

Rice University Mission in Integrated Pest Management (IPM)

“To maintain a healthy environment for all who live, work, and visit the campus.”

IPM definition: Effective and environmentally sensitive approach to pest management with the least possible hazard to people, property, and the environment. Taking advantage of all options including, not limited to pesticides both natural and synthetic, by using a four step approach.

- 1) Identifying pest and monitoring
- 2) Setting a threshold the campus can tolerate
- 3) Program for prevention
- 4) Control methods when preventative is no longer working

The Rice University grounds department follows the IPM strategies for turfgrass and ornamentals that were developed by Texas A&M’s Department of Entomology and published in 2014.

The IPM strategies for turfgrass are described here: <http://landscapeipm.tamu.edu/ipm-for-turfgrass/ipm-planning-for-turfgrass/>

The IPM strategies for ornamentals are described here: <http://landscapeipm.tamu.edu/ipm-for-ornamentals/ipm-planning-for-ornamentals/>

These strategies are included as a supplement to this mission document for reference only. Please note that they are the work of the Texas A&M University Department of Entomology.

Landscape IPM

IPM Planning for Turfgrass

Key Points

- Select insect and mite resistant or tolerant species species, cultivars or varieties when planting or re-planting turfgrass areas
- Use minimum amounts of slow-release nitrogen fertilizer
- Maintain minimal thatch layer
- Mow and water properly
- Avoid unnecessary use of pesticides which destroy organisms that decompose thatch and other beneficials
- Scout and monitor for pest populations using one or more of the available techniques:
 - liquid irritants (1 oz liquid soap per gallon of water) sprinkled over a square yard of turf causes mobile above-ground pests to come to the surface;
 - black light traps monitors June beetle (adults of white grubs) and sod webworm moth flight peaks;
 - flotation technique for monitoring chinch bugs where an opened coffee can is driven into the thatch filled with water, and the chinch bugs float to the surface; and,
 - 3-to 4-inch diameter, 4-inch deep core samples are used to monitor white grubs

Chemical Treatment

Decisions to implement insecticide treatments should be based on current or historic detection of the pest and/or damage occurrence, and not on a scheduled, preventive insecticide-based treatment regimen. More often than not, the occurrence of damaging levels of insect pests is an indication of a more basic agronomic problem (e.g., too much or too little fertilizer, watering practices) that, if corrected, will prevent further outbreaks of these “secondary” pests. However, even when sound agronomic practices are closely followed, a probability of pest outbreaks exists. When outbreaks do occur, effective methods of suppressing damaging population levels must be implemented.

Table 1. The approximate seasonal occurrence of major arthropod pests on turf, particularly for the coastal and central regions of Texas (—’s and XXXX’s indicating the hypothetical occurrence and period of peak activity and TTTT’s possible treatment periods).

Commodity and Pest	Month											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Turf	-	-	-	-	-	-	-	-	-	-	-	-
<u>Fall armyworms</u>	.	-	—	—	-	.	.	-XTX-	XTXT	XTX-	—	.
<u>White grubs</u>	.	.	—	-XX-	XXXX	—	-TT	TT—	T—	-	.	.
<u>Chinch bugs</u>	.	.	.	—	-XX-	-XT	XTXT	XTXT	XTX-	.	.	.

Mole Crickets	.	.	.	.	-TT-	-TT	.	-XXX-	XXXX	XXXX	-	XX	.	
Bermudagrass stunt mite	.	.	.	.	.	.	.	.	.	.	.	.	.
Fire ants	-XX-	XX	-	XTX	XTTX	XTXT	-XX	-XX-	-XX-	XTXTX	XTXT	-	XX	XX
Fleas	.	-	-	-XX	-XXX-	-XX	-XX-	-XX-	-XX-	-XX-	-XX-	---	-	-
Ticks	-	-	-X	XXXX	XX-	-	XXXX	XXXX	X-X	XXX-	---	-	-	-
Chiggers	.	.	-	-XX	XXXX	X-	---	---	---	-	.	.	.	.

Action Thresholds

Armyworms: Treat when large numbers of small-to-medium-size worms are present and damage is becoming excessive.

White grubs (immature June beetles): Examine turf during the suggested treatment period. Treatment is justified when more than 4 grubs per 1-foot (4 inches deep) per 1000 ft² of lawn are found, or if there is a history of annual outbreaks.

Chinch bugs: Treatment should be initiated at first signs of damage when chinch bug populations are present.

Crickets (field crickets, mole crickets): Treat when annoying populations exist and damage becomes evident. For mole crickets, test when young nymphal stages are present (late May, June).

Mites (Banks grass mite, Bermudagrass stunt mite): Treat or mow when mites are present and causing damage.

Fire ants: Treat to prevent mound or ant activity that interferes with turf usage, using the best combination of tactics to achieve management objectives.

Fleas: Treat as part of a total flea management program that includes treatment of household, pets and yard.

Ticks: Treat when ticks become numerous.

Chiggers: Use repellents when entering infested areas. Use insecticide applications to suppress bothersome infestations when they occur.

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Landscape IPM

IPM Planning for Ornamentals

Because the ornamental landscape is composed of a combination of different species and varieties of plants, designing a single management program for the entire landscape is extremely difficult. Each species has its own requirements for maintaining plant health, and each has its own level of tolerance to arthropod damage before its health and/or aesthetic value is threatened.

Selecting Pest-Free Plants

One of the key components of IPM is selecting the right plants. When establishing new landscapes, select low maintenance, environmentally adapted, pest free species. Plant breeders are constantly improving plants to be pest-resistant.

- [List of plants that are susceptible to arthropod pests](#) from Know It and Grow It (Whitcomb 1983)
- [Select Plants by Adaptability Region](#) – Earth Kind web site
- The Importance of Using Native Plants in the Landscape:
 - [Native Plants: An Overview](#)
 - [The Native Plant Database](#)
 - [Using Native Plants in the Golf Course Landscape](#)
 - [Introducing Native Plants](#)
 - [Texas Native Trees](#)

Pest Suppression

Determine your goals for management. Decide what level of damage can be tolerated prior to taking action to suppress pest populations. In general, little or no damage can be tolerated on plants produced for sale, or highly valued plants in prominent positions in the landscape, whereas plants in a landscape maintenance program can sustain some damage from pests before their health and/or aesthetic value becomes impaired.

Pest suppression tactics are best implemented when the pests causing sufficient damage (or threaten to cause sufficient damage) first appear. Take action during the most vulnerable life stage(s) of the pests. [Scout and monitor](#) for insect and arthropod pest populations using

- Visual inspections of randomly selected sets of leaves
- The “beat method” where pests are dislodged from their host plants by beating plant parts on a piece of paper (this method is great for detecting mites, thrips and scale crawlers)
- Using yellow sticky traps to attract winged aphids, thrips, whiteflies, fungus gnats and shore flies (this method is best suited to the greenhouse)
- Black light traps
- Pheromone traps

Remember that the mere presence of the pest is not necessarily justification for treatment. Inspect plants to determine that the pest is beginning to cause plant damage prior to treatment.

For some pests, notably scale, aphids and phylloxera, management begins during the winter when dormant oil can be applied prior to the swelling of the buds. On evergreen plants, use a lighter (summer) oil or check the label to ensure that application of the oil will not result in plant injury (phytotoxicity). Selection of pesticides for the suppression of pests on ornamental plants is extremely important since some species are sensitive to them. Follow the label directions and use products on plants listed there. If the label is general (i.e. “use on ornamentals”) test pesticides on a few of the plants and observe any phytotoxic reactions that may develop prior to treating all the plants.

Practice good sanitation in the landscape, removing dead limbs, dead leaves (particularly those harboring insect-caused galls), and remove hiding places for trash pests such as millipedes, sowbugs, pillbugs, snails and slugs. During the off-season, repair and maintain equipment and update your pesticide product label and material safety data sheet file. Don’t depend solely on your memory to remember label instructions and rates. Labels change over time.

Table 1. The approximate seasonal occurrence of major arthropod pests on ornamentals in the coastal regions of Texas (X’s indicate the period of peak occurrence and possible treatment periods).

Commodity and Pest	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Trees & shrubs	.	.	.	.	.	.	.	.	.	.	.	.
Aphids	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Scales	XX	XXXX	XX-X	-X-X	-X-X	-X-X	-X-X	-X-X	-X-X-	X-X-	X-X-	---
Bagworms	XXXX	XX	.	-XX	XXXX	XX-	---	---	---	.	.	.
Cankerworms	.	.	-XX	XXXX	XXXX	X-	.	.	.	.	.	.
Tent caterpillars	.	.	-XX	XXXX	XXXX	X-	.	.	.	.	.	.
Fall webworms	.	.	.	XXXX	XXXX	X-	---	-XXX	XXXX	XXXX	.	.
Walnut caterpillar	.	.	.	.	---	---	-X	XXXX	X---	.	.	.
Lacebugs	.	.	-X	XXXX	XXXX	XX-	---	---	.	.	.	.
Elm leaf beetles	.	.	---	-X	XXX-	X-X-	X-X-	---	---	.	.	.
Borer beetles	.	.	.	---	---	---	---	---	---	---	.	.
Twig girdlers	.	.	.	.	.	.	.	-	---	---	-	.
Mites	.	.	.	--	--	--	--	---	---	--	-	-

Aphids: Many species of aphids exist and they mainly affect ornamentals. High populations of some species build up during winter months on evergreens or bedding plants and populations build up rapidly on new growth in the spring. Some species, such as wooly aphids, are favored by hot dry weather.

Scales: Like aphids, species are numerous and biologies differ. Generally, control includes applying dormant oil and/or insecticide treatments timed to correspond to the hatching of scale eggs and the appearance of the crawler stages. Control may require 2 to 4 applications at 7 to 10-day intervals.

Bagworms: Hand-pick bags in the winter to eliminate spring populations. If impractical, treat in spring when new bags are less than 1/2-inch long.

Cankerworms: If practical, prevent wingless females from depositing eggs in the fall by placing a band of sticky material around the base of the tree 3 to 4 feet from the soil.

Tent caterpillars Eastern, Western, Forest and Sonoran): Inspect trees for egg masses in the winter and remove them, if practical. After eggs hatch and tents appear, prune nests from trees and/or destroy them or spot treat if feasible.

Fall webworms: There are 2 to 4 generations per year. In winter and early spring, egg masses and webs can be removed and/or destroyed if practical. Otherwise, webs can be spot-treated or plants can be sprayed when webs are numerous and worms are not fully grown.

Walnut caterpillars: There are 2 to 3 generations per year in Texas, with the last one being the most damaging. Monitor for egg deposits and hatch on the undersides of leaves and treat if small worms are numerous.

Lacebugs: Populations begin to build up in early spring. If feasible, wash off nymphal populations. Otherwise treat when damage becomes evident on highly valued ornamentals.

Elm leaf beetles: Check undersides of leaves for yellow eggs and young larvae in March or April. If present treat 3 weeks after leaves have emerged and again in 2 to 3 weeks. Continue to monitor at 2 to 3 week intervals throughout the summer and treat if reinfestation occurs.

Borer beetles (roundheaded, flatheaded, and caterpillars; many species): Maintain tree health to make trees less attractive to borer beetles. Practice proper pruning and use wound paint during the summer months. To protect highly valued or stressed trees, chemically treat regularly at 3 to 5 week intervals throughout the summer unless the biology of the borer species involved is known.

Twig girdlers (Genus *Onciders*, three species): Remove and/or destroy girdled limbs in fall or protect small highly-valued damage-prone trees during the fall with insecticide treatments applied at 3 to 5 week intervals until trees lose their leaves.

Mites: Outbreaks occur anytime during the year, particularly during dry months or following use of certain broad-spectrum insecticides. Treat when mites are present and damage becomes noticeable.

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