Timely detection, correct identification, and good management of soil insect pests are critical issues for peanut producers because subterranean insects cause direct yield loss by feeding on peanut pods and kernels. Among the dozen peanut insect pests that feed on various parts of the plant, about half of the insect species are associated with soil and occur sporadically in all peanut production areas of Alabama.

This publication provides general information about the identification and biology of some key soil insect pests of peanuts, as well as a brief explanation of their feeding injury and natural control (where known). Specific insecticidal recommendations are available in the Alabama Pest Management Handbook (Vol. 1), published by the Alabama Cooperative Extension System.

Characteristics of Soil Insect Pests

Peanut pests that live in soil generally feed as immature insects (e.g., caterpillar, grub, nymph); very commonly, the adult insects are not threatening to crops. The distribution, relative abundance, and seasonal activities of insects are largely moderated by specific soil conditions. Some soil insects that attack peanuts have unique life cycles characterized by multiple host ranges, excellent mobility and host finding abilities, and prolonged development period during unfavorable conditions.

Burrower Bugs (Hemiptera: Cydnidae)

Occurrence

Out of the twenty-seven species of burrower bugs that are known to be crop pests, only six species have been reported from peanut producers in several states. The predominant species is Pangaeus bilineatus, which causes direct kernel feeding injury. The first report of damage to peanuts caused by P. bilineatus was from Georgia in 1959; at the time, it caused a 20 percent reduction of crop yield in the state. In southeastern Alabama, heavy infestations of P. bilineatus have been observed since 1966; high burrower bug infestations result in poor marketability of the peanut kernels.

Host Range

Peanut, cotton, strawberry, pepper, spinach, and many other cultivated and wild plants can serve as hosts for burrower bugs.

Identification and Life Cycle

Burrower bugs are small black or brown insects (figure 1) that are extremely mobile. Their wings are partially hardened near the wing base and overlap at rest. The burrower bug has a small head that bears a pair of multisegmented antennae and needle-like mouthparts. The tibia (long shaft of insect leg) has numerous spines. Research from South Carolina and Texas indicates two peaks in population: May to June and again in July to August. Light traps have been effectively used to detect and forecast field populations. Females oviposit near roots and pods by depositing single eggs in soil.

Overwintering Stage

Adult burrower bugs hide under rocks, crop stubble, volunteer plants, and decaying wood for winter protection.

Damaging Stages and Feeding Injury

Burrower bugs have been controlled with conventional tillage practices and common use of soil insecticides; however, in conservation tillage systems,
burrower bugs can become a sporadic pest that feeds on maturing peanut kernels late in the production season. Adults and nymphs have piercing-sucking mouthparts that are inserted into maturing kernels during feeding. Peanut kernels develop light yellow to dark brown lesions as a result of this feeding; the damage is called “pitting” (see figure 2). Extensive feeding causes loss of kernel weight and decreases the number of sound kernels. Research indicates that 30 percent of kernel feeding is associated with a 1.2 percent increase in damaged kernels. Direct examination of pods is the most reliable method of sampling.

**Natural Enemies**

Only one parasite (*Triozocera Mexicana*) on burrower bug adults and nymphs and one predator (*Solenopsis xyloni*) have been reported active in peanut fields. Some other surface-dwelling predators like ground beetles androve beetles may feed on small nymphs. However, the economic impact of beneficial arthropods is unknown.

**Management Tips**

- Do not strip-till peanuts into corn or wheat stubble to reduce the risk of feeding injury.
- Till in the fall, before planting.
- Destroy volunteer plants throughout the season for lower population buildup and risk to subsequent crops.
- Apply granular insecticides at pegging (early July).

**Whitefringed Beetles (Coleoptera: Curculionidae)**

**Occurrence**

This insect is a native of South America. It was first reported in Florida in 1936, but it is now present in over a dozen states, its dispersion facilitated by commercial activities. There are several species of *Naupactus* that can occur simultaneously in peanut fields. In Florida, a species complex, consisting of *N. leucoloma, N. minor*, and *N. peregrinus*, has been found in peanut fields.

**Host Range**

Immature stages of the insect can feed on over 350 different host plants, including peanuts, cotton, cowpea, alfalfa, cole crops, okra, beans, and various grasses and sedges. The whitefringed beetle is a major insect pest of sweetpotatoes in central and north Alabama where feeding injury occurs late in the season.

**Identification and Life Cycle**

Immature stages of this insect are plump, C-shaped grubs with a reduced, brown head that bears strong mandibles (figure 3). The grubs are legless, white to cream in color, with deep folds in their skin. Larvae may molt eleven times before becoming an adult. Larvae pupate in earthen galleries and emerge as adults in late April to late July (pupation period ~13 days). Body color of the adult beetle is light to dark gray, with a faint white stripe on each side. Although usable hind wings are present, the fused fore wings that protect the softer hind wings render this insect incapable of flight.

Adults emerge from soil in early May, and emergence could continue throughout the production season. All adult beetles of *Naupactus* in the United States are females; the male forms have only been described from native populations in South American countries. Female beetles can live for 2 to 5 months and reproduce parthenogenetically (i.e., daughters are clones of their mother). White eggs are laid in clusters (up to sixty eggs per cluster) on plant stems and organic residue, or simply inserted into the soil at <1 inch depth. Eggs turn yellow near hatching (~17 days in summer), and the entire life cycle is about 1 to 2 years (i.e., grubs can survive multiple seasons).

**Overwintering Stage**

Larvae or grubs move to a depth of 10 to 12 inches in the soil for overwintering. Eggs laid in soil can also overwinter. Grubs move within 3 to 4 inches of the soil surface to pupate.
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**Damaging Stages and Feeding Injury**

Soil-dwelling grubs are most injurious to peanuts. Both adults and grubs have chewing mouthparts. Feeding injury by grubs resembles root injury caused by wireworms, rootworms, and white grubs. Yield losses could be significant due to heavy stand losses early and mid-season. Larvae cause large irregular holes in the taproot, and this injury can be fatal to the plant. Adult beetles may feed on peanut foliage causing “notches” along the leaf margin, but the economic impact of this feeding behavior on yield is insignificant. Population buildup of whitefringed beetles can occur rapidly.

**Management Tips**

- Limit planting leguminous crops like peanut and soybean in heavily infested areas. Growing grassy crops (like oats) may inhibit movement of grubs in soil. Long rotations (3 to 4 years) may also prevent buildup of this insect.
- Broadcast and mix broad-spectrum preplant insecticides already labeled for use in peanuts with the top 3 to 4 inches of soil for some control of this insect. Insecticide application timing should coincide with the emergence of adults in the field (look for notching on leaves). There are no labeled insecticides for controlling this insect.

**Southern Corn Rootworm (Coleoptera: Chrysomelidae)**

**Occurrence**

This insect is present throughout the United States and feeds on a variety of crops. The southern corn rootworm (SCRW), *Diabrotica undecimpunctata howardi*, is the immature form of the spotted cucumber beetle. The southern CRW belongs to the large family of root-feeding insect pests and is also closely related to the northern CRW, western CRW, and the striped cucumber beetle.

**Host Range**

SCRW has over 200 host plants, including cultivated crops and weeds. This insect is considered a major pest on corn, sweetpotato, and peanut.

**Identification and Life Cycle**

The adult beetle is easily seen with the naked eye and can be distinguished by the spots on its elytra (hardened fore wings). There are twelve irregular spots on the greenish yellow back of the beetle (figure 4). Adults mate in the field or in the field borders, and eggs are laid in the soil at the base of suitable host plants. Adult females are reproductive throughout the year, except in November and December (when females enter diapause). Eggs hatch into cream-colored larvae that are about 0.7 inch in length when fully grown. The larvae are elongated and have three pairs of legs that provide the insect high mobility. The head and terminal abdominal segment of larvae are dark brown. Total developmental time is 30 to 40 days, and more than one generation may occur in southern United States.

**Overwintering Stage**

Beetles diapause in November, but the diapause interval is short and beetles emerge quickly early in the spring. Research indicates that most overwintering populations consist of female beetles that rapidly lay eggs and start fresh infestations.

**Damaging Stage and Feeding Injury**

SCRW is a sporadic insect pest of peanut in Alabama. Larvae can make one or more holes on the side walls of a peanut pod in order to access the kernels (figure 5). Soils with high organic matter and those that hold moisture (clay soils) have been associated with infestations in peanut fields, probably due to increased survival of the immature stages under those conditions. The feeding activity of beetles may destroy seedlings in some situations, but leaf...
injury caused by beetles late in the season generally is not threatening to the crop. Larval infestations in soil should be thoroughly scouted during the pegging and pod development stages.

**Natural Enemies**

Some species of tachinid flies (e.g., *Celatoria*) are known to attack SCRW.

**Lesser Cornstalk Borer (Lepidoptera: Pyralidae)**

**Occurrence**

The lesser cornstalk borer (LCB), *Elasmopalpus lignosellus*, is one of the major insect pests of peanut crops in some parts of Alabama.

**Host Range**

A specific range of host plants is not known for this insect, but it occurs in hot spots throughout the state. Grain crops such as corn and sorghum, soybeans, field peas, and peanuts under droughty conditions can be seriously damaged by LCB.

**Identification and Life Cycle**

Larvae are about ½ inch in length and have a blue-green body. Larvae have brown or purple bands, which are unique to this insect (figure 6). The adult male moth is a grayish brown insect that sits with its wings folded over its body. The adult male moth’s fore wings also have a blackish edge and several spots. Female moths are gray, and the terminal abdominal segments have tufts of hair that are used to coat the eggs during oviposition (egg-laying).

**Damaging Stage and Feeding Injury**

Larvae generally feed at the soil-air interface or just below the soil line on various parts of the peanut plants, such as the leaves, stems, and pegs. Major damage is caused when larvae feed externally on the pods and make feeding holes to enter the pods. An identification characteristic for LCB is that it makes sand tunnels or silken tubes on the pod (figure 7). Crop injury could be severe on plants grown in sandy soil, and infestations are aggravated in hot dry weather. Larval feeding injury on the plant roots aids in the transmission of diseases, such as the southern stem rot (*Sclerotium rolfsii*), and also moderates aflatoxin levels in peanuts.

**Management Tips**

- It is very important to detect this insect early in the season so control measures can be undertaken in a timely manner. Scouting maps are available for LCB through the AWIS Weather Services Web site.
- Initiate chemical control measures at the first sign of pod-feeding and after LCB presence is confirmed in soil samples. Insecticides applied too early could have deleterious effects on predators and could cause pest resurgence. Minimize secondary pest outbreaks by applying granular insecticides at the pegging stage.

**Wireworms (Coleoptera: Elateridae)**

**Occurrence**

Several species of wireworms occur in peanut fields; an independent description for all species has been excluded from this fact sheet.

**Host Range**

This insect has several host plants, and, due to its extended life cycle, feeds on different growth stages of a given plant host.
Identification and Life Cycle

Wireworms are the immature stages of click beetles belonging to the family Elateridae. Wireworms are cylindrical in shape and have a dark brown body (figure 8). These are univoltine insects (one generation per year).

Figure 8. Wireworms in soil
(Photo courtesy of Frank Peairs, Colorado State University, www.insectimages.org.)

Overwintering Stage

Wireworms can have life cycles ranging from 3 months to 2 years; some species can live up to 9 years in soil. Wireworms overwinter many inches below the ground, which makes insecticidal control very difficult.

Damage Stage and Feeding Injury

Larvae start feeding on the underground parts of peanut plants in May. Wireworms are attracted to the carbon dioxide and heat given off by belowground plant parts; this attraction also depends on the nutritional status of the insect.

These insects often become a problem when peanuts follow sod. Thus, wireworms may attack the peanut crop early in the season, causing major stand loss. Wireworms make large entry holes in the pods to feed on the seeds. Pod injury symptoms from wireworms can look like SCRW injury, but wireworms are known to make larger entry holes on the pod than rootworms.

Management Tips

• Maintain a good crop rotation in order to reduce infestations. These insects have been reported to increase if peanut follows other row crops.
• For limited early-season control of wireworms, apply broad-spectrum insecticides such as chlorpyrifos. Very few chemical insecticides are available for wireworm management in peanut crops. Several species of wireworms also have a tendency to avoid treated crop seeds (behavioral resistance), and this is a cause of concern for crop producers.

Cutworms (Lepidoptera: Noctuidae)

Occurrence

Cutworms are migratory insects that can damage foliage as well as peanut pods by living at the soil-air interface. Several species of cutworms are found across the state; their common names indicate their appearance (e.g., black, spotted, variegated, bronzed). Most common species occurring in Alabama peanut fields are Agrotis ipsilon (black cutworm) and A. subterranea (granulate cutworm). Other species may also be prevalent depending on geographic location and crop rotation.

Host Range

Cutworms feed on over sixty different host plants and are considered one of the primary threats to peanut production in certain areas. In Alabama and elsewhere, cutworms feed on a variety of cultivated food crops as well as turf grasses and wild plants.

Identification and Life Cycle

Black cutworm moths are medium sized (1- to 2-inch wingspan) with dark fore wings and hind wings that are almost pure white with a gray lining. Adult moths feed on nectar and are harmless to peanut plants. Moths mate in wild vegetation and lay eggs singly or in clusters at the base of weedy plants. The caterpillars are sluggish, nocturnal insects, and they hide under the soil surface during the day. Black cutworms are greasy, black caterpillars that curl in to a C shape when disturbed. Caterpillars may undergo five to eight larval molts 20 to 30 days before diapause. The number of generations depends on the species and latitude; five to six generations have been reported from Florida.

Overwintering Stage

Depending on the species, cutworms can overwinter in the egg, larval, or pupal stages in soil. For example, dark-sided cutworms overwinter as eggs that hatch in the spring, resulting in delayed crop damage (gradual insect incidence). Black cutworms overwinter as pupae in an earthen cell, and moths emerge from the soil using subterranean galleries that open to the soil surface.

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**Damaging Stage and Feeding Injury**

Cutworm feeding activity is influenced by prevailing weather conditions, especially rainfall. Cutworms generally cut off young plants at the soil level; some species can climb plants to access the soft tissues (e.g., growing terminals and young leaves). Cutworms’ habit of injuring more plants than what they actually eat is of concern; this is especially true for black, bronze, clay-backed, and dingy cutworms. Their feeding may be intense in short, straight rows within the planted crop, making symptoms appear in patches.

Feeding injury at the peanut pod stage is characterized by the presence of a large entry hole in the middle of pods and complete absence of kernels. According to some reports, peanuts that have been dug and inverted may also be targeted by cutworms (yield losses are insignificant in this case).

**Management Tips**

- Look for caterpillars during dusk and dawn by turning up about 1 inch of soil beneath cut plants and along the affected row. Check for plants that have been dragged a short distance to a feeding hole.
- Check for wilting plants during the afternoon because severed plants will wilt during the day. You can use several colored flags to monitor feeding hot spots; increase in the diameter of a damaged patch will indicate cutworm activity.
- Keep peanut fields weed free. In recent years, the occurrence of cutworms has increased with the large-scale adoption of conservation tillage practices.
- Use chemicals for insecticide control when caterpillars are small. High mobility of cutworms within the soil and extended life cycle limit the efficacy of chemical control measures.