the body just behind the head. The rear end of the body is smooth, shiny and usually dark brown or black.

Description of Damage

White grub damage may be first evident as reduced stands. Later, white grub feeding on roots may result in reduced plant vigor.

How to Scout

Heavy white grub infestations may be detected during land preparation. After being brought to the surface, white grubs will quickly burrow underground. Therefore, they are often not noticed. If poor stands or weak plants are noticed, check the soil around dead or dying plants for the presence of white grubs. Grub infestations sufficient to cause problems usually occur where peanuts follow sod crops that have been established for several years.

# FOLIAGE FEEDERS

Some peanut insect pests can be classified as foliage feeders. Foliage feeders damage peanut plants when they consume enough foliage to deminish the ability of the plant to produce and mature seeds. Many insects can consume peanut foliage but the most important are corn earworms, velvetbean caterpillars, beet armyworms, fall armyworms, yellowstriped armyworms and loopers. The larval stage of these insects damages plants and scouting techniques are designed to monitor larval populations. However, adult moths are often seen in peanut fields and can sometimes be good indications of future problems. Don't spend any time trying to count moths, but noting high numbers in the comments section is often helpful to the grower.

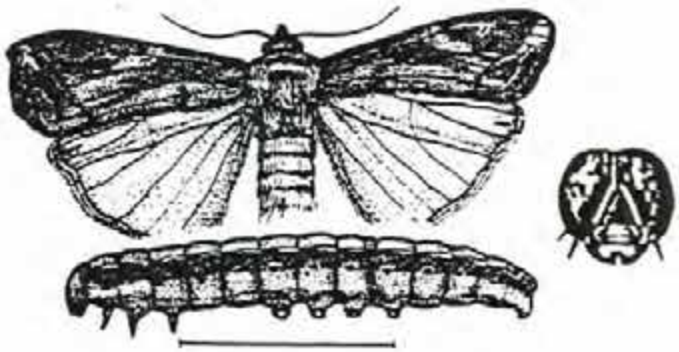
## Description of Insects

Corn Earworm

Corn earworms cannot be identified by color. They may be light green, pink, brown, yellow or almost black. The head capsule is usually yellow or orange. They are generally lighter on the underside of their bodies. There are four pair of abdominal

prolegs. Fully grown corn earworm larvae are up to 1 3/4 inches long. The skin is coarse with short black hairs.

## Fall Armyworm



The fall armyworm body s gray, light brown or mottled green in color while the head is usually a shiny dark color. The skin is smooth, not covered with short bristles like the corn earworm. Fall armyworms have four abdominal prolegs. When looked at from a "head on" view, they have an inverted "Y- shaped" mark on the front of their head (Plate 3). Most caterpillars have this mark on their head but it is not nearly as prominent as that found on the fall armyworm. Fall armyworms reach approximately 1 1/2 inches in length when fully grown. When abundant, fall armyworms can strip plants of foliage and migrate or "march" to other host plants.

Female fall armyworm moths lay their eggs in masses of about 150 each. The masses are covered with scales from the female's body. Although you don't need to count egg masses, if you notice them you should note it in the comments section of your report.

## Granulate Cutworm

Granulate cutworms are stout, smooth-skinned caterpillars that may be gray to brown in color. Some people describe them as being "greasy". The underside of the worm is lighter in color than the back. Full grown cutworms may be up to 1 1/2 inches in length. Granulate cutworms will curl into a tight ball when disturbed (Plate 3). In addition to consuming foliage, granulate cutworms can cause serious damage to young plants by cutting off or gnawing stems near the soil surface. After peanut plants are inverted in preparation for harvest, cutworms may feed on exposed pods.

## Beet Armyworm

Beet armyworms are almost always green but may or may not have dark stripes running lengthwise on each side. The predominant identifying characteristic is a small black spot located on each side directly above the second pair of true legs (Plate 3). Eggs are laid in masses very similar to that of fall armyworms. Note the presence of these egg masses in the comments section of your report.

Newly hatched beet armyworms stay near the egg mass for a few days. You may find groups of several dozen young beet armyworms on one or two compound leaves. Young beet armyworms tend to eat only the upper or lower leaf surface of a leaf, not causing a hole. This type of damage is referred to as "window paneing".

## Yellowstriped Armyworm

The yellowstriped armyworm occasionally occurs on peanuts, but rarely in damaging numbers. It has a pair of triangular black spots on most of its body segments and often has a bright yellow stripe running the length of its body. (Plate 3)

## Velvetbean Caterpillars

This caterpillar reaches a length of almost two inches when fully grown. It usually has a yellow head capsule and will wiggle violently when disturbed. The caterpillars are usually green in color with yellowish-white stripes located running the length of their body. Brown or black color forms with yellow stripes may also be found. The darker caterpillars usually are found late in the growing season or when populations reach high numbers.

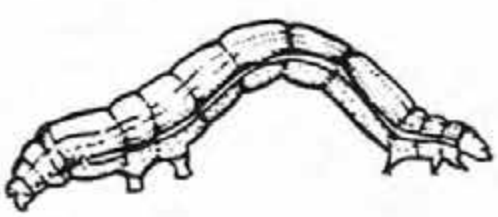
Young larvae "loop" when they walk and continue to do so until they are about 1/2 inch long. The velvetbean caterpillars can be

distinguished from loopers since they have 4 pair of prolegs and the loopers have only two. After the worm grows larger it loses its "looping" action. The caterpillar can often be identified by the anal prolegs which project backward and outward seeming to drag behind the body as it moves (Plate 3).

Velvetbean caterpillars do not overwinter in Georgia. The moths fly north each summer from their southern habitats and usually arrive in Georgia by August or September. These insects feed day and night and can quickly defoliate peanut plants.

## Loopers

Loopers are occasional pests of peanuts. They are voracious feeders and prefer to feed deep inside the foliage rather than on exposed upper surfaces. Loopers, which reach up to 1 1/2 inches in length, are usually green in color and have faint white stripes running the length of their bodies. They are "baseball bat" shaped, tapering from a large rear to a small head end. The worm "loops" when it crawls and is sluggish when it is disturbed. Loopers can be separated from other foliage feeders since they have only two abdominal prolegs.



How to Scout

At each randomly selected sample site in the field, mark a three foot section in the row middle, parallel with the rows. The distance between your elbow and finger tips is approximately one and one half feet. Starting in the middle of an adjacent row, pull half of the foliage from that row toward the middle. Briskly slap (or karate chop) the foliage to dislodge any foliage feeders. Do the same for the other adjacent row. Pull the foliage back away from the middle and identify and count the foliage feeders you find. If there are many caterpillars, you may find it helpful to mash or throw away each one as you count it. You should count all sizes of caterpillars including very small ones, so look closely.

Due to their unique feeding habits, granulate cutworms require a little extra effort during scouting. Granulate cutworms feed at night, and, during the day, may be found buried under leaf litter or just under the surface of the soil. In addition to shaking foliage, you should run your hand lightly over the surface of the soil to reveal cutworms buried withing the sample site. Most are found near the drill (where the seed were planted) where they are covered by the most dense foliage. Granulate cutworms can be very serious pests. If you get in a hurry and neglect looking for cutworms, you may miss the potential for some serious damage.

After identifying and counting the insects from all sample sites, determine the average number per foot of row. Each sample site represents three feet of row (actually half of two three-foot sections). If you sample ten sites in a field then you have

sampled a total of thirty row feet (three feet at ten locations). If you counted a total of 120 foliage feeders, then there are 4 foliage feeders per foot of row (120 foliage feeders/30 row feet).

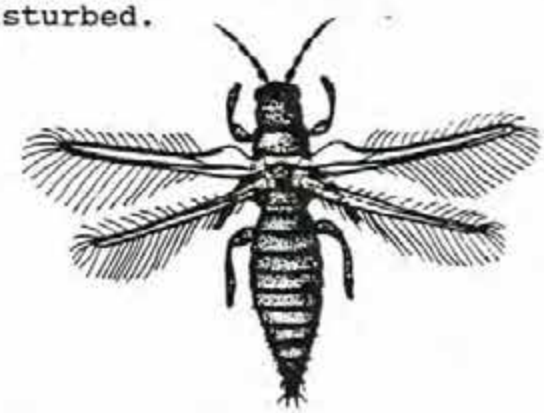
## OTHER ABOVE GROUND PESTS

These insects can be found feeding on peanut foliage, but their damage is not due to the reduction of leaf surface.

### Thrips

Description of Insect

Thrips are tiny, slender insects about 1/32 inch in length. They vary in color from yellow to black. Adults will have wings and may fly when disturbed.



Description of Damage

Thrips feeding often results in stunted plants with leaves that are scarred and "possum earred" (leaf edges are turned down).

Thrips also transmit the virus that causes tomato spotted wilt in peanuts.

How to Scout

It is not practical to count thrips during routine scouting. The insects are extremely small and often move around quickly. It would, however, be helpful to the farmer if you could indicate the presence of thrips and thrips damage. You can look for thrips by tapping a plant over a white sheet of paper (your scouting card would do). Thrips will be dislodged from the foliage and fall onto the paper where they can be easily seen. Thrips damage may be visible for several weeks after feeding occurs. Therefore, it is important to distinquish between fresh damage and old damage. It will be up to the farmer and the county agent to make that distinction. Your observations, however, can be helpful in early identification of thrips problems. Record your observations in the comments section.

## Leafhoppers

Description of Insect

Leafhoppers are small wedge-shaped, green or brownish insects about 1/8 to 1/4 inch long. Both adults and nymphs are similar in shape, but the nymphs are smaller and do not have wings.

Description of Damage

Leafhoppers insert their beak into the midrib on the lower side of peanut leaves and suck plant juices. Leaves will turn yellow from the point where the feeding occurred to the tip of the leaf. This damage is often referred to as "hopper burn" (Plate 2). In severe cases, leaf margins will die or entire leaves will fall off.

How to Scout

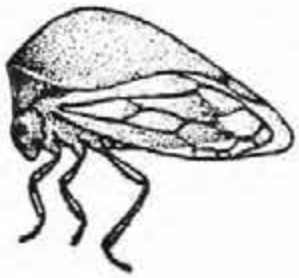
Be alert for hopper burn as you scout. Hopper burn will often begin on the edge of a peanut field. Hopper burn may be evident for some time after leafhoppers have left a field. Therefore, if hopper burn is noticed, look closely to confirm the presence of leafhoppers. As you walk through the field, look for leafhoppers flying ahead of you. Adults will be difficult to see up close because they quickly fly for cover when disturbed. Nymphs, however, have no wings and can be easily observed.

It is not necessary to count leafhoppers. Record leafhoppers as none, light, medium or heavy. These ratings are obviously subject to interpretation. In general, a "light" infestation would be characterized by an occasional observation of leafhoppers and/or hopper burn. If the entire field has a yellow color due to hopper burn and leafhoppper adults and nymphs are easily found, indicate a heavy infestation. If damage is evident but leafhoppers are not present, indicate such in the comments section.

# Threecornered Alfalfa Hopper

## Description of Insect

Adult threecornered alfalfa hoppers are light green in color and are wedge-shaped (Plate 2). They stand about 1/4 inch high and are about 1/4 inch long. Nymphs are similar in shape and color but are spiny and do not have wings.



## Description of Damage

Both adults and nymphs have piercing mouthparts and feed by inserting their beak into the stem and sucking plant juices. They tend to move in a circular fashion around a stem, making feeding punctures as they go. The damaged area typically swells and above ground root growth may occur (Plate 2). On peanuts, threecornered alfalfa hopper feeding may occur on limbs, leaf petioles or pegs.

## How to Scout

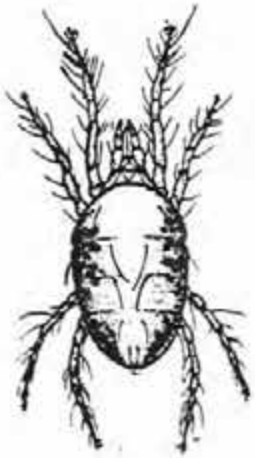
Feeding by threecornered alfalfa hoppers often goes unnoticed. Carefully, examine plants for damage when checking peanut fields. Peg damage is especially important so observe pegs carefully. Adult hoppers may be seen moving ahead of you as you move through the field. Like adult leafhoppers, they are quick to fly when disturbed. Although nymphs are not capable of flight, they will

try to hide by moving to the opposite side of the leaf.

Check several locations in the field and record threecornered alfalfa hopper infestations as none, light, medium or heavy. Heavy damage would be when insects and damage are found in more than fifty percent of the locations checked.

## Spider Mites

Spider mites are not really insects but are closely related to insects.



### Description of Pest

Although spider mites are small they can be seen with the naked eye, especially if they are moving. A hand lens will help with identification. Immature spider mites have 3 pair of legs, the mature or adult mites have 4 pair of legs which clearly separate them from the insects. The most common species will be yellow with two dark spots on the back.

### Description of Damage

Spider mites feed on peanuts by sucking plant juices from the undersides of the leaves. This feeding, which usually begins near the midribs of the leaves, results in a speckling of the upper surfaces of the leaves. As the infestations become more severe the

leaves may turn yellow and die. Heavy infestations are characterized by visible webbing.

How to Scout

In the early stages, spider mites infestations are usually localized within a field. Localized spots of spider mites are usually found along a field border adjacent to woods or weedy areas (Plate 2). Therefore, field margins should be checked closely for spider mite damage. Damaged areas can sometimes be seen best from a distance. However, before identifying a spot in a field as a spider mite infestation, look closely for the mites. An area of yellow plants could be caused by several things. Spider mites are almost always associated with periods of hot, dry weather. Look especially close during hot, dry weather. When conditions are right, spider mites can damage a field very quickly, so early detection is very important. When populations are high, masses of spider mites can be found on the highest parts of the plant.

Damage can be recorded as none, light, medium or heavy. Record the size and location of localized infestations in the comment section.

## Rednecked Peanutworm

Rednecked peanutworms are occasionally found in the terminal (bud) of peanut vines. When infestations occur, they are usually in early or mid-season.

Description of Insect

Larvae are small, being only 3/8 to 1/2 inch in length when fully grown. They are white to cream colored with a brown head. A narrow red band is located just behind the head (hence the name).

Description of Damage

Although rednecked peanutworms do not consume a great deal of foliage, damage to terminals can result in stunting. Young plants are particularly susceptible.

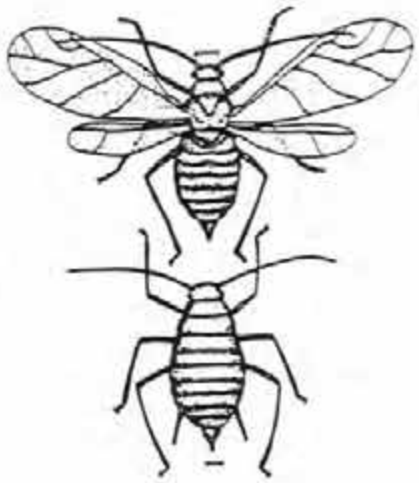
How to Scout

As you walk through a peanut field, be alert for visible terminal damage and stunted growth. Occasionaly inspect a terminal by carefully pulling apart the young leaves that are bunched together in the terminal. Not all terminal damage is due to rednecked peanutworms, so don't report them unless you actually find the insect.

Report the presence of this insect in the comments section of the report form. If numbers are high, you may want to look at several terminals and report the percent that are infested.

# Aphids

Aphids almost never require control on peanuts. You may, however, occasionally see aphids on peanuts and should be able to identify them. Be careful not to confuse aphids with immature whiteflies.



## Description of Insect

Aphids (plant lice) are, soft-bodied, sucking insects that are about 1/16 inch in length. Aphids vary from pale yellowish green to dark green or almost black. Both winged and wingless forms may occur.

## Description of Damage

Aphids feed by inserting their beak into tender portions of plants and sucking juices. Feeding may result in stunted, distorted leaves. Heavy infestations can severely reduce plant vigor. Aphids exude a sticky substance called "honeydew" which supports the growth of a black fungus called "sooty mold". Sooty mold may be the first indication of an aphid infestation.

## How to Scout

Occasional aphids can be ignored. If you begin to notice high populations and sticky leaves covered with sooty mold, you should indicate such in the comments section.

# Sweetpotato Whitefly

## Description of Insect

Adult whiteflies are less than one eighth of an inch long and covered with a white waxy powder. They spend most of their time under foliage but will fly when disturbed. Adult females lay eggs that hatch into tiny "crawlers". When crawlers find a suitable feeding site, they attach themselves to the leaf and become immobile. At first glance these immobile, immature whiteflies resemble aphids. They are yellow, oval and flattened. When development is complete, adults will emerge leaving behind an empty, oval-shaped "skin" attached to the leaf.

## Description of Damage

Whiteflies damage plants by sucking juices from foliage resulting in leaf yellowing and stunted growth. However, the most obvious symptom of a whitefly infestion is black, sticky foliage. Like aphids, when whiteflies feed, they exude a sticky substance know as "honeydew". A black fungus called "sooty mold" grows on the honeydew giving the peanut foliage a dark color. The fungus does not directly damage plants but, if abundant, it can block out light and reduce photosynthesis. Heavy infestations of whiteflies can kill mature peanut plants.

How to Scout

If, while scouting for other insects, you notice the above symptoms, record your observations in the comments section.

## BENEFICIAL INSECTS

Insect pests are vulnerable to a vast array of natural enemies. These natural enemies are always at work but are not always able to keep pests from damaging crops. The success of natural enemies depends on environmental conditions and the crop production practices of man.

Control of insect pests by biological agents is the first line of defense in a sound insect control strategy. There is a wide array of beneficial insects, spiders, and disease organisms present in peanut fields that help control peanut pests. Physically moving beneficial organisms into a peanut field is not practical. However, avoidance of practices that unnecessarily reduce naturally occuring beneficials will allow them to work to their maximum potential.

As a scout, you can provide information on beneficial organisms that will help farmers make treatment decisions. Most beneficial organisms are very mobile and, therefore, difficult to count. However, carefull observation will give the experienced scout a good idea of the abundance of beneficial organisms. Most importantly, you should know enough about beneficial insects that

they don't misidentify them as pests.

Beneficial insects can be broadly categorized into parasitoids and predators. Parasitoids are typically smaller than their prey and require only one host for complete development. Adults lay eggs and the developing larvae may feed either internally or externally depending upon the species. The parasitoid generally kills its host, but not as suddenly as that of a predator. A good example of a parasitoid is the Braconid wasp.

Predators on the other hand, are generally larger than their prey and require several hosts to complete their development. They are free-living and generally are found in great abundance in nature. Lady beetles, big-eyed bugs, and spiders are good examples of predators.

Braconid and Ichneumonid Wasps

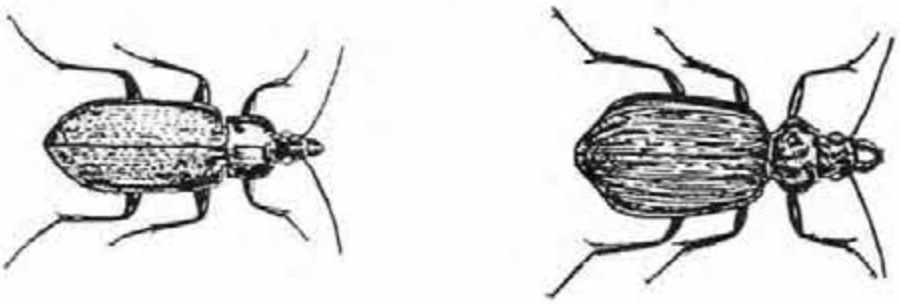
braconid wasp

ichneumonid wasp

These small wasps do not resemble wasps that sting man. They are much smaller and rarely noticed. Female wasps lay eggs in their host where larvae develop. Pests are sometimes completely

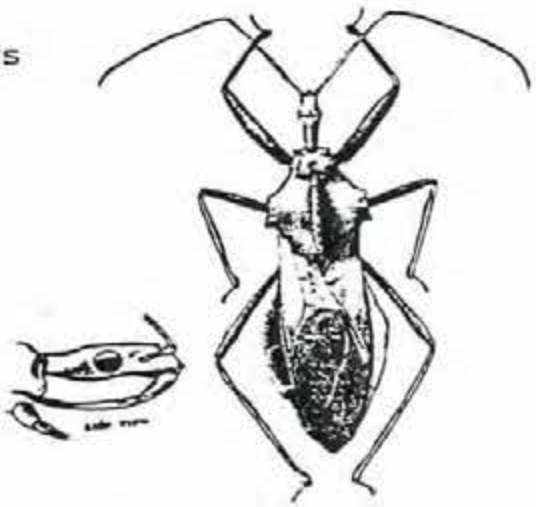
destroyed leaving only a mass of silken cocoons containing braconid wasp pupae. These masses of yellow silken cocoons are a common occurance in peanut fields.

## Ground Beetles



Several species of ground beetles prey on foliage feeders, especially cutworms. Both adult and larval ground beetles are predacious. The adults are about one inch long and black, sometimes with specks of brilliant colors (Plate 2). They have longitudinal groves in their wing covers. They may run rapidly when disturbed, but seldom fly. Larvae are soft-bodied and dark colored.

## Assassin Bugs



There are several species of assassin bugs you may encounter in a peanut field. In general, they are brown or black and have a beak

that extends below their body and between their legs. This beak is used to suck out the juices of other insects. One common species is known as the wheel bug. It has a semi-circular crest on its back that has spurs and resembles a cogwheel or gear.

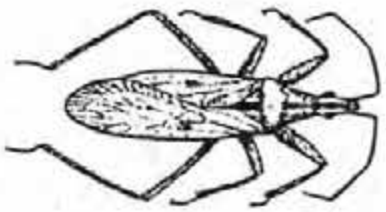
Lacewings

larva

eggs

Lacewings are easily recognized by their delicate, lace-like wings which are held over their bodies like a roof when at rest. There is a green and a brown species but the green species is most common. Immature lacewings, called aphidlions, have no wings and big jaws that look like forceps. Both adults and larvae feed on other insects. Eggs are laid individually on the tip of long filaments attached to foliage. You may occasionally find eggs when scouting peanuts.

## Damsel Bugs



Also called nabid bugs, these slender, tan or brown one half inch long insects are common in peanut fields. The front legs are adapted for grasping and holding prey. Nymphs resemble adults but have no wings. Both adults and nymphs feed on many different types of insects including leafhoppers and small caterpillars.

## Big-Eyed Bugs

Adult big-eyed bugs are black with clear wings that take on a silvery appearance. They are slightly less that 1/4 inch in length. Nymphs are silver or gray with small black specks. Both adults and nymphs have large, bulging eyes. Adults and nymphs feed on soft-bodied insects, small caterpillars and insect eggs.

## Lady Beetles


adult


larva

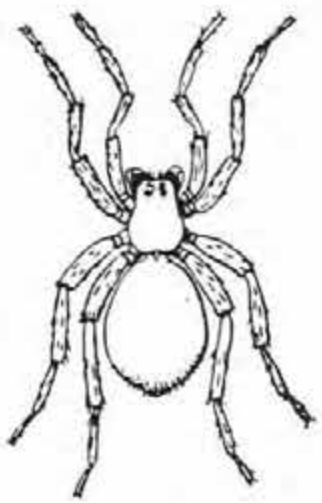

pupa


eggs

Several species of lady beetles are predacious on harmful insects. The adult lady beetles are hemispherical in shape, usually red or yellow with black spots. They may also be referred to as lady-bird beetles or lady bugs. Orange or yellow spindle-shaped eggs are laid in clusters on foliage. These eggs hatch into flattened, brightly colored larvae. Adults and larvae feed primarily on aphids but also feed on eggs of insect pests.

## Spiders

Although not true insects spiders are important predators of insect pests. Spiders have 4 pairs of legs and 2 body regions (insects have 3 pairs of legs and 3 body regions). There are many different species all of which are predacious. Each species has its own unique method of capturing prey.



# PEANUT DISEASES

G. Boyd Padgett, Extension Plant Pathologist

There are several diseases which can be found on peanuts in Georgia. However, only a few occur frequently and cause economic damage.

It is important to understand that diseases are controlled by prevention. Once a disease is found in a field, usually nothing can be done to control it. Recognition of diseases and evaluation of them is to determine effectiveness of current control programs and to plan control practices for the next peanut crop.

## Leafspot Diseases

The most common diseases of peanuts are leafspots. Until about 1975, only one leafspot disease was commonly found in Georgia peanut fields. This was early leafspot, caused by Cercospora arachidicola. Since that time, late leafspot caused by Cercosporidium personata, has become the predominant leafspot disease.

These two diseases are very similar in appearance. A microscopic examination is usually necessary to positively identify the specific fungus. However, a reasonably accurate diagnosis can often be made without such an examination. Early leafspot spots are usually tan to brown or reddish-brown and often surrounded by a yellow halo. Spots of late leafspot are darker in color, often

nearly black. A halo is often less obvious or absent. However, the presence or absence of a halo is not a reliable characteristic for distinguishing between these two diseases.

Some types of chemical injury are often very similar in appearance to leafspot. Although it is sometimes necessary to examine the spots under a microscope to identify the cause, there are certain guidelines which will allow you to separate leafspot disease from chemical injury.

The more or less sudden appearance of spots on leaves where none or few were seen before is almost certain to be chemical injury. This is particularly true if pesticides were applied a few days before the spots appeared.

Chemical injury is most likely to occur on leaves directly exposed to pesticide sprays. This is normally the top, youngest leaves on the plant. Leafspot disease is more likely to be on the older, lower leaves.

Look to see if there is any type of pattern to the spotting. Pesticide injury often occurs on the ends of rows, where sprayers are turned around. Pesticide injury is commonly found on leaflet margins.

Look at the spots in indirect light. Spots caused by chemical injury will usually be shiny and have a white chemical deposit in them. Leafspot will be dull.

Evaluation of Leafspot Control: The average peanut grower spends over $50 an acre to control leafspot. Yet, most have little idea of the effectiveness of their control program. A leafspot

control program can and should be evaluated. The procedure is relatively simple and, unlike scouting for insects, leafspot counts have to be made only once.

It is important to remember that the main purpose of evaluation is to determine the effectiveness of your current control program. This will alert you that changes may need to be made in the future. Leafspot evaluations are made near digging.

Evaluations should be made for each individual field. Do this one to two weeks before digging. Make the evaluation in at least 3 places in each field.

Evaluations should be made using the 1-10 scale of the Florida system listed below. Walk out in the field in random location and make a visual inspection and estimate of the leafspot. Make a general inspection of about 50 feet of row. Then pull back the vines in two or three locations in this 50 feet to estimate any leafspot on the lower limbs and leaves.

1. No disease.
2. Very few spots (none on upper canopy).
3. Few spots (some on the upper canopy).
4. Some spots with more on upper canopy and slight defoliation noticeable.
5. Spots noticeable even on upper canopy with noticeable defoliation.
6. Spots numerous and very evident on upper canopy with approximately 50% defoliation.

7. Spots numerous and approximately 75% defoliation.
8. Upper canopy completely covered with spots and approximately 90% defoliation.
9. Very few leaves remaining and those covered with spots, some plants completely defoliated.
10. Plants dead.

If the evaluation is "3" or less, control is excellent. Keep up the good work!

If it is more than "3", but no more than "5", control is fair. There are some weak places in your fungicide scheduling. You may have missed a spray, stretched the interval more than 14 days, stopped spraying too long before digging, etc. Try to find out what the problem may be and plan to correct for next year.

If the evaluation is more than "5", your control program is poor. You probably have not followed a good program at all: started too late, missed several sprays, used a fungicide not recommended, etc. Contact your local county extension agent and read the current recommendations for leafspot control.

## White Mold Disease

White mold is the most common soil-borne peanut disease in Georgia.

Identification. White mold is a mid- to late season disease.

Symptoms of this disease are usually not seen before late July. The first symptoms are a yellowing and wilting of one or more branches. Sometimes the disease may kill only one or two branches on a plant, but usually the entire plant yellows, wilts and dies. Dead plants will have a dry, brown lower stem and crown. White mold does not spread much beyond the first few plants in any one spot. If more than 10-12 plants are dead in one spot, it probably two or more infection areas that have joined.

During wet weather, the stems of diseased plants and the soil around them are often covered with a dense white, fungus growth. Small, tan to brown structures called sclerotia usually develop on stems and leaves.

Evaluation: The best time to evaluate a field for white mold is 24-48 hours after digging. At that time entire dead plants can be easily separated from plants with only one or two dead branches. If the entire plant is not dead, it should not be counted.

White mold evaluation is made by counting the groups of dead plants in 100 feet of row. Each group of dead plants is called a "hit". One hit may include one to five or six dead plants. Whenever there are enough adjacent dead plants to make up a group longer than one foot, it should be counted as follows: over one foot to two feet = 2 hits; over two feet to three feet = 3 hits; and so forth.

Make these hit counts in at least four random locations over the field. To avoid bias, make counts something like the following. Decide before you get to the field that your first count will be

made on the 20th (or 23rd or 30th etc.) windrow from the edge of the field or a telephone pole or some known starting point. Walk down this row 50 to 75 steps and make the first count. Then walk over some pre-selected number of windrows, angling towards the other end of the field as you walk. Continue picking locations like this until you have made at least four counts and covered most of the field. At each location, mark the 100 feet of row, then count the hits in the windrow for this length.

Add up the hits for each location counted and divide this total by the number of locations you counted. Then since you counted the hits in a windrow, divide this average by the number of individual rows in a windrow to; get the average number of hits in 100 feet of one row.

If the average is 5 hits or less, the control program is good. If it is 6 to 9, the control program is fairly good, but cultural control practices should be examined for possible improvement. The rotation might need to be lengthened. If the crops between peanut crops are not grass or grain crops, these should be considered.

If the average number of hits is 10 or more, the control program is poor. A better rotation may be necessary. Chemical control may be necessary also.

## Rhizoctonia Limb Rot

Rhizoctonia limb rot is a relatively new but serious disease of peanuts in Georgia. It is a late season disease. Symptoms usually

do not show up until the last 3-4 weeks before digging.

Limb rot is a wet, cool weather disease. It occurs almost entirely in irrigated peanuts. Even under irrigation, this disease is most severe when there are several days of cool, rainy weather in late August or September.

Limb rot is usually not noticed until the peanuts are dug and inverted. This disease rarely kills plants. Limbs that were in contact with the soil or near the soil will be black and rotten. Before digging, look for disease by pulling back the top branches. Disease usually begins with a small, reddish-brown lesion on a branch in contact with or near the soil. From these small lesions, the disease progresses up and down the branch. Rhizoctonia limb rot is also more common where injury occurs, such a tractor tire running over the vines.

Dead branches can completely disintegrate. During wet conditions, fungus growth will completely cover dead branches and leaves and form a mat on the soil.

At this time there is no method of evaluating Rhizoctonia limb rot. Nor is there any effective control method.

## Pod Rots

As peanuts approach maturity and plants are pulled up to make maturity assessments, rotten pods may be noticed. This a disease commonly called pod rot, but this is a complex problem involving soil fungi, nutrition and probably other factors.

Plants with root and stem diseases may also have rotten pods. In these disease situations, branches and entire plants will be dead along with the rotten pods. With the disease being described here, there will be no plant symptoms. Only the pods will be rotten.

Pods of any size may rot, but most commonly only full size pods rot. Rot usually starts at the apical end (the end away from the stem attachment). Pods may be partially or completely rotten.

Pod rot is most commonly associated with a calcium deficiency or calcium imbalance in the soil. If more than a few pods are rotten in a field, take soil samples to check for calcium related problems.

## Tomato Spotted Wilt Virus Disease

Tomato Spotted Wilt Virus Disease (TSWV) is a new peanut disease in Georgia and the Southeast. It was first found on peanuts in Georgia in 1986. Since that time it has become common in virtually every peanut field. TSWV is capable of causes serious yield losses. However, at this time (1991) losses to this disease have been very minor. There is a definite possibility that TSWV could become a very destructive disease.

Identification. Symptoms can be seen anytime after plants emerge. A wide range of symptoms can occur as a result of this disease. The first symptoms appear on new leaves in one or more terminals. New leaves may have light green and yellow mottling,

light green to; yellow ringspots and streaks, or dark brown rings and line patterns.

Terminal buds on some plants die, but older leaves often remain green. Plants infected early in the season are severely stunted or killed.

Older plants, particularly near maturity, may suddenly turn yellow, wilt and sometimes die without developing distinct leaf symptoms. These plants usually have a rotten root system.

Only a few small pods are formed when plants are infected early in the growing season. Kernels produced on infected plants may have discolored seed skins, partly or completely red.

TSWV is transmitted or carried from plant to plant by thrips. Research to date in Georgia to date does not show any benefit in TSWV control from insecticidal control of thrips.

## Nematodes

Nematodes can cause serious economic problems on peanuts, but economically damaging nematodes do not occur in every field. Nematodes are the one disease causing problem that can be identified before the crop is planted in the field. Identification of this problem cannot be predicted with absolute accuracy, but taking soil samples at the correct time and in the proper way can be a highly accurate method of determining potential problems. Soil sampling for nematodes should be part of any good pest management program.

Identification. Nematodes feed on pods and roots. When nematodes feed on the roots, this reduces the ability of the roots to take up water and nutrients. Plants attacked by nematodes frequently appear to be suffering from lack of moisture or fertilizer even when these are present in adequate amounts.

Typical above ground symptoms are stunting, yellowing, loss of vigor, general decline and sometime death of the plant. Nematode injury in a field is rarely uniform. Symptoms usually occur in scattered areas over the field. If these symptoms occur, take soil samples. Nematodes may sometimes cause yield losses without showing above ground symptoms.

The nematodes causing economic damage to peanuts in Georgia are root knot nematodes. A number of other different types of nematodes are usually identified in soil samples: lesion, stunt, spiral, ring, lance, etc. However, these do not cause economic damage to peanuts in Georgia.

Three types of root knot nematode feed on peanut roots and pods and cause damage: peanut, Northern and javanese. Of these, the peanut root knot is the most damaging and by far the most common in Georgia. Northern and javanese root knot are rarely found in peanut fields. Peanut root knot causes galls or knots on roots, pods, pegs and pod stems. When pegs or young pods are fed on, they are greatly distorted. Knots in the roots appear much like nitrogen fixing bacterial nodules. Nodules can be easily broken off the side of a root. Root knot galls cannot be broken off without breaking the roots in two. Even if these symptoms are

seen, soil samples should be taken. Soil samples are the most accurate way to determine nematode problems.

Taking soil samples. Soil samples should be taken to confirm suspected nematode problems, to help diagnosis growth problems in a field and to best manage pest problems.

The best time to take samples is in late summer when a crop is growing in the field. Samples for peanuts are most accurate if taken when peanuts are growing in the field, but may be taken when other crops are in the field, if peanuts are to be planted the next year. Generally, soil samples may be taken in the fall, up until early December. After this time the population of identifiable nematode stages fall so low that root knot nematodes may not be detectible.

The amount of soil submitted for nematode analysis is extremely small when compared to the volume of soil in an entire field. For this reason, if the sample is to accurately reflect the nematode situation, it must be taken correctly.

Soil moisture should be about right for good seed germination when the sample is taken. Take the sample form within the crop row. If a crop is not present, take the sample randomly over the field. Use a soil sampling tube and take small amounts of soil 2 to 8 inches deep. Collect soil from at least 10 different location. One sample should represent no more than 5 to 10 acres. Mix the soil one sample in a bucket. Put about one pint of this in a plastic bag. Number each sample as a key to location.

Take the samples to your county extension agent. It will be

sent to the Extension Nematology Lab. The answer you receive will identify any nematodes present and tell you if any control measures are needed.

# WEED MAPPING

Steve M. Brown, Extension Agronomist-Weed Science

Weed scouting does not require a lot of time but it provides the basis for many weed management decisions. Scouting or surveying fields and set aside acreage for weeds aids in the selection of weed control programs in present and future crops.

Tools for proper weed scouting include: 1) basic skills and references in weed identification, and 2) a notebook or field map on which to record observations. Often, "windshield" surveys from a pickup or a tractor are adequate in assessing weed infestations in a particular field, but curious, isolated weed patches may require spot checking on foot.

Weed identification or recognition skills are essential in scouting for weeds. Correct identification even to the species is important. For example, one needs to be able to distinguish between such closely related weeds as yellow and purple nutsedge, sicklepod and coffee senna, and a dozen or so morningglories. Identification aids are available from numerous sources--County Extension offices, farm supply dealers, and public libraries to name a few. For weeds not readily recognized, scouts should seek help to verify identity.

Severity of infestations is also worth noting. If a weed occurs in sparse numbers or if populations are extremely heavy, record it.

Written notes are a must. Methods of documentation can vary but the key is to WRITE IT DOWN in some form for permanent reference.

After the fact, what was clear in your mind one day may become a jumble within a few more.

Early season weed observations in peanut fields play a role in determining remedial postemergence treatments. Farmers routinely make these inspections when generally surveying the crop or making fungicide applications.

Records of weed infestations late in the season provide a field history of what problems can be expected in subsequent years. Knowledgeable scouts can provide this added service as the cropping season nears completion. Weed maps, surveys, and written notes provide a record of weed infestations in specific fields. Fields, including set aside land, in which peanuts may be planted in following years should also be monitored.

Such information helps a producer determine, among other things, what residual herbicides might be necessary in future crops or even what crops might be feasible. Proper records allow a producer to decide such questions as: Do I need to include residual herbicides for purple nutsedge control? Might I save $20 or more and leave off certain residual measures altogether and just get by with postemergence treatments for control of certain broadleaf weeds?

Weed scouting and surveying is a key element in planning and implementing economical, effective weed control programs.

## GENERAL SCOUTING PROCEDURES

Before you scout your first peanut field of the season, make sure you understand which field(s) the farmer wants scouted. Also, make sure you and the farmer are in agreement on your payment. We recommend that peanuts be scouted once per week. If the farmer requests a different schedule, you may need to adjust your fee. If he requests a scouting interval of greater than one week, you may want to inform him that damage may not be detected in time to prevent economic damage. Work out a routine by which you deliver your scouting reports to the farmer or county agent. **You have not completed your job until the report is delivered.**

How you scout an individual peanut field varies according to the situation. Insect problems are rarely uniform across a field. If they were, you could sample one site and know what's happening in the entire field. The number of sample sites you should visit per field depends on the size of the field and the amount of variation in terrain, soil type, etc. Ten sites will be adequate for most 40-80 acre fields. If a single field contains differences in irrigation, peanut variety or planting date, you may want to scout the different areas separately.

Your sampling procedure (how you select scouting sites within a field) should be designed to give an accurate indication of the insect situation in the field as a whole. Never establish a sampling routine that gives information on the same sites week after week. Vary your pattern.

Some problems, such as spider mites and hopperburn typically begin on the field border. Make sure your sampling includes field borders. If possible, visually scan the entire field and investigate possible problems.

Soil moisture is extremely important to soil insects. If a field has differences in terrain, make sure you sample high spots as well as low spots. If 30% of the sites you check have southern corn rootworms, and all of sites that had southern corn rootworm were in one low corner of a field, you should indicate such on the scouting report.

The following diagrams illustrate different sampling procedures. In Figure 1, the scout has selected 10 sites to include on his scouting report. Those ten sites include both high and low sections of the field and field borders. In Figures 2 and 3 the field includes a center pivot irrigation system. In Figure 2, the scout has chosen to include all ten of his sample sites on one report. He has sampled in the irrigated and non-irrigated portions of the field as well as in high and low areas. In Figure 3, the scout has chosen to make two reports, one for the irrigated portion of the field and one for the non-irrigated. Either method is acceptable as long as the method is clearly indicated on the report. If distinct difference become apparent in the irrigated and non-irrigated portions of the field, separate reports would be more useful in making management decisions. **Be observant and don't hesitate to change your sampling procedures if it will make your information more useful.**

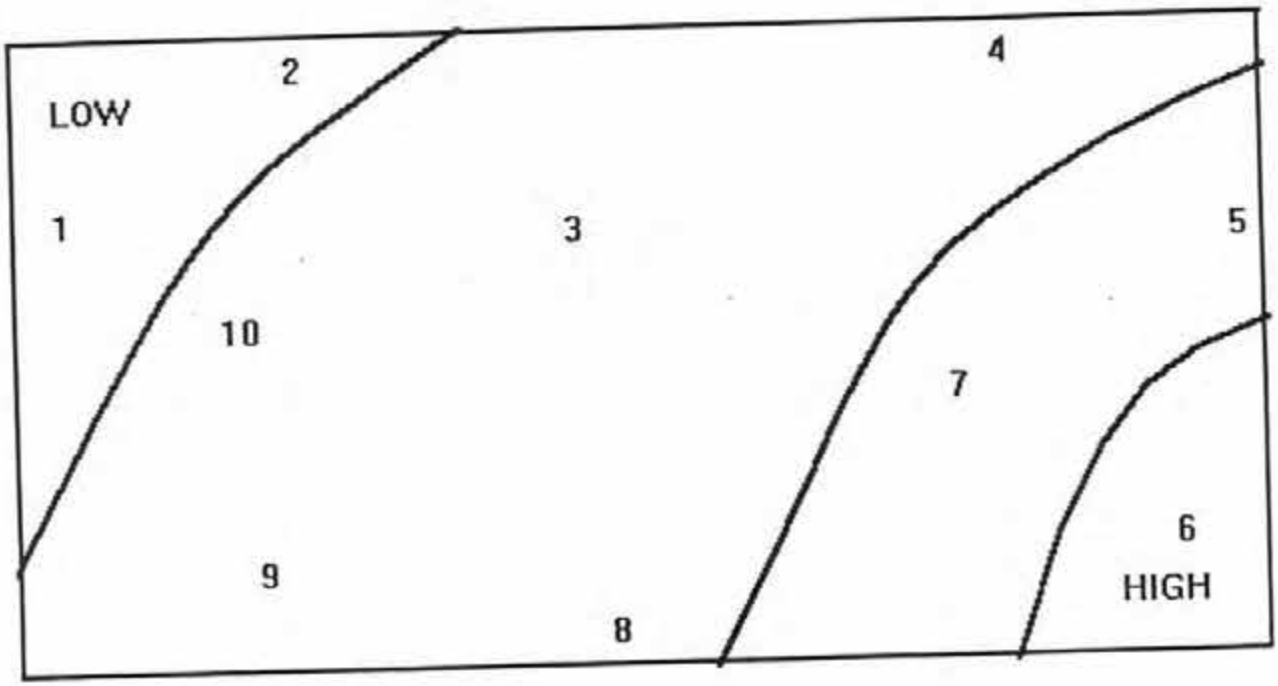



Figure 1.

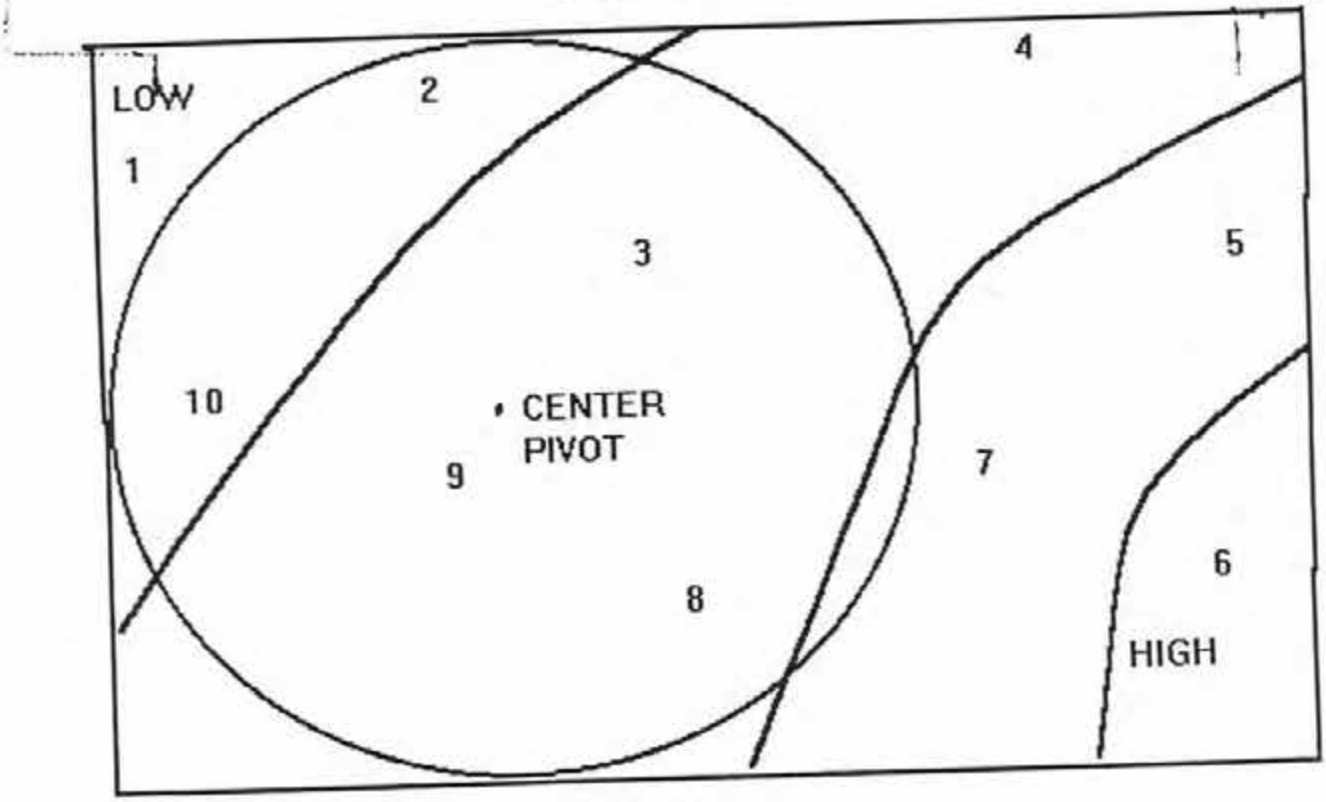



Figure 2.

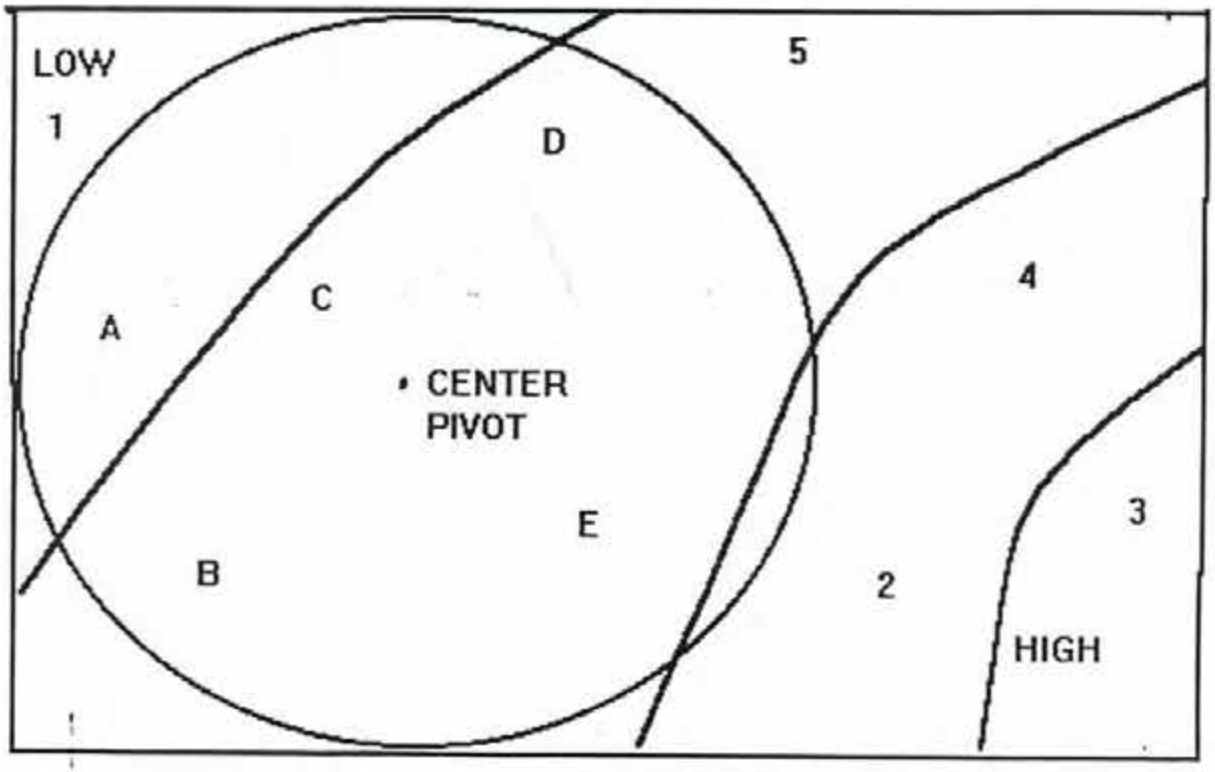



Figure 3.

## SCOUT SAFETY

Scouting peanuts is not a dangerous profession. However, there are several potential dangers that you can avoid with common sense. You will likely travel to some remote places when you scout peanuts. It is a good idea to let someone know your weekly route so they will know where to look if you are missing.

Heat is the greatest threat to the safety of peanut scouts. You will be working in some very hot places. Always carry something to drink in your vehicle. Drink often to replace body fluids and take occasional breaks to cool off.

It is a good idea to carry a first aid kit in your vehicle in the event of minor cuts, abrasions or insect stings. Use a suntan lotion to protect your skin from excessive exposure to the sun.

Several toxic pesticides may be used in peanut fields. However, with a little common sense, your exposure to them will not pose a health hazard. Communication with the farmer is important. The farmer should inform you when a pesticide has been applied or is about to be applied. Unless you are wearing specific protective equipment, you must stay out of treated fields for a certain amount of time (see list of field re-entry intervals below). It is the grower's responsibility to inform you if you should not go into a field.

Granular insecticides may have been placed in the furrow, with the seed, at planting time. Although these pesticides may be extremely toxic, you will not be exposed during routine scouting.

These granular insecticides will be gone several weeks after planting. If, for some reason, you must dig in the seed furrow within a month after planting, wear rubber gloves to protect your hands.

Even though some pesticides are almost non-toxic to humans, you should never put yourself in a position of being exposed to direct application. If a spray plane arrives while you are scouting, get out of the field! The pilot may not see you.

To reduce your degree of exposure to pesticides, always were long pants, long sleeve shirts socks and shoes (no sandals or flip flops). Wash your hands after scouting and before eating.

Re-Entry Intervals for Commonly Used Peanut Insecticides
(Without Protective Equipment)

| Insecticide | Re-Entry Interval (hrs.) |
|---|---|
| Asana | 12 |
| Comite | 168 |
| Dyfonate | 48 |
| Lannate | 48 |
| Lorsban 4E | 24 |
| Lorsban 15G | 12 |
| Orthene 75S | 24 |
| Sevin | 12 |
| Temik | 48 |
| Thimet | 48 |

## TERMINOLOGY USED IN THIS MANUAL

## (AND OTHER TERMS YOU MAY HEAR AROUND PEANUT FARMERS)

**Abdominal prolegs-** the fleshy legs found under the abdomen of a caterpillar. There may be two, three, or four pairs.

**Additional Peanuts-** Peanuts not included in the government price support program. These peanuts will not be worth as much as quota peanuts.

**Aflatoxin-** A toxin produced, under certain conditions, by a fungus that sometimes infects peanut pods and kernels.

**Anal prolegs-** the pair of fleshy legs found on the rear end of a caterpillar.

**Cable Tow-** An irrigation system consisting of a spray gun which is pulled along a cable.

**Center Pivot-** An irrigation system which move in a circle around a fixed center.

**Cotyledons-** The two halves of a peanut seed are cotyledons. They provide energy for the young peanut plant before it is able to survive on its own.

**Hull Scrape**- A method by which peanut farmers determine the best time to harvest.

**Landplaster (or Gypsum)**- calcium sulfate which is used as a supplemental source of calcium for peanuts.

**Larva (plural larvae)**- an immature stage of some insects such as moths, butterflies and beetles. This stage is often the most destructive and usually has an entirely different appearance than the adult stage.

**LSK**- a peanut grading classification referring to "loose shell kernels". These are kernels that have been prematurely shelled in the harvest or handling process.

**Nymph**- an immature stage of some insects such as leafhoppers and true bugs. Nymphs often resemble adults except they are smaller.

**Parasitoid**- an insect that feeds on another insect, consuming most of its tissues and eventually killing it. Usually, only one host is required to complete the parasitoid's life cycle.

**Peg**- the extension of a peanut flower that penetrates the soil and swells to form a pod.

**Pops-** pods with underdeveloped kernels, usually due to a lack of calcium.

**Predator-** an insect that attacks and eats other insects. Usually, many prey are required to complete the predators life cycle.

**Quota Peanuts-** Peanuts grown under the government price support program. These peanuts will bring a better price than additional peanuts.

**Runner Peanuts-** the primary market type of peanuts grown in the Southeastern United States. Runner peanuts are used mostly in peanut butter and candies. Kernel size of runners are intermediate between the Virginia and spanish types. "Runner" also refers to growth habit of the vines.

**SMK-** a peanut grading term referring to "sound mature kernels".

**Spanish Peanuts-** one of four market types of peanuts. These are primarily grown in the Southwestern United States (Texas and Oklahoma) and have a smaller kernel size than runner peanuts.

**True legs (thoracic legs)-** The three pairs of legs found under the front end of an insect larvae. These are the legs that are retained in the adult stage.

**Twin rows-** a row pattern option whereby two rows (or twins) are planted 7 to 10 inches apart. There are usually two sets of twins per bed.

**Valencia Peanuts-** a market type of peanuts very similar to the spanish type except it has 3 or 4 kernels per pod. The kernel skin of Valencia peanuts is also darker in color than spanish peanuts. Valencia peanuts are grown mostly in New Mexico.

**Virginia peanuts-** The largest of the four market types of peanuts. Those peanuts are produced primarily for in-shell roasting or as a snack peanut. Virginia peanuts have a large kernel size and are grown mostly in Virginia and North Carolina.

**Ent. 95-001** **Peanut Scout Handbook**