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Insect and Mite Pest Management in Florida Peanut[1]

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Introduction

Peanut (Arachis hypogaea) is one of the most important cash crops grown in the United States, with an estimated production value of over $1 billion. The southeastern coastal plains harbor most of the US peanut acreage from North Carolina to Texas. Florida is ranked among the top five major peanut producers in the United States, with 160,000 acres planted in 2022 and an annual production value of $130 million in 2021 (USDA-NASS). The majority of peanut acreage in Florida is in the Panhandle and central Florida, with Jackson, Santa Rosa, and Levy counties in the top three. Peanuts are affected by several insect pests that feed on various plant parts, including foliage, roots, and fruiting structures. Feeding by these pests can not only cause significant damage to the plant canopy and kernels but can also transmit diseases, reducing the overall quality and quantity of yield if not properly detected and managed. This publication serves as a guide for Extension agents and growers to provide an overview of proper sampling techniques and management for peanut pests found in the Florida Panhandle.

Peanut Pest Insects: Identification Guides

The ability to identify and recognize different insect pests and their associated damage in a peanut field is necessary for pest management. The primary pests of peanuts can be categorized into the following groups: foliage feeders and subterranean ("peg and pod") feeders. Foliage feeders include thrips, leafhoppers, lepidopteran (moth) larvae, mites, and whiteflies. Subterranean pests include coleopteran (beetle) larvae, lepidopteran larvae, and burrowing bugs (Heteroptera, family Cydnidae). The life cycles of these pests vary and can be driven by climate, crop rotations, and adjacent crops. See identification guides below for life cycle and identification information.

Foliage Feeding Pests

- Tobacco thrips – Frankliniella fusca Hinds
- Potato leafhopper – Empoasca fabae Harris "'hopper burn"
- Three-cornered alfalfa hopper – Spissistilus festinus Say
- Two-spotted spider mite – Tetranychus urticae Koch
- Silverleaf whitefly – Bemisia tabaci Gennadius
- Corn earworm – Helicoverpa zea Boddie
- Tobacco budworm – Heliothis virescens Fabricius
- Fall armyworm – Spodoptera frugiperda Smith
- Granulate cutworm – Feltia subterranea Fabricius
- Velvetbean caterpillar – Anticarsia gemmatalis Hubner
- Beet armyworm – Spodoptera exigua Hübner
- Southern armyworm – Spodoptera eridania Stoll
- Yellowstriped armyworm – Spodoptera ornithogalli Guenee
- Soybean and cabbage Loopers – Chryodeixis includens, Trichoplusia ni
- Rednecked peanutworm – Stegasta bosqueella Chambers

Subterranean (Peg and Pod Feeding) Pests

- Lesser cornstalk borer (LCB) – Elasmopalpus lignosellus
- Southern corn rootworm (SCW) – Diabrotica undecimpunctata
- Wireworms "peanut wireworm" – Conoderus scissus
- Whitefringed beetles – Naupactus leucoloma Boheman
- Burrower bug – Pangaeus bilineatus

Chemical Control and Economic Thresholds

The best way to manage these insects is to scout fields and treat them only when necessary. Insecticide should be applied only when pest density reaches the economic threshold for a particular pest insect. Although most peanut pests are defoliators, peanuts can compensate for a lot of foliage feeding. When pest density is below the

economic threshold, spraying insecticide will do more harm than good and can potentially cause a secondary pest outbreak. For example, organophosphates and pyrethroids are known to increase the risk of spider mite outbreaks after an application. Below, we provide a survey of different sampling methods and current economic thresholds for peanut pest insects when known.

Sampling Methods

Proper sampling methods are vital for getting the best estimates of pest populations within your fields. It is important to sample at multiple locations (at least 10) within a field to get an overall field average. One sampling location may indicate a "hot spot" and may not necessarily represent the whole field. Sketching the field to create a predetermined sampling route to record and visualize the spatial dynamics of the pests in your field is a good practice. Insect populations are generally clumped/aggregated or non-uniform, and spot treatments could be warranted under certain circumstances. Using several sampling and scouting methods across the season at different growth stages will increase the chances of early detection and is a better strategy than is waiting until plant damage or stress becomes visible. Soil sampling before planting (either spade sampling or using seed baits/pitfall traps) can indicate burrower bug and wireworm populations within the field. Once peanut seedlings emerge, you can shift to weekly visual inspection, beat sheet, and sweep netting methods. See descriptions of these methods below.

Visual inspection: Carefully inspect plants (foliage, stem, roots) for signs of insect feeding like hopper burn (v-shaped yellowing on leaflet tips), defoliation, terminal damage, wilted stems, and plant yellowing. Check plant terminals for the presence of thrips in folded leaflets. Check stems for silk tubes (LCB), and pull up plants to inspect roots and fruiting structures for more silk tubes.

Beat sheet/cloth/card sampling: Beat sheets can be used to sample foliage-feeding caterpillars and other pests. A standard sheet is composed of white or black cloth. It should be three feet long and wide enough to fit between rows. Place the sheet at the base of the plants and vigorously shake the plant canopy to dislodge pests. Count the number of larvae per foot of row. Thrips can be monitored with this method, but often thrips will not be dislodged if they are in folded leaflets, which makes visual inspection the better method for detection/accurate counts. Use an index card or laminated sheet of paper to make thrips easier to see. Beat or slap the foliage against the card or paper, and count the thrips that fall off the leaves onto the card.

Pitfall traps: This is a relatively inexpensive way to detect and monitor adult burrower bugs and click beetles (wireworm adults) throughout the season or before planting. Dig a hole in the soil between rows deep enough to place a 12oz plastic cup. Fill the cup one-third full with soapy water or propylene glycol. The rim of the cup should be flush with the surrounding soil so insects will fall into the cup. Check weekly for insects or more frequently if rain is in the forecast. This method will only indicate insect presence in the field. Physical and visual inspection of plant roots and pods will further indicate pest presence.

Germinating seed baits: Seed baits are mainly used for wireworm monitoring/detection before and during the season, especially if a field has had previous infestations. Use a mixture of untreated wheat, sorghum, and corn seeds. Soak the seed mixture for 24 hours before placement. Dig a pit (9 inches wide and 4 inches deep) and put a handful of the soaked mixture into it. Cover the seeds with a shallow layer of soil and place a 15x15-inch piece of a black plastic garbage bag on top. Seal the edges with the surrounding soil. After one week, dig up the seed baits and the soil around and under the seeds, as wireworm larvae appear in both seeds and surrounding soil. Manually sort through the soil and seeds to find wireworms. One bait per 3 acres of the crop may be sufficient to assess the wireworm population in a field.

Spade sampling: Soil samples can be collected with a small spade or soil corer (4- to 6-inch diameter and 4-inch depth). Take samples around the area adjacent to the plant base and sift soil with a mesh screen (size 5–12).

Sweep net sampling: Using a 15-inch-diameter sweep net, briskly thrust the net downward in an arc of about 3 feet perpendicular to the plant rows. Make the sweeps from one side to the other parallel to the ground. While sweeping, pace down the row, taking one sweep per step for 12–15 paces. A sweep net sample consists of 12–15 sweeps as one sample. The sweeps should be vigorous enough to dislodge the insects, and a proper sample will contain leaves. After the 15 sweeps, count the number of target insects and move to another area for sampling.

Pod sampling: Direct visual examination of pods is the most reliable sampling method for soil-dwelling insect detection and injury, such as southern corn root worm, burrower bugs, and wireworms. Start sampling at the beginning of pod development. Check the pods for small to medium-sized circular holes/puncture marks at one end of the pod. Larvae can make a series of entry holes all in one area of the pod. Examine developing kernels for puncture marks from burrower bug feeding as well. Pods can be partially dried to enhance the detection of feeding injury on the kernels.

Cultural Control Practices

In addition to chemical control, there are several cultural control practices used for pest management and for disease management in peanut. These include planting date manipulation, conservation tillage and planting disease-resistant cultivars. Planting date manipulation is one of the few available options for tobacco thrips management and Tomato spotted wilt virus (TSWV). In the Southeast, the planting window for peanuts is normally from April to June and shifts slightly each year depending on environmental conditions, which also affect thrips populations. Studies have shown that thrips populations and TSWV are both greater in April-planted peanuts compared to May- or June-planted peanuts, and thus the optimal time to plant is from May 10th through May 31st throughout the Southeast. Conservation tillage systems such as strip tillage are another cultural control practice that reduces thrips populations and risk of TSWV. Crop or cover crop residue is thought to interfere with the thrips' ability to find the host plant (peanut). For more information on conservation tillage, see the publication Producing Peanuts Using Conservation Tillage. For more information on other cultural control practices and peanut production, see the publication Management and Cultural Practices for Peanuts and visit the Florida Peanut Team webpage.

Table 1. Sampling Methods and Action Threshold per Pest.

Pest	Method of sampling	Economic threshold
Beet armyworm	Beat sheet/visual sampling	4 caterpillars per foot of row before vines have lapped or stressed plants 8 caterpillars per foot of row after lapping
Peanut burrower bug	Spade sampling/pod sampling/pitfall traps	Not established
Corn earworm	Beat sheet	4 caterpillars per foot of row before vines have lapped or stressed plants 8 caterpillars per foot of row after lapping
Cutworm	Spade sampling	4 caterpillars per foot of row before vines have lapped or stressed plants 8 caterpillars per foot of row after lapping
Fall and southern armyworms	Beat sheet/visual sampling	4 caterpillars per foot of row before vines have lapped or stressed plants 8 caterpillars per foot of row after lapping
Grasshopper	Sweep net sampling	> 35% defoliation of leaves and grasshoppers present in the field
Green cloverworm	Beat sheet/visual sampling	4 caterpillars per foot of row before vines have lapped or stressed plants 8 caterpillars per foot of row after lapping
Lesser cornstalk borer	Visual sampling of stems/plant parts in contact with soil Look for silk tubes.	Fresh damage in 30% of sites sampled
Potato leafhopper	Sweep net sampling	When 25% of plants show hopper burn symptoms and leafhoppers are present
Rednecked peanut worm	Visual examination of terminal buds	More than 80% terminal damage
Soybean looper	Beat sheet/visual sampling	4 caterpillars per foot of row before vines have lapped or stressed plants 8 caterpillars per foot of row after lapping
Spider mites	Visual sampling Look for areas of light-colored canopy.	Not established
Three-cornered alfalfa hopper	Sweep net sampling/visual sampling	Not established
Thrips	Beat sheet/visual sampling	Not established[1]
Tobacco budworm	Beat sheet/visual sampling	4 caterpillars per foot of row before vines have lapped or stressed plants 8 caterpillars per foot of row after lapping
Velvet bean caterpillar	Beat sheet/visual sampling	4 caterpillars per foot of row before vines have lapped or stressed plants 8 caterpillars per foot of row after lapping
Wireworms	Seed baits/pitfall traps/spade sampling	1 or more found per square foot

[1] While a threshold of 25% of leaves damaged by thrips has been established in the absence of Tomato spotted wilt virus (TSWV), if TSWV is present, the economic threshold would be significantly lower than that. Given that most peanut crops in Florida are affected by TSWV, we do not recommend the use of this threshold.

Table 2. Florida Insecticide Options in Peanut. Contact: Isaac L. Esquivel, Field and Forage Crop Entomologist (Isaac.Esquivel@ufl.edu). This table lists registered pesticides that should be integrated with other pest management methods. Contact your local UF/IFAS Extension office for additional information (https://sfyl.ifas.ufl.edu/find-your-local-office/).

Insects	IRAC[1] MOA	Trade Name (Active Ingredient)	Rate Product/acre	REI	Days to Harvest	Remarks
Beet armyworm	3A	**Brigade 2EC*** (bifenthrin)	2.1–6.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	28	**Vantacor 5SC**** (chlorantraniliprole)	1.2–2.5 fl oz	4 H	1 D	Do not apply more than 0.2 lb ai chlorantraniliprole /acre/year.
	15	**Dimilin 2L** (diflubenzuron)	4–8 fl oz	12 H	28 D	Do not make more than 3 applications/season.
	22	**Steward 1.25EC** (indoxacarb)	9.2–11.3 fl oz	12 H	14 D	Do not apply more than 45 fl oz/A/season. Minimum interval between treatments is 5 days.
	3A+28	**Besiege**** (lambda-cyhalothrin + chlorantraniliprole)	6–10 fl oz	14 H	7 D	Pyrethroid; can flare spider mites.
	1A	**Lannate 2.4LV** **Lannate 90SP** (methomyl)	1.25–3 pt 0.25–1 lb	48 H	21 D	Do not make more than 3 applications. Do not feed treated vines to livestock.
	18	**Intrepid 2F** (methoxyfenozide)	6–10 fl oz	4 H	7 D	
	15	**Diamond .083EC** (novaluron)	6–12 fl oz	12 H	28 D	Do not apply more than 36 fl oz/A/season. Do not feed treated peanut hay or vines to livestock.
	5	**Radiant 1SC** (spinetoram)	3–8 fl oz	4 H	3 D	Do not apply more than 24 fl oz of Radiant SC (0.188 lb ai spinetoram)/A/year. Do not allow grazing of peanut hay.
Burrower bug		**No current registered insecticide for this pest is available.**				
Corn earworm	3A	**Brigade 2EC*** (bifenthrin)	2.1–6.4 fl oz	12H	14 D	Pyrethroid; can flare spider mites.
	28	**Vantacor 5SC** (chlorantraniliprole)	1.2–2.5 fl oz	4 H	1 D	Do not apply more than 0.2 lb ai chlorantraniliprole /acre/year.
	3A	**Baythroid XL 1EC**; **Tombstone** (beta-cyfluthrin)	1.8–2.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Asana XL** (esfenvalerate)	2.9–5.8 oz	12 H	21 D	Pyrethroid; can flare spider mites.
	3A	**Danitol 2.4EC** (fenpropathrin)	10.66–16 fl oz	24 H	Digging 14 D	Pyrethroid; can flare spider mites.

Insects	IRAC[1] MOA	Trade Name (Active Ingredient)	Rate Product/acre	REI	Days to Harvest	Remarks
	3A	**Karate Z 2.08** (lambda-cyhalothrin)	1.28–1.92 oz	24 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Warrior II Zeon 2.08CS** (lambda-cyhalothrin)	1.28–1.92 fl oz	24 H	14 D	Pyrethroid; can flare spider mites.
	3A+28	**Besiege** (lambda-cyhalothrin + chlorantraniliprole)	10 fl oz	14 H	7 D	Pyrethroid; can flare spider mites.
	1A	**Lannate 2.4LV; Lannate 90SP** (methomyl)	0.75–3 pt 0.25–1 lb	48 H	21 D	Do not make more than 3 applications. Do not feed treated vines to livestock.
	5	**Radiant 1SC** (spinetoram)	3–8 fl oz	4 H	3 D	Do not apply more than 24 fl oz of Radiant SC (0.188 lb ai spinetoram)/A/year. Do not allow grazing of peanut hay.
	3A	**Mustang Maxx 0.8EC** (zeta-cypermethrin)	3.2–4 oz	12 H	7 D	Pyrethroid; can flare spider mites.
Cutworm	3A	**Brigade 2EC** (bifenthrin)	2.1–6.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Baythroid XL 1EC; Tombstone** (beta-cyfluthrin)	1–1.8 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Asana XL 0.66EC** (esfenvalerate)	9.6 oz	12 H	21 D	Pyrethroid; can flare spider mites.
	22	**Steward 1.25EC** (indoxacarb)	9.2–11.3 fl oz	12 H	14 D	Do not apply more than 45 fl oz/A/season. Minimum interval between treatments is 5 days.
	3A	**Karate Z 2.08** (lambda-cyhalothrin)	1.28–1.92 oz	24 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Warrior II Zeon 2.08CS** (lambda-cyhalothrin)	1.28–1.92 fl oz	24 H	14 D	Pyrethroid; can flare spider mites.
	1A	**Lannate 2.4LV**; **Lannate 90SP** (methomyl)	1.5–3 pt 0.5–1 lb	48 H	21 D	Spray late in the afternoon for maximum efficacy. Do not feed treated vines to livestock.
	3A	**Mustang Maxx 0.8EC** (zeta-cypermethrin)	1.28–4 oz	12 H	7 D	Pyrethroid; can flare spider mites.
Fall armyworm	1B	**Orthene 97** (acephate)	12–16 oz	24 H	Digging 14 D	

Insects	IRAC[1] MOA	Trade Name (Active Ingredient)	Rate Product/acre	REI	Days to Harvest	Remarks
	3A	**Brigade 2EC*** (bifenthrin)	2.1–6.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	28	**Vantacor 5SC** (chlorantraniliprole)	1.2–2.5 fl oz	4H	1 D	Do not apply more than 0.2 lb ai chlorantraniliprole/A/year.
	3A	**Baythroid XL 1EC**; **Tombstone** (beta-cyfluthrin)	2.4–2.8 fl oz	12H	14 D	Pyrethroid; can flare spider mites.
	15	**Dimilin 2L** (diflubenzuron)	4–8 fl oz	12 H	28 D	Do not make more than 3 applications/season.
	3A	**Danitol 2.4EC** (fenpropathrin)	10.66–16 fl oz	24 H	Digging 14 D	Pyrethroid; can flare spider mites.
	22	**Steward 1.25EC** (indoxacarb)	9.2–11.3 fl oz	12 H	14 D	Do not apply more than 45 fl oz/A/season. Minimum interval between treatments is 5 days.
	3A	**Karate Z 2.08** (lambda-cyhalothrin)	1.28–1.92 oz	24 H	14 D	Pyrethroid; can flare spider mites.
	3A+28	**Besiege** (lambda-cyhalothrin + chlorantraniliprole)	6–10 fl oz	14 H	7 D	Pyrethroid; can flare spider mites.
	1A	**Lannate 2.4LV**; **Lannate 90SP** (methomyl)	0.75–1.5 pt 0.25–0.5 lb	48 H	21 D	Do not feed treated vines to livestock.
	15	**Diamond .083EC** (novaluron)	6–12 fl oz	12 H	28 D	Do not apply more than 36 fl oz/A/season. Do not feed treated peanut hay or vines to livestock.
	5	**Radiant 1SC** (spinetoram)	3–8 fl oz	4 H	3 D	Do not apply more than 24 fl oz of Radiant SC (0.188 lb ai spinetoram)/A/year. Do not allow grazing of peanut hay.
Grasshoppers	1B	**Orthene 97** (acephate)	12–16 oz	24 H	Digging 14 D	
	3A	**Brigade 2EC** (bifenthrin)	2.1–6.4 fl oz	12H	14 D	Pyrethroid; can flare spider mites.
	28	**Vantacor 5SC** (chlorantraniliprole)	0.7–1.7 fl oz	4 H	1 D	Do not apply more than 0.2 lb ai of chlorantraniliprole /acre/year.
	3A	**Baythroid XL 1EC**; **Tombstone** (beta-cyfluthrin)	2.4–2.8 fl oz	12H	14 D	Pyrethroid; can flare spider mites.
	3A	**Karate Z 2.08** (lambda-cyhalothrin)	1.28–1.92 oz	24 H	14 D	Pyrethroid; can flare spider mites.

Insects	IRAC[1] MOA	Trade Name (Active Ingredient)	Rate Product/acre	REI	Days to Harvest	Remarks
	3A+28	**Besiege** (lambda-cyhalothrin + chlorantraniliprole)	6–10 fl oz	14 H	7 D	Pyrethroid; can flare spider mites.
	15	**Diamond .083EC** (novaluron)	9–12 fl oz	12 H	28 D	Nymph suppression only.
	3A	**Mustang Maxx 0.8EC** (zeta-cypermethrin)	3.2–4 fl oz	12 H	7 D	Pyrethroid; can flare spider mites.
Green cloverworm	3A	**Brigade 2EC** (bifenthrin)	2.1–6.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Baythroid XL 1EC**; **Tombstone** (beta-cyfluthrin)	1–1.8 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	15	**Dimilin 2L** (diflubenzuron)	2–4 fl oz	12 H	28 D	
	3A	**Asana XL 0.66EC** (esfenvalerate)	2.9–5.8 oz	12 H	21 D	Pyrethroid; can flare spider mites.
	3A	**Karate Z 2.08** (lambda-cyhalothrin)	0.96–1.6 oz	24 H	14 D	Pyrethroid; can flare spider mites.
	3A+28	**Besiege** (lambda-cyhalothrin + chlorantraniliprole)	5–8 fl oz	14 H	7 D	Pyrethroid; can flare spider mites.
	1A	**Lannate 2.4LV**; **Lannate 90SP** (methomyl)	1.5–3 pt 0.5–1 lb	48 H	21 D	Do not feed treated vines to livestock.
	15	**Diamond 0.83EC** (novaluron)	6–12 fl oz	12H	28 D	Do not apply more than 36 fl oz/A/season. Do not feed treated peanut hay or vines to livestock.
	5	**Radiant 1SC** (spinetoram)	3–8 fl oz	4 H	3 D	Do not apply more than a total of 24 fl oz of Radiant SC (0.188 lb ai spinetoram)/A/year. Do not allow grazing of peanut hay.
	3A	**Mustang Maxx 0.8EC** (zeta-cypermethrin)	1.28–4 fl oz	12 H	7 D	Pyrethroid; can flare spider mites.
Lesser cornstalk borer	28	**Vantacor 5SC** (chlorantraniliprole)	0.7–1.7 fl oz	4 H	1 D	Do not apply more than 0.2 lb ai of chlorantraniliprole /acre/year.
	15	**Diamond 0.83EC** (novaluron)	6–12 fl oz	12H	28D	Do not apply more than 36 fl oz/A/season. Do not feed treated peanut hay or vines to livestock.

Insects	IRAC[1] MOA	Trade Name (Active Ingredient)	Rate Product/acre	REI	Days to Harvest	Remarks
Potato leafhopper	1B	**Orthene 97** (acephate)	12–16 oz	24 H	Digging 14 D	
	3A	**Brigade 2EC** (bifenthrin)	2.1–6.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Baythroid XL 1EC**; **Tombstone** (beta-cyfluthrin)	1–1.8 fl oz	12 H		Pyrethroid; can flare spider mites.
	3A	**Asana XL 0.66EC** (esfenvalerate)	2.9–5.8 oz	12 H	21 D	Pyrethroid; can flare spider mites.
	3A	**Karate Z 2.08** (lambda-cyhalothrin)	0.96–1.6 fl oz	24 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Warrior II Zeon 2.08CS** (lambda-cyhalothrin)	0.96–1.6 fl oz	24 H	14 D	Pyrethroid; can flare spider mites.
	3A+28	**Besiege** (lambda-cyhalothrin + chlorantraniliprole)	10 fl oz	14 H	7 D	Pyrethroid; can flare spider mites.
	3A	**Mustang Maxx 0.8EC** (zeta-cypermethrin)	1.76–4 fl oz	12 H	7 D	Pyrethroid; can flare spider mites.
	21A	**Portal** (Fenpyroximate)	2.0 pints	24H	1D	Allow 14 days between applications Apply by ground using a minimum of 10 gallons of water per acre. Apply by air using a minimum of 3 gallons of water per acre.
Rednecked peanut worm	3A	**Brigade 2EC** (bifenthrin)	2.1–6.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Baythroid XL 1EC**; **Tombstone** (beta-cyfluthrin)	1–1.8 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Asana XL 0.66EC** (esfenvalerate)	2.9–5.8 oz	12H	21 D	Pyrethroid; can flare spider mites.
	3A	**Karate Z 2.08** (lambda-cyhalothrin)	0.96–1.6 oz	24 H	14 D	Pyrethroid; can flare spider mites.
	3A+28	**Besiege** (lambda-cyhalothrin + chlorantraniliprole)	6–10 fl oz	14 H	7 D	Pyrethroid; can flare spider mites.

Insects	IRAC[1] MOA	Trade Name (Active Ingredient)	Rate Product/acre	REI	Days to Harvest	Remarks
	3A	**Warrior II Zeon 2.08CS** (lambda-cyhalothrin)	0.96–1.6 fl oz	24 H		Pyrethroid; can flare spider mites.
	3A	**Mustang Maxx 0.8EC** (zeta-cypermethrin)	1.76–4 fl oz	12 H	7 D	Pyrethroid; can flare spider mites.
Southern armyworm	5	**Radiant 1SC** (spinetoram)	3–8 fl oz	4 H	3 D	Do not apply more than 24 fl oz of Radiant SC (0.188 lb ai spinetoram)/A/year. Do not allow grazing of peanut hay.
Southern corn rootworm	**No current registered insecticide for this pest is available**					
Soybean looper	28	**Vantacor 5SC** (chlorantraniliprole)	1.7–2.5 fl oz	4 H	1 D	Do not apply more than 0.2 lb ai of chlorantraniliprole/A/year.
	22	**Steward 1.25EC** (indoxacarb)	9.2–11.3 fl oz	12 H	14 D	Do not apply more than 45 fl oz/A/season. Minimum interval between treatments is 5 days.
	18	**Intrepid 2F** (methoxyfenozide)	6–10 fl oz	4 H	7 D	Do not make more than 3 applications/year.
	15	**Diamond 0.83 EC** (novaluron)	6–12 fl oz	12H	28 D	Do not feed treated peanut hay or vines to livestock.
	5	**Radiant 1SC** (spinetoram)	3–8 fl oz	4H	3 D	Do not apply more than 24 fl oz of Radiant SC (0.188 lb ai spinetoram)/A/year. Do not allow grazing of peanut hay.
Spider mites	12C	**Comite 6.55EC** (propargite)	2 pt	48 H	14 D	Do not apply more than twice per season. Do not graze or feed livestock on treated areas or cut treated forage for hay.
	12C	**Comite II 6EC** (propargite)	2.25 pt	48 H	14 D	Do not apply more than twice a season. Do not graze or feed livestock on treated areas or cut treated forage for hay.
	21A	**Portal** (Fenpyroximate)	1–2 pt	24H	1D	Do not apply more than twice or more than 4.0 pt per season. Allow 14 days between applications. Apply by ground using a minimum of 10 gallons of water per acre. Apply by air using a minimum of 3 gallons of water per acre.
Three cornered alfalfa hopper	3A	**Baythroid XL 1EC**; **Tombstone** (beta-cyfluthrin)	1.8–2.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.

Insects	IRAC[1] MOA	Trade Name (Active Ingredient)	Rate Product/acre	REI	Days to Harvest	Remarks
	3A	**Brigade 2EC** (bifenthrin)	2.1–6.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Warrior II Zeon 2.08CS** (lambda-cyfluthrin)	0.96–1.6 fl oz	24 H	14 D	Pyrethroid; can flare spider mites.
Thrips	1B	**Orthene 97** (acephate)	6–12 oz	24 H	Digging 14 D	
	4A	**Admire Pro 4.6F** (imidacloprid)	7–10.5 fl oz	12 H	4 D	Apply as an in-furrow spray at planting. Do not apply more than 10.5 oz/crop season. Do not apply to Virginia-type varieties.
	3A	**Baythroid XL 1EC**; **Tombstone** (beta-cyfluthrin)	2.8 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Brigade 2EC*** (bifenthrin)	5.12–6.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Warrior II Zeon 2.08CS** (lambda-cyfluthrin)	1.28–1.92 fl oz	24 H	14 D	Pyrethroid; can flare spider mites.
	1B	**Thimet 20 G** (phorate)	5–7.5 lb	48 H		Apply in-furrow at planting. In-furrow applications for single rows use 5.5 oz of 20G/1000 feet of row. Do not exceed 7.5 lbs/A for twin rows. Soil moisture is necessary for adequate uptake. Young seedlings may exhibit varying degrees of leaf damage.
Tobacco budworm	28	**Vantacor 5SC** (chlorantraniliprole)	1.7–2.5 fl oz	4 H	1 D	Do not apply more than 0.2 lb ai of chlorantraniliprole/A/year.
	22	**Steward 1.25EC** (indoxacarb)	9.2–11.3 fl oz	12 H	14 D	Do not apply more than 45 fl oz/A/season. Minimum interval between treatments is 5 days.
	5	**Radiant 1SC** (spinetoram)	3–8 fl oz	4 H	3 D	Do not apply more than 24 fl oz of Radiant SC (0.188 lb ai spinetoram)/A/year. Do not allow grazing of peanut hay.
	18	**Intrepid Edge** (spinetoram + methoxyfenozide)	1.7–3.3 oz	4 H	7 D	
		NOTE: Lannate applied for corn earworm gives good control				
Velvetbean caterpillar	15	**Diamond .083EC** (novaluron)	6–12 fl oz	12 H	28 D	

Insects	IRAC[1] MOA	Trade Name (Active Ingredient)	Rate Product/acre	REI	Days to Harvest	Remarks
	5	**Radiant 1SC** (spinetoram)	3–8 fl oz	4 H	3 D	Do not apply more than 24 fl oz of Radiant SC (0.188 lb ai spinetoram)/A/year. Do not allow grazing of peanut hay.
	15	**Dimilin 2L** (diflubenzuron)	2–4 fl oz	12 H	28 D	Do not make more than 3 applications/season.
	3A	**Mustang Maxx 0.8EC** (zeta-cypermethrin)	1.28–4 fl oz	12 H	7 D	Pyrethroid; can flare spider mites.
	3A	**Baythroid XL 1EC; Tombstone** (beta-cyfluthrin)	1–1.8 fl oz	12 H	14 D	Do not exceed 3 applications per season of 2.8 fl oz/10-day intervals. Pyrethroid; can flare spider mites.
	3A	**Brigade 2EC** (bifenthrin)	2.1–6.4 fl oz	12 H	14 D	Pyrethroid; can flare spider mites.
	3A	**Asana XL 0.66EC** (esfenvalerate)	2.9–5.8 oz	12 H	21 D	Pyrethroid; can flare spider mites.
	3A	**Karate Z 2.08CS** (lambda-cyfluthrin)	0.96–1.6 fl oz	24 H	14 D	
	1A	**Lannate 2.4LV** (methomyl)	1.5–3 pt	48 H	21 D	Do not feed treated vines to livestock.
	3A	**Warrior II Zeon 2.08CS** (lambda-cyfluthrin)	0.96–1.6 fl oz	24 H	14 D	Pyrethroid; can flare spider mites.
Wireworms		**No current registered insecticide for this pest is available**				

[1] Mode of action class for pesticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification V.10.1.

*Populations of these pests from the Panhandle have been shown to be less susceptible to bifenthrin compared to lab-reared populations. Caution is advised when using this product to control the specified pests. See: https://doi.org/10.1002/ps.5984 for more information.

**Populations of beet armyworm from the Panhandle have been shown to be less susceptible to chlorantraniliprole compared to lab-reared populations. Caution is advised when using this product if this species is the dominant one found. See: https://doi.org/10.1002/ps.5984 for more information.

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