L-1244

DESTRUCTIVE MITES IN THE GARDEN AND HOME LANDSCAPE

Frank E. Gilstrap and Clifford E. Hoelscher*

Many mite species are associated with home lawns, vegetable gardens and ornamental plants. Because mites are very small they usually are not noticed until present in large numbers. Adult mites typically have eight legs and no antennae or wings, thus, they are in the same class as ticks, spiders, scorpions and "harvestmen" or "daddy longlegs." Mites differ from insects in the following ways:

Adult Mites	Insects
8 legs	6 legs
no antennae	2 antennae
no wings	usually 4 wings

Most mite species feed not on plants, but on organic matter in the soil, on other mites or on small insects. However, several mite species do attack house and garden plants. The most common of these are spider mites and eriophyid mites.

This publication is designed to provide the homeowner with information needed to recognize and control damaging mite infestations.

Spider mites are oval-shaped, about 1/25 of an inch in diameter, and when viewed through a magnifying glass appear to be sparsely covered with long hairs (Figure 1). Many members of this family are gregarious and some produce large quantities of fine webbing.

Eriophyid mites, commonly called gall mites, rust mites or bud mites, are much smaller than spider mites (about 1/25 of an inch long) and produce no webbing (Figure 2). These cigar-shaped mites are difficult to see, even with the aid of a magnifying glass. Mites from both families feed by inserting their mouthparts into a plant and sucking out plant juices.

*Assistant professor, Department of Entomology, Texas Agricultural Experiment Station, The Texas A&M University System; and area Extension entomologist, Texas A&M University Research and Extension Center at Stephenville.

SPIDER MITES (Family *Tetranychidae*)

Spider mites usually begin colonies on the undersides of leaves. Early plant damage is seen as "stippling" or "sandblasting" at the site of the colony. Spider mites develop through egg, larval and two nymphal stages before molting to adults. The eggs are spherical in shape and about 1/4 to 1/3 as large as the adult female mite. Newly deposited eggs are translucent, and vary from cream color to bright orange or red, depending on the mite species. A six-legged larval stage hatches from the egg. Two nymphal stages follow the larval stage and each nymph has eight legs, as does the adult mite.

In some spider mite species, only females are known. In other species, unmated adult females produce only male young, though after mating mostly female young are produced. Males are about 1/2 to 3/4 as large as adult females and are arrowhead-shaped. The following are the most common spider mites in Texas.

Two-Spotted Spider Mite (*Tetranychus urticae* Koch)

Description and Life History. The two-spotted spider mite feeds on a wide variety of plants and is one of the most common mites attacking home gardens and ornamental plants. The adult female is pale yellow or pale to dark green with conspicuous dark spots on each

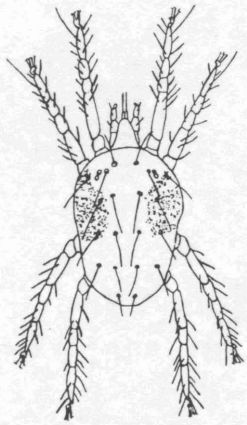

Figure 1. A spider mite of the family Tetranychidae.

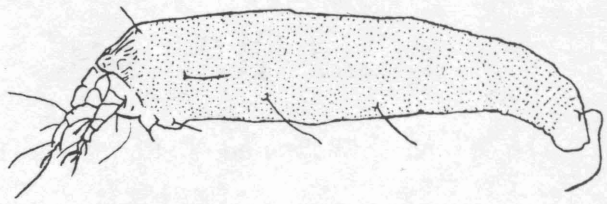

Figure 2. A rust mite of the family Eriophyidae.

side. These darkened areas are caused by food showing through the transparent body wall. The eggs are spherical, clear and colorless when first laid, becoming opaque and finally ivory just before hatching. The newly hatched larva is colorless at first, though it becomes greenish after feeding. Both nymphal stages are green to pale yellow. Two-spotted spider mites usually overwinter as adult females on the host plant or in nearby debris. These overwintering females are pale orange to straw-colored and active, though they do not produce eggs during the winter. In mild climates or in greenhouses, adult mites may remain active and reproduce year-round.

Two-spotted spider mites usually begin colonies on the undersides of plant leaves. Webbing is visible to the naked eye and all stages of mite development occur in and beneath the webbing. Many female mites may be present in each colony, and several colonies may be present on each infested leaf. Small colonies usually begin near a leaf vein and with favorable weather spread rapidly to nearby leaves and plants.

The rate of population increase is highly dependent on the weather. Dry, hot weather (80 to 90 degrees F) is most favorable to mite reproduction. Such weather also intensifies feeding damage to the plant. A single female mite produces from 2 to 20 eggs per day, for a total of about 150 to 200 eggs during her 2- to 3-week lifetime. Development from egg to adult requires 5 to 15 days.

As the host plant becomes seriously injured and damaged leaves turn yellow or brown, mites begin to migrate to uninfested plants. During heavy migrations, thousands of mites can be seen clustered on leaf tips at the tops of infested plants. Migrating mites occasionally form long chains of individuals hanging from the plant. Individual mites drop from the chains and walk or are carried by wind to other plants.

Damage. Feeding usually takes place on lower leaf surfaces, though occasionally upper leaf surfaces are infested. Light to moderate infestations on lower surfaces are indicated by stippling on upper leaf surfaces. As feeding continues and the mite population increases, leaves become lighter in color as a result of the mites removing the green chlorophyll from leaf tissue. Heavily damaged leaves turn tan or bronze, become dessicated and usually die.

Carmine Spider Mite (*Tetranychus cinnabarinus* Boisduval)

Description and Life History. The carmine spider mite is dark red to carmine in color with a dark area on each side. Eggs of this mite are light orange to red. The biology of the carmine spider mite is essentially the same as the two-spotted spider mite, and these species attack the same host plants. Carmine mites are quite common on outdoor plants and in greenhouses, and can multiply explosively.

Damage. The carmine spider mite usually feeds on the lower surface of the leaf as does the two-spotted spider mite. Light infestations cause stippling which becomes progressively worse with higher populations. Webbing is usually abundant and high populations may web over entire leaves.

Pecan Spider Mite (*Eotetranychus hicoriae* McGregor)

Description and Life History. The pecan spider mite is a straw-colored to pale green mite with several to many dark spots along the back and sides. This species feeds on pecan, chestnut, hickory and oak trees throughout the eastern United States. It initiates small colonies on both sides of leaves, though it occurs principally on the undersurfaces. Bright yellow females hibernate in protected places on tree bark or in limb crotches.

A second species of spider mite, *Oligonychus virdis* (Banks), also attacks pecan trees in southeastern portions of the United States. This mite prefers the upper leaf surfaces, but occurs on both sides of infested leaves.

Damage. Pecan spider mites are not considered major pests, as they normally are controlled by their natural enemies. However, occasional outbreaks occur, especially after trees have been treated with pesticides to control other pecan pests. These mites cause dark brown or liver-colored blotches and moderate to heavy webbing on the leaflets. Heavy infestations in the early fall may cause premature leaf fall starting at the lower branches. Leaves remaining on the tree appear dry or scorched. Escessive premature foliage loss may prevent trees from blooming properly the following spring.

Banks Grass Mite (*Oligonychus pratensis* Banks)

Description and Life History. The Banks grass mite attacks grassy plants such as garden corn, johnsongrass and Bermudagrass lawns. The adult female is pale to deep green with numerous dark spots on the back and sides.

Mite infestations usually develop first on the undersides of leaves along the main veins. Heavy populations will cause the lower portions of grasses to become matted with webbing. High temperatures are most favorable to population buildups of this mite. Adult females hibernate in plant debris at the bases of host plants.

Damage. This mite usually causes serious damage only in areas of meager rainfall or infrequent irrigation. Thus, lawns or gardens frequently watered are not normally damaged. Symptoms of light infestations on Bermudagrass lawns are seen as stippled leaves and light to moderate webbing at the bases of the plants. Usually, lawn infestations need not be controlled except in late summer when temperatures are high.

Early damage to corn is seen as stippling on the mature leaves, followed by a red coloration at the sites of heavy mite feeding. With dry, hot weather high populations develop very quickly and can kill corn at the tassle stage of development. Such plants look as though they died from lack of moisture, and are usually heavily enveloped in sheets of webbing produced by the many thousands of mites.

Brown Wheat Mite (*Petrobia latens* Muller)

Description and Life History. The brown wheat mite sometimes attacks onions, carrots, lettuce, melons and strawberries, although these mites prefer to feed on grass-type plants. High populations will migrate and may damage gardens and ornamental plants. Only female mites occur. The adult female is dark brown or greenish brown with long, light yellow legs. The front pair of legs is much longer than the body. These mites produce no webbing and may drop to the ground or run rapidly when disturbed.

Eggs are not deposited on the foliage, but on soil particles in the vicinity of host plants. Two types of eggs are produced, depending on environmental conditions. During dry, hot summer weather or during the fall when host plants are in poor condition, a white egg is produced which does not hatch for many months, and then only after exposure to moisture. Subsequent population development is dependent on a lack of heavy rainfall. During dry spring or fall weather, a cherry red egg is produced and population increases are rapid. The brown wheat mite occasionally deposits its eggs inside dwellings. This can be discouraged by maintaining a grass-free band 18 to 24 inches wide around buildings.

Damage. The brown wheat mite is primarily a dry weather pest. Damage is quite similar to that caused by drought, even where there appears to be sufficient moisture. On close inspection of infested plants, leaves are seen to have a fine mottling. When such plants are observed at a distance, a bronzing or yellowing effect is seen. In gardens, infestations usually start in a localized area and then spread rapidly. During early stages of infestation plant foliage turns yellow and later becomes dry and brittle.

Clover Mite (*Bryobia praetiosa* Koch)

Description and Life History. The clover mite feeds on a wide variety of plants including clovers, lawn grasses and ornamental flowers. Populations usually are highest in spring, late summer or early fall. The mite overwinters in the egg stage away from the host plant, though some active stages may survive the winter in warmer climates. Larvae hatch in spring when temperatures are 65 to 75 degrees F. Newly hatched individuals seek host plants on which to feed, leaving the host plants for each molt to the next developmental stage. The dark red females behave similarly, leaving the host plant for egg laying and returning to feed. Eggs are bright red. When conditions become unfavorable for the mites, as when the lawn is mowed or hot summer or cold winter weather approaches, these mites seek shelter on trees or in dwellings, where they remain until conditions improve or until they die. Typically, only the eggs survive unfavorable conditions.

When disturbed, these mites drop from the plant, curl their legs and remain motionless.

Damage. Clover mites produce no webbing, and injury to plants is first seen as a winding, narrow trail of tiny bleached spots on infested leaves. More extensive damage causes the foliage to turn yellow or brown and leaves eventually wilt and die. Mites can be discouraged from entering dwellings for molting or egg laying by maintaining a grass-free band 18 to 24 inches wide around such buildings.

Texas Citrus Mite (*Eutetranychus banksi* McGregor)

Description and Life History. The Texas citrus mite is tan to brownish green with dark brown to greenish

spots on the sides. This mite occurs year-round on Texas citrus, with smallest populations usually found from February to April and largest numbers during May and June. Low relative humidity, temperatures of about 80 degrees F and the absence of rainfall favor buildups of this mite. Low to moderate populations usually occur in the south quadrant of the tree. Texas citrus mites are seen on upper leaf surfaces and produce no webbing.

Damage. Injury to citrus leaves includes stippling, light colored spots and a greyish or silvery appearance. Under conditions of drought or low relative humidity with winds, the combined effects of mites and weather may cause heavy leaf and fruit drop and, occasionally, twig die-back.

ERIOPHYID MITES (Family *Eriophyidae*)

Eriophyid mites are very small, 4-legged mites which cause many kinds of plant damage. Many of these mites inject salivary chemicals into plants during feeding, which causes either leaf discoloration or leaf shape distortion. Eriophyid mites are generally quite specific as to the host plants each species will attack.

The Bermudagrass or couchgrass mite, *Eriophyes cynodoniensis* (Sayed), infests Bermudagrass in climates where atmospheric humidity is low. The mites cause thickened shoots to develop where they then congregate, living under the broadened leaf bases. Grass infested by Bermudagrass mites is tightly bunched and stunted.

The tomato rust mite, *Aculops lycopersici* (Massee), attacks many solanaceous plants including tomato, pepper, potato, eggplant, tobacco and petunia. Plant injury begins at the base of the plant and spreads upward over the leaves and stems. Damage to tomatoes consists of bronzed stems which may crack longitudinally. Leaves turn brown, become paper-like in appearance (though they do not wilt), and may drop if injury is severe. Potatoes do not show stem damage, but the leaves of potatoes dry severely and plants may die from heavy infestations. Eggplant usually supports large populations of the mite, with the damage consisting of distorted or crinkled leaves. The most favorable growing conditions for the tomato rust mite is a temperature of 80 degrees F and 30 percent relative humidity. Developmental time from egg to adult may be only 6 or 7 days. Adult female mites may produce up to 53 eggs during their lifetimes.

The citrus rust mite, *Phyllocoptruta oleivora* (Ashmead), is an occasional pest of citrus in Texas. This eriophyid mite feeds on both upper and lower leaf surfaces and on fruit; however, green fruit and the undersides of leaves are preferred. Warm, humid conditions favor development of this mite. At average summer temperatures of 91 degrees F, development from egg to adult requires about 7 to 10 days. During the winter months or at an average 72 degrees F, development requires 16 days or more. Each female mite lays about 20 eggs during her 10- to 20-day lifetime. These eggs are laid on fruit and on leaf surfaces. Heavy populations of this mite cause bronzing of leaves and green twigs, and loss of vitality. Damage to fruit is only superficial, though deterioration of such fruit may be more rapid than normal.

MITE CONTROL

The most important aspect of mite control is early detection. Repeated checks for infestations, especially in ornamental or vegetable gardens, should be routine. Several leaves from several plants should be checked on both upper and lower surfaces to discern webbing or adult mites. Even low populations can cause damage easily seen by the watchful gardener. Stippling, yellowing or other unusual leaf appearances should be quickly checked by the homeowner.

Chemical Controls. Chemical controls for mites in the home garden are suggested in Table 1, and a list of miticides that can be used in the home landscape is given in Table 2. Mite control is often difficult because of resistance to the miticide used. The homeowner must be sure to achieve complete spray coverage of infested plants. Many of the miticides are contact materials, and the spray solution must come in contact with the mites to achieve satisfactory control. Repeat applications (two to four) of a miticide are generally required for satisfactory control. Read all label instructions carefully before using a miticide material. Store all unused materials in a locked area to avoid accidental poisoning of small children or pets.

Non-Chemical Control. Plant-feeding mites, particularly spider mites, are generally highly susceptible to destruction by water. When feasible, a fine, hard stream of water (through an ordinary garden nozzle) will usually kill most mites present. The nozzle should be held 4 to 8 inches from the infested leaf surface and moved across the leaf to get full coverage. The water stream should be directed at the leaf surface where most mites are present and each leaf should be completely wetted. Destruction of the webbing by water washes most mites from the plant and causes others to become helplessly entangled. In either case, those mites wetted by water are killed and cause no further damage. However, eggs are unaffected by this procedure and a few mites are frequently missed in the initial washing. Thus, washings should be repeated two or three times at 3- to 5-day intervals to kill newly hatched mites and escaped adults.

Table 1. Suggested miticides for the home garden and days from last spray application to harvest.

*Do not use; not an Environmental Protection Agency registered use.

	Diazinon	Kelthane	Malathion	Sulfur	Ethion
Beans	7 days	7 days[1]	1 day	0 days	10 days[2]
Beets	*	*	*	0 days	*
Cantaloupes	3 days	*	1 day	0 days	*
Carrots	10 days	*	*	0 days	*
Corn	1 day	*	*	0 days	50 days[3] (field)
Cucumbers	7 days	7 days	1 day	*	0 days
Mustard greens	*	*	*	0 days	*
Okra	*	*	*	*	*
Peanuts	*	*	*	0 days	*
Peas	*	*	3 days	*	*
Peppers	*	2 days[4]	*	*	0 days[5] (0.5 lb/acre) 21 days (1.0 lb/acre)
Potatoes	*	*	*	0 days	*
Squash	*	2 days[6]	1 day	0 days	0 days (summer)
Tomatoes	1 day	2 days[7]	1 day[8]	0 days	2 days[9] 28 days[10]
Watermelons	1 day	2 days[11]	*	0 days	*

[1]Preharvest interval through 0.6 lb/A spray or 1.5 lb/A dust (beans — 45 day preharvest interval from 0.6 through 0.8 lb/A spray as a foliage application on dry beans only).

[2]1.5 lb/A — Do not make more than one application after the edible parts have formed.

[3]Do not apply more than once after ears have formed.

[4]Preharvest interval through 0.8 lb/A spray or 1.5 lb/A dust — foliage application.

[5]Do not apply more than three times during fruiting period (applicable to the 1.0 lb. rate).

[6]Preharvest interval through 0.6 lb/A spray or 1.5 lb/A dust.

[7]Preharvest interval through 0.8 lb/A spray or 1.5 lb/A dust — foliage application.

[8]2.0 lb/A as a dust or diluted spray; 0.6 lb/A as an undiluted (low volume) spray.

[9]0.5 lb/A spray or 0.8 lb/A dust.

[10]1.2 lb/A — Do not apply more than once after fruit begins to form..

[11]Preharvest interval through 0.6 lb/A spray or 1.5 lb/A dust.

Table 2. Suggested miticides for the home landscape.

	Chlorbenzilate	Diazinon	Kelthane	Malathion	Sulfur[1]	Ethion	Trithion
Bermudagrass		X	X		X	X	
House plants			X				
Roses		X[2]	X	X			
Citrus	X		X				X
Woody shrubs		X	X		X	X	
Marigolds			X				
Pecans		X	X	X	X		
Spring flowering annuals		X	X	X			
Summer flowering annuals		X	X	X			

Follow label directions carefully for rates of application.
[1]Agricultural uses only.
[2]For use in greenhouses.

Cooperative Extension Work in Agriculture and Home Economics, The Texas A&M University System and the United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.
20M — 2-77, Revised LH 4