

Insect Management in Pasture ¹

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Probably the most important pests of pasture grasses in Florida are spittlebugs, mole crickets, and caterpillars. Other insects may become important at certain times in localized areas. The subsequent sections describe some of these pests and suggest options for their control.

Description of Insect Pests

Aphids

DESCRIPTION

Two species of aphids are capable of causing occasional damage to Florida forages. The sugarcane aphid is a pale lemon-yellow color and prefers pangolagrass. It is most common in south Florida. The second species, the greenbug, is present throughout the state and is pale green with a dark green stripe on its back. The greenbug generally does not cause economic damage because natural enemies (parasites and predators) usually keep the populations at low levels.

LIFE CYCLE AND DAMAGE

Both species overwinter as adults on alternate hosts. Winged adults migrate to hosts plants throughout the year. Both species damage grasses by feeding on the phloem tissue with their needle-like mouthparts. Their feeding causes the tissue in the area of the penetration to turn



Figure 1. Greenbug, *Schizaphis graminum*.

Credits: Guy Bishop and S. E. Halbert, Division of Plant Industry, University of Florida.

yellow. Numerous feeding sites in the same area can cause the entire leaf blade to take on a pale yellow color.

Armyworms

DESCRIPTION

Although the southern and yellowstriped armyworms may occasionally be found in forages, it is usually the fall armyworm that causes the most serious damage. Adult fall armyworm moths are approximately 3/4 inch in length and gray with lighter markings. They have a distinct

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light-colored stripe along the front edge of the mid-forewing. Eggs are laid in masses of 100–150 eggs and are covered with scales from the female's body. Newly hatched larvae are approximately 1/16 inch long and are light green to cream-colored with a dark head capsule. As they feed and grow, they become darker with distinctive light colored lines down the sides of their bodies. On larger larvae the head capsule is dark with a lighter-colored inverted Y-mark on the front. The pupae, found in the thatch and soil, are dark chestnut brown and are approximately 5/8 inch in length.



Figure 2. Fall armyworm larva feeding on a grass blade.
Credits: Guy Bishop and S. E. Halbert, Division of Plant Industry, University of Florida.

LIFE CYCLE AND DAMAGE

During most winters, the fall armyworm is able to survive in central and south Florida. However, during exceptionally cold winters its survival is limited to just south Florida. The moths are strong flyers and are capable of reinfesting north Florida in early spring. The fall armyworm has several hundred wild and cultivated plant hosts in Florida including corn, cotton, peanuts, and millet. The eggs are laid on the lower leaf blades and hatch in 3–4 days. The larvae undergo 6 molts and require 12–16 days to reach their full 1 ½ -inch length. Early instars each last 1½–2 days while larvae spend up to 4 days in each of the last two instars. As a result, approximately 90% of the food consumed during the larval stage is eaten during the last two instars. Early instars feed on the margins of the grass blades. Later instars may consume the entire blade or leave only the midrib on more mature stands. The pupal stage usually lasts 9–10 days. However, field observations indicate that the pupal stage may be extended by approximately 20 days under drought conditions. After emergence, adults live an average of two weeks. During her lifetime a female moth will lay 3–5 egg masses each containing from 100–150 eggs.

Chinch Bugs

DESCRIPTION

Chinch bugs prefer millet, are most abundant in dry years, and prefer thin stands. The adult chinch bug is 1/3 inch long with a black body. It has white wings with a black triangle at the middle of its outer margin of each front wing. Chinch bug nymphs (the immature stage) are reddish with a white band across their backs. Older nymphs are darker, but keep the white band. Eggs are white when first laid but turn bright orange just before hatching. The eggs are generally not seen by the casual observer as they are usually placed between the leaf sheath and stem.



Figure 3. Chinch bug nymphs.



Figure 4. Chinch bug adult and nymph.

LIFE CYCLE AND DAMAGE

The chinch bug overwinters as an adult or larger nymph in the thatch of infested fields. Activity resumes in the spring

when temperatures exceed 65°F. Females lay 45–100 eggs over a period of several weeks. Eggs hatch in 8–10 days, and the young nymphs usually feed in protected areas such as under the leaf sheaths. The nymphs go through 5 instars over a period of 4–6 weeks. Heavily infested areas turn yellow and then brown. As chinch bugs deplete green tissue in one area they may migrate to new areas causing the existing area to expand or new areas to form.

Mites

There are several species of mites that feed on forages in Florida but probably the most common are the Banks grass mite (a spider mite) and the bermudagrass mite (an eriophyid mite).

DESCRIPTION

Adults of the Banks grass mite are bright green with light orange legs during the summer. During the winter, the green color fades and the mites take on a bright orange-salmon color. Female mites are broadly oval and are approximately 0.016 inch in length, while the male mite has a strongly tapered abdomen and is about 0.013 inch long.

The bermudagrass mite has the typical small, worm-like shape of eriophyid mites. Adults are only 0.006 inch long when fully grown and are creamy white in color.

LIFE CYCLE AND DAMAGE

Banks grass mites usually overwinter as mated females at the base of grass plants. As temperatures warm in the spring, females begin feeding and laying eggs. A female will lay 50–70 eggs during her life span. During warm weather eggs hatch in 4 days and development of the immature stages requires 5 days. The mite most commonly attacks bermudagrass in Florida. Damage first appears as yellow flecks along the grass blades. As feeding progresses, the leaves become straw colored and may eventually wither and die.

Bermudagrass mite feeds only within the leaf sheath of bermudagrass. Each adult female lays approximately 12 eggs during her lifetime. Eggs hatch in 2–3 days, and adulthood is reached in as little as 7 days. Bermudagrass mites are very tolerant of high temperatures. Associated damage includes yellowed leaves, stunted growth, and rosettes formed from the additional growth of leaves and buds.

Mole Crickets

DESCRIPTION

Two species of mole crickets, the tawny and southern mole cricket, cause damage to forages and pastures in Florida. Generally, the damage is most evident in bahiagrass. The presence of mole crickets is usually first evident with the occurrence of their tunnels near the surface of the soil. Their burrowing loosens the soil and resembles tiny mole tunnels. Adults are approximately 1 ½ inches in length and are tan to greyish-brown in color. The forewings are shorter than the abdomen, and the front legs are flattened for digging.



Figure 5. Tawny mole cricket.

LIFE CYCLE AND DAMAGE

Females are attracted to the calls of males in the spring when temperature and moisture are favorable. Egg laying may begin in March but most are laid during May and June. Mated females dig a few inches into the soil and construct an egg chamber. Females construct 3–5 egg chambers and lay an average of 35 eggs in each. Eggs hatch in about 20 days, and the nymphs feed on plant roots until the fall when most reach adulthood. Most feeding occurs at night following a rainfall. Damage occurs as a result of root feeding and appears as areas of wilted, dead plants. Large populations can kill extensive areas of pastures.

BIOLOGICAL CONTROL

The mole cricket nematode, *Steinernema scapterisci*, was evaluated at the University of Florida as a biological control agent of the mole cricket. It was found that this nematode provides effective control of late instar and adult tawny, southern, and short-winged mole crickets. This nematode has been produced commercially under the trade name NematacS.

Studies have shown that the only stage of the nematode capable of infecting a mole cricket is the third stage (infective juvenile). This is the stage marketed in the commercial

product. After a mole cricket is infected by as few as two infective juveniles, the nematode reproduces inside the mole cricket body, undergoes two complete life cycles, and produces about 50,000 infective juveniles that emerge to seek out additional mole cricket hosts.

Another biological control, the red-eyed Brazilian fly (*Ormia depleta*) was released in Florida for the first time in 1988, and is now established in at least 30 counties in the central and southern part of peninsular Florida. Adult flies actively search for mole crickets at night. The adult flies require plant nectar as an energy source. Adult females give birth to living larvae which are deposited on and near adult mole crickets. The larvae burrow into the mole crickets, feeding on their internal organs. The larvae are fully-developed within about 7 days, and they emerge from the dying mole crickets to pupate in the ground. Adult flies emerge from the pupae after about 11 days and push their way to the soil surface.

Adult female flies, when ready to deposit their larvae, are attracted to the song of mole cricket males. Males of both tawny and southern mole crickets (found all over the state) produce songs attractive to these flies but short-winged mole crickets (found primarily only in extreme south Florida) do not sing. The flies are capable of finding adult male tawny and southern mole crickets by their song, and will attack these and also will attack female mole crickets positioned near the singing males. The specificity of attraction to the song of tawny and southern mole crickets means that these flies are harmless to non-target organisms.

These flies are not sold as commercial products but are classical biological control agents that have established populations in Florida. There is no point in making further releases of flies in counties where populations are established. In areas where the fly has become established, emphasis should be placed on maintaining nectar-producing plants in landscaping. Flies having access to adult mole crickets and to nectar throughout the year will thrive and build up large populations.

Spittlebugs

DESCRIPTION

Spittlebugs prefer a wide range of grasses including bermudagrass, limpograss, rhoadesgrass, and stargrass. Adults of the two-lined spittlebug have the characteristic leafhopper shape and are dark brown to black with red legs and eyes. It gets its name from the conspicuous two red to orange lines across its wings. Nymphs are cream-colored with brown

heads and eyes. They produce a white, frothy mass that completely hides them as they feed.



Figure 6. Two-lined spittlebug.

LIFE CYCLE AND DAMAGE

The two-lined spittlebug survives the winter in the egg stage in hollow stems and at the base of plants in debris. During the summer, eggs hatch in 15–19 days and the nymphs begin feeding and producing a frothy mass immediately. Nymphs feed for 30–50 days before molting into the adult stage. On average, each adult female lays 45 eggs. There are two, occasionally three, generations a year in Florida.

Adults and nymphs damage grasses by inserting their needle-like mouthparts and sucking plant juices. During feeding, the adults inject toxic juices into the leaf, which causes streaking or stippling. For information on the damage and management of spittlebugs on limpograss, see <http://edis.ifas.ufl.edu/ag242>.

There are no chemicals currently registered for control of spittlebugs on pastures.

Striped Grass Loopers

DESCRIPTION

The striped grass looper is frequently found in mixed populations with the fall armyworm. They prefer bermudagrass and stargrass but when high populations are present nearly all species of grass can be damaged. They may easily be distinguished from fall armyworms by the number of abdominal prolegs: grass loopers have two pairs while the fall armyworm has four. In addition, its body is covered with black and white spots and there is a light-colored narrow stripe along the middle of its back. Their color varies from cream to orange to nearly black. The head capsule has numerous vertical lines.

Adults are dark brown and rest with their wings held flat over their bodies giving the moth a broad inverted V



Figure 7. Striped grass looper.

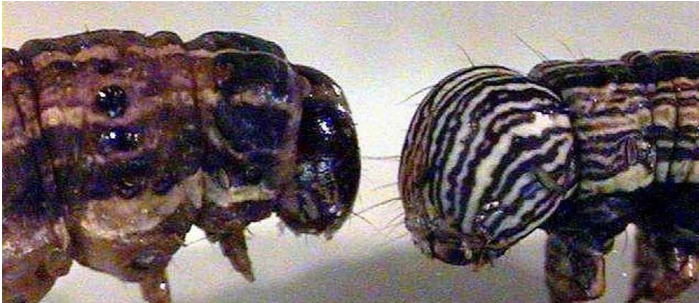


Figure 8. Comparison of fall armyworm head capsule (left) and grass looper head capsule (right).

outline from above. A faint dark line extending from near the tip of one wing to the other is usually evident.

LIFE CYCLE AND DAMAGE

There are several generations of loopers each year in Florida. Eggs hatch in 3–4 days, and larvae begin feeding by stripping the epidermis from the top surface of the leaf. When the larvae are approximately half grown, they begin feeding on leaf margins. After feeding for approximately 3 weeks the larvae locate protected areas in the canopy, fasten several blades of grass together, and spin a cocoon. After spending 8–10 days in the pupal stage, the adults emerge, mate, and after 3–4 days begin laying eggs.

Small larvae strip the epidermis from leaves giving the affected areas a brown, ragged appearance. Larger larvae consume entire blades leaving, at most, only a portion of the midrib.

Other Pests

The above list of insect and mite pests of forages represents only the most commonly encountered problems. Others such as grasshoppers, white grubs, scale insects, and mealybugs occasionally infest forages. However, controls are generally not required.

Monitoring for Insect Pests

The primary insect pests that are normally monitored in pastures in Florida are the fall armyworm and the striped grass looper. Both of these insects are sampled in the same way and their numbers are usually combined in determining whether a threshold (treatable) population exists in a field.

Before disturbing the area to be sampled, examine the edge of the grass blades in the sample area for signs of feeding damage. If no damage is found, chances are good that, at most, only small larvae will be found. On the other hand, if the damage is moderate to heavy, various combinations of small and large larvae may be present. However, regardless of the level of damage continue to assess the population using the following procedure.

To sample pastures for the fall armyworm and looper, examine the blades of grass, stems, organic debris at the base of the plants and soil surface in a one foot square area. Count the number of larvae and record their size as either less than 1/2 inch in length or greater than 1/2 inch in length. If most larvae are less than 1/2 inch in length and the threshold population has been reached, treatment is usually justified because removing the larvae will prevent additional feeding damage. Conversely, if all larvae are greater than 1/2 inch in length and are nearly full grown, treatment may not be needed as the larvae are near the end of their feeding period and are about to pupate. Examine at least 10 one square foot samples at random across the field. Since the fall armyworm female moth tends to lay her eggs in areas of abundant growth, be sure to include a few of these areas in your 10 samples.

If only a few fields are to be sampled, estimating a 1 foot by 1 foot area usually works fine. However, if many samples are to be taken, you may want to make a 1 foot by 1 foot sampling frame out of wire or 1/2 inch PVC pipe. In addition to providing more uniformity between samples, the sampling frame has the added advantage of providing a more random selection of a sampling site when it is thrown ahead of you in the general area to be sampled.

After all samples have been taken, calculate the average number of small and large larvae per square foot for the field. If the field has not been previously treated, chemical control is usually justified if an average of 3–4 small larvae per square foot is found. If the field has been previously treated, control is justified if an average of 2 small larvae per square foot is found.

Control Recommendations for Pasture Insect Pests

Insect infestations in pastures usually start in small, isolated areas. Make frequent inspections and spot treat before infestations become widespread. This practice not only saves insecticide, but also prevents extensive injury to the grass and reduces the residue problem.

Recommended materials are listed in [Table 1](#). The use of trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products named and does not signify that they are approved to the exclusion of others of suitable composition. Dilute WP and EC formulations in enough water for sufficient coverage (usually 3 gallons by air and 10 gallons by ground).

Apply low rates of materials to light infestations, light forage cover, and smaller stages of pests. Apply higher rates to heavy infestations, dense forage cover, and mature stages of pests.

Restrictions

Dimilin 2L: Do not exceed 6 oz/a/year.

Lannate LV: Do not make more than four applications per crop. Do not apply more than 0.9 lb ai/a/crop. For Bermudagrass only.

Sevin 80 WSP: Up to 2 applications may be made but not more often than once every 14 days. Do not exceed 3 3/4 lb/a/year (3 qt of Sevin XLR or 4F).

Tracer: Do not apply more than 6 fl oz of Tracer (0.186 lb ai spinosad) per acre per season.

Read each label carefully to determine how long animals should be prevented from eating the forage.

Table 1. Chemical control recommendations for selected pests of pastures.

Trade Name (Common Name)	lb ai/a	Formulation/a	Min Days To Harvest and Restrictions
APHIDS			
Malathion 57 EC (malathion)	0.94-1.25	1.5-2 pt	0
ARMYWORMS, GRASS LOOPERS AND OTHER CATERpillARS			
Several Brands (<i>Bacillus thuringiensis</i>)	See individual brand labels		
Dimilin 2L (diflubenzuron)	0.0313	2.0 oz	1-hay. For early instars (2nd or 3rd instars).
Lannate 2.4 LV (methomyl)	0.23-0.9	0.75-3 pt	7-grazing; 3-hay. For Bermudagrass pasture application only. Remove livestock prior to application.
Malathion 57 EC (malathion)	1.25	2 pt	0
Sevin 80 S (carbaryl)	1-1.5	1.25-1.87 lb	14
Sevin XLR or 4F (carbaryl)	1-1.5	1-1.5 qt	14
Tracer (spinosad)	0.031-0.062	1-2 fl oz	3 hay or fodder: no pre-harvest interval for forage.
CHINCH BUGS			
Sevin 80 S (carbaryl)	1-1.5	1.25-1.87 lb	14
Sevin XLR or 4F (carbaryl)	1-1.5	1-1.5 qt	14
GRASSHOPPERS			
Dimilin 2L (diflubenzuron)	0.0156 - 0.0313	1.0-2.0 oz	1-hay. For early instars (2nd-4th instar).
Malathion 57 EC (malathion)	0.94-1.25	1.5-2 pt	0
Sevin 4F (carbaryl)	0.5-1	0.5-1 qt	0. For use on rangeland.
Sevin XLR or 4F (carbaryl)	1-1.5	1-1.5 qt	14