

Plant Diagnosis, Analysis and Identification Services of UF/IFAS
<http://solutionsforyourlife.ufl.edu>

Proper collection, handling and shipping of samples for identification, analysis or diagnosis are critical. Your Extension agent will assist you, and refer you to specific *edis* publications.

Diagnostic and Identification Clinics

- **Insect Identification:** Agents will provide ID kits for submitting samples to the Insect ID Lab (fee, \$8). Refer to Fact Sheet **RFSR010, *Insect Identification Service***.
- **Diseases:** The main Plant Disease Clinic in Gainesville and regional clinics at Research and Education Centers in Quincy, Immokalee and Homestead constitute the Disease Clinic Network (typical fee of \$20, may vary). Refer to Fact Sheet **RFSR007, *Florida Extension Plant Disease Network***.
- **Nematodes:** Number and type of plant-parasitic nematodes in soil and plant samples are reported (fee, \$20 for Florida, \$25 for others). Refer to Fact Sheet **ENY-027, *Nematode Assay Laboratory***.
- **Plant Identification:** Botanist and taxonomists at the Florida Museum of Natural History Herbarium identify plants, including weeds. See Fact Sheet **RFSR013, *Plant Identification and Information Service***.

Extension Soil Testing Laboratory: ESTL analyzes soil, animal waste and water, with varying fees for different tests. The routine soil fertility test reports pH, lime requirement and extractable P, K, Ca, and Mg with fertilizer and lime requirements recommendations for most crops (fee, \$7). Other tests include micronutrients, electrical conductivity (soluble salts), organic matter, and some tissue analyses. Water is tested for chemical and mineral aspects only. Forms for the various tests including sampling technique and handling instructions are found at <http://soilslab.ifas.ufl.edu>. Contact your County Health Department for biological and potability tests.

Extension Offices: Agents and staff provide sampling materials (vials, bags, forms, mailing cartons and labels, etc.) and "How-To" guidance in collecting samples. Some offices have plant clinics and soil test labs. In addition, Agents may assist in interpreting results and providing information to help you make pest, nutrient, and other management decisions for your farm, ranch, dairy, nursery, grove or natural area.

Distance Diagnostic and Identification System: DDIS allows some diagnoses and pest identification using digital photography and an Internet connection to UF/IFAS specialists. Contact your agent for instructions for submitting samples or digital images. Click on Training Materials at <http://ddis.ifas.ufl.edu> for some tips on taking effective photos for submission to DDIS.

If you map fertility, pests or other sample results using GIS, include latitude/longitude or point data names with the samples so you can associate the results in your system when they return.

Integrated Pest Management Information

Integrated Pest Management (IPM) is a sustainable approach to managing pests through biological, cultural, physical and chemical tools in ways that minimize risks to the environment and to human health. IPM Florida – <http://ipm.ifas.ufl.edu>

Pest Scouting

Follow these steps for scouting your field for insects, using the sample schemes below. Note weeds, disease and nematode symptoms, and other problems.

- **Scout fields regularly.** Scout every 3 to 7 days, according to the crop. It may require daily field checks. Scout throughout the season, up to harvest.
- **Sample fields carefully.** Be sure your sampling is unbiased. Do not sample borders, fence rows or other unusual areas. Make certain your sample represents the entire field. Don't enter the field at the same point every time. Sample in the shape of an M or a Z.
- **Note any problems and keep records.** Record pest levels using the Field Records in this notebook, or using a Scouting Record that you find useful.

Sampling for Pests in Florida Crops

| Crop/Sampling Unit | Samples Per Acre(s) | Minimum # Samples Per Field | Minimum # Field Locations | Days Between Samples |
|---|---------------------|-----------------------------|---------------------------|----------------------|
| Corn (grain) | | | | |
| 5 consecutive plants | 1 per 2 Ac | 20 | 5 | 7 |
| Cotton | | | | |
| Plant (terminals) | 2 per Ac | 50 | 20 | 3-4 |
| Whole Plant (after9-1) | 1 per Ac | 25 | 25 | 3-4 |
| 1/3 grown squares | - | 100 | 100 | 3-4 |
| Grain Sorghum | | | | |
| Whorl (before bloom) | 2 per Ac | 100 | 10 | 7 |
| Head (during bloom) | 2.5-3 per Ac | 50 | 10 | 2-3 |
| Head (after bloom) | 2.5-3 per Ac | 50 | 10 | 7 |
| Peanuts | | | | |
| 3 row feet-shake cloth | 1per 2-3 Ac | 5 | 5 | 7 |
| 9" dig at base of plant | 1 | 15 | 15 | 7 |
| Soybeans | | | | |
| 3 row feet | 1per 5 Ac | 4 | 4 | 5-7 |
| Pasture & Hay Fields | | | | |
| 1square foot (1'x1') | 1per 4 Ac | 10 | 10 | 7 |
| Sugarcane | | | | |
| 5 stalks each from 5 stools | 1per 40 Ac | 100 | 4 | 14-21 |
| Strawberries | | | | |
| Uniform areas – same variety, plant date, etc. | | 25 leaflets or 10 flowers | 25 | 7 |
| Tomato, Peppers, Snap Beans: refer to comprehensive guides | | | | |

Five Steps of IPM

- **Scout:** Consistently inspect and monitor for pests and their natural enemies.
- **Identify:** Accurately identify the pests and their natural enemies, and understand their behaviors.
- **Set Action Thresholds:** Determine the level of damage that can be tolerated before action is warranted.
- **Apply IPM Methods:** Use a multi-tactic approach that integrates four methods of pest management (cultural, physical, biological & chemical control).
- **Evaluate the IPM Program:** Use pest ID and scouting data, review management methods and their effectiveness, determine which are effective and economical.

Treatment Thresholds for Insect and Disease Pests

| Crop / Insect | Action Threshold – When to Treat |
|---|---|
| Corn | |
| Stink bug | Early silk through milk stage, 1 stink bug per 5 plants. End of milk through the hard dough stages, 1 stink bug per plant. Only stink bugs ¼ inch or longer should be considered. |
| Cotton | |
| Fall armyworm | 15-20 small larvae per 100 plants |
| Beet armyworm | 3 or more active hits per 100 feet of row <u>Conventional cotton cultivars:</u> in fields previously untreated for bollworm, 30% eggs or 20% small larvae. In previously treated fields, 25%-30% eggs or small larvae. <u>Bt transgenic cultivars:</u> 8-9 larvae > ¼ inch per 100 plants |
| Budworm/Bollworm | When > 50% of plants are infested with live aphids. |
| Cotton aphid | When > 50% of plants are infested with live aphids. |
| Plant bugs | 6-7 per 100 sweeps |
| Stink bug | When there is 1 stink bug per 6 feet of row (drop cloth) or 15%-20% boll damage |
| Spider mites | When there are >9 mites per leaf. Spot treat infestation |
| Thrips | 2 thrips per plant up to 5-leaf stage |
| Whiteflies | When > 50% of terminals are infested with adults. |
| Grain Sorghum | |
| Corn earworm, fall armyworm | Before heading, when 5% or more of the plants have fall armyworm egg–masses or newly hatched larvae. Treatment may be justified when 50% or more of the plants have live worms present in whorls. After heading, when there are 1-2 or more worms per head |
| Sorghum Midge | From early bloom stage to late milk stage, when there are 1 or more adult midges per 2 heads |
| Sorghum webworm | When there are 3-5 or more worms per head |
| Peanuts | |
| Beet armyworm, corn earworm, fall armyworm | Before the plants have met in the middles, when there are 3-4 worms per foot of row. If the plants have met in middles, when there are 4-5 worms per foot of row. After the plants have completely covered the middles, when there are 5-6 or more worms per foot of row. |
| Cutworms | When there is 20% or more defoliation due to cutworms and cutworms are present. |
| Lesser corn-stalk borer, Southern corn rootworm | Before pegging, when 10% or more of plants are infested with borers or rootworms. After pegging, if 15% or more of the plants are infested. |
| Spider mites | When leaf discoloration due to mite feeding is evident and mites are present. |
| Soybeans | |
| All foliage feeders | <i>Soybean defoliation should not be permitted to exceed 30% anytime during plant development.</i> See inside back cover |
| Beet armyworm | When there are 10 or more worms per foot of row. (Treat when worms are less than ½ of an inch) |
| Corn earworm, fall armyworm | Before bloom, when there are 4 or more large (greater than ½ of an inch) worms per foot of row. After bloom, when there are 1 or more large worms per foot of row. |
| Soybean looper | When there are 4 or more loopers per foot of row. (Treat when worms are less than ½ inch) |
| Three cornered alfalfa hopper | When 15% of the plants less than 12" tall show stem damage and there is an active population of nymphs. |

| | |
|------------------------|--|
| Stink bug | After pods have set up to mid-podfill, when there is one stink bug nymph (greater than ¼ of an inch diameter) or 1 adult per 3 feet of row. After mid-podfill, when there is 1 large nymph or adult per 1 foot of row. If soybeans are being grown for seed, treat when the population exceeds 1 large nymph or adult per 6 feet of row anytime after pods have set. |
| Velvetbean caterpillar | Before bloom, when there are 10 or more worms per foot of row. After bloom, when there are 4 or more large (greater than ½ of an inch) worms per foot of row. At growth stage flowering to pod fill with cool temperatures, if rust has been identified in the region fields or sentinel plots, consider a fungicide application. |
| Asian soybean rust | |
| Sugarcane | |
| Sugarcane borer | 2-3 live larvae per 100 sampled stalks |
| Strawberries | |
| Mites | Apply miticide when 2 to 5% of the leaflets infested with one or more spider mites |
| Thrips | Sample at least ten newly-opened flowers per homogeneous area. Apply a thrips insecticide if there is an average of 5 or more thrips (adults or nymphs) per flower. |
| Worms | Spray any uniform areas where 1 or more plants have an active worm infestation. |
| Pasture / Hay | |
| Fall armyworm | When there are 2-3 larvae per square foot |
| Grass loopers | When there are 2-3 larvae per square foot |
| Mole crickets | If noticeable stand loss is evident |
| Spittlebugs | In-season treatment is seldom justified. Problem fields may benefit from burning the field in late February/early March. |

For most crop, ornamental, forest and livestock enterprises in Florida, find a fact sheet in **edis** titled "Insect Management in..." with complete scouting, sampling and threshold information, pest descriptions and controls:

http://edis.ifas.ufl.edu/TOPIC_GUIDE_Insect_Management_Guide

Specific, detailed and comprehensive IPM/Scouting Guides are available: Growers IPM Guide for Florida Tomato and Pepper Production
http://ipm.ifas.ufl.edu/resources/success_stories/T&PGuide/index.shtml

Integrated Pest Management for Florida Snap Beans

<http://edis.ifas.ufl.edu/pdffiles/PP/PP11700.pdf>

Commercial Ornamental Nursery Scouting Manual

<http://mrec.ifas.ufl.edu/Iso/SCOUT/INTRO.htm>

Water Quality - Point Source Contamination Prevention

- Don't mix chemicals within 200 feet of wells, ditches, streams or other water source
- Prevent back-siphoning: use check valves and an air gap between fill hose and chemical tanks or nurse tanks
- Store pesticides and fertilizers in a secure location away from water sources
- Triple rinse or pressure wash pesticide containers, and put rinsate in the spray tank
- Identify vulnerable sites, especially sinkholes, and avoid pesticide or fertilizer application near them or their watershed