Euonymus scale

Unaspis euonymi
Order Hemiptera, Family Diaspididae; armored scales
Introduced pest

Host plants: Most species of evergreen euonymus bittersweet, and pachysandra

Description: Adult female scale covers are dark brown, convex, oystershell-shaped and approximately 3 mm long. Male covers are smaller and white. Males are winged, pale orange. Females are yellow. Crawlers are yellow-orange.

Life history: This scale may be found on the leaves, stem, or fruit. Females occur mostly on stems, males mostly on leaves. There are two to three generations a year.

Overwintering: Mated females.

Damage symptoms: Upper surfaces of leaves become yellow spotted as scales feed on the undersurface. In heavy infestations, leaves become white with male covers and plants may lose many of their leaves. Continuous infestations continued over a number of years can cause dieback or plant death.

Monitoring: Eggs of the first generation hatch in Wooster, Ohio when Vanhoutte spirea blooms in mid May (Herms), and in Midland, Michigan when black locust blooms in late May to early June (Herms). Eggs of the second generation hatch in late July. Look on the undersurface of leaves for white male covers and on bark for brown female covers. Look for leaves spotted yellow on the upper surface and for dieback. Before spraying, check for the presence of beneficials such as lady beetle larvae and adults.

Cultural control: Plant the more resistant species of Euonymus, such as *E. alatus* and *E. kiautschovicus.* Variegated varieties of euonymus are more susceptible than green. All *E. fortunei* 'Vegetus' are highly susceptible.

Chemical control: Controlling scales is best achieved by targeting the crawler stage. Crawlers vary in color depending on species, pale red, yellow, or light brown, and are usually the size of a spider mite, so you will need a hand lens to see them.

Each species has its own particular time when crawlers emerge. Some scales have more than one generation. Crawlers of some armored scales are active in May, while crawlers of many soft scales emerge a few weeks later. However, there are exceptions. For example, magnolia scale crawlers (soft scale) hatch in late summer and early fall, while eggs of juniper scale and euonymus scale (armored scales) hatch in early and mid June, respectively in the Upper Midwest. Some scales have two (e.g. eastern strains of pine needle scale, Fetcher scale) or more (e.g. euonymus scale, San Jose scale) generations each year, depending on location. A good monitoring program is critical for determining the period of crawler activity. Degree day or phenological models provide a seasonal period for monitoring insect populations and timing insecticide application (see chapter 11 by Dan Herms).

Euonymus scale adult female covers and numerous small white developing male covers. (101)
Photo: John Davidson

Euonymus scale male small white covers on euonymus. (100)
Photo: John Davidson

Euonymus scale. (W68)
Photo: Whitney Cranshaw

Euonymus scale (continued)

Monitor scale crawler emergence on individual trees by examining twigs, by tapping a branch over a white sheet of paper, or by applying two sided tape to branches and examining the tape for crawlers at least weekly during the period when crawlers are expected.

Armored scales need to be controlled as crawlers before their waxy cover is produced. This cover protects them from contact insecticides. Only soft scales, not armored scales, produce honeydew, a sugary fluid on which a fungus, sooty mold grows. The black fungus often obscures the female scales beneath. Soft scales can be controlled as crawlers and immatures. Imidacloprid, a systemic insecticide, only controls soft scales.

Timing pesticide application to the crawler stage is very important. Inappropriate timing is not only ineffective, but may be counterproductive. Both armored and soft scales are usually noticed when mature females are present which is not the appropriate time to spray insecticides. Usually the predators and parasitoids (beneficial insects) attacking the scales are killed, while the females are protected beneath their covers. Improper insecticide timing results in poor control, wasted insecticide, and mortality of beneficial insects. Once beneficials are killed, it may take many years for their numbers to increase to the level providing control.

Chemical control: *General information on all scales.*

Conservation of beneficial insects: Use short duration, low residual insecticides, such as horticultural oil, insecticidal soap, and insect growth regulators (IGR).

Foliar applied broad spectrum insecticides, such as acephate, carbaryl, imidacloprid ***(soft scales only)****, and pyrethroids:* Use only when scale populations are high to rescue trees; beneficial insects will also be killed.

Dormant season oil treatments: Use for soft scales that winter as immatures; and for armored scales that winter as eggs under female covers (delayed dormant).

Summer oil treatments: Oil smothers exposed eggs, crawlers, and immature females.

Insect growth regulators (IGR), such as pyriproxifen: Use for crawlers as they disrupt molting.

Soil applied systemic insecticides or trunk injections, such as imidacloprid: Apply imidacloprid in fall for crawlers in spring; **not effective against armored scales**, which feed at different sites than soft scales. Less harmful to beneficial insects than foliar-applied, broad spectrum insecticides.

Biological control: The lady beetle, *Chilocorus kuwanae*, can significantly reduce euonymus scale populations.

Plant mortality risk: High

Biorational pesticides: horticultural oil, insecticidal soap, pyriproxifen

Conventional pesticides: acephate, bifenthrin, carbaryl, chlorpyrifos (nursery only), deltamethrin, fluvalinate, lambda-cyhalothrin, malathion, permethrin

Life-history traits of armored scale (Diaspididae), soft scales (Coccidae), and felt scales (Eriococcidae)

Life-history Traits	Armored Scale	Soft Scale
soft covering attached to the scale insect	no	yes
eggs laid in sac-like structure	yes	yes
overwintering stage	eggs or mated female	mated female or second instar
seasonal time for crawlers	late April thru early July	April thru August
ability to move after crawler stage	no	limited movement from leaves in summer to twigs for the winter
honeydew production	no	abundant
feeding site on the plant	cells of parenchyma	phloem
examples in manual	black pineleaf scale	calico scale
	euonymus scale	cottony maple scale
	gloomy scale	European fruit
	juniper scale	lecanium scale
	obscure scale	Fletcher scale
	oystershell scale	pine tortoise scale
	pine needle scale	spruce bud scale
	scurfy scale	tuliptree scale
	elm scurfy scale	European elm scale (Eriococcidae)