

N.C. Cooperative Extension Pamlico County Center
Scales: Armored (Diaspididae), Soft (Coccidae) and Felt (Eriococcidae)



Oyster-shaped female armored scale cover
(Source: <https://content.ces.ncsu.edu/armored-scale-identification-and->



Yellow spots from euonymus scale feeding
(Source: <https://content.ces.ncsu.edu/armored-scale-identification-and-management-on-ornamental-plants>)

Description: Scale insects feed on leaves or branches of many ornamental plants grown in landscapes and nurseries. Armored and soft scales live beneath waxy covers that protect them from predators, parasitoids, and pesticides. Felt scales have waxy filaments and resemble mealybugs. The waxy cover of armored scales is not attached to the adult body, allowing cover removal to reveal the scale insect hidden below. Armored scales typically do not move once they begin to feed. Soft scales secrete a waxy layer over themselves that cannot be separated from their body. Certain scale insects excrete sugary honeydew and may move from branches to leaves. Black [sooty mold fungus](#) often grows on this honeydew.

Scale insects are typically small and inconspicuous. They are in the insect order Hemiptera with six legs as well as antennae but often lose these features as they mature. The protective covers often blend well with plant bark so populations may become very large before being detected or a plant shows noticeable damage. Therefore, scouting to detect populations early is especially important for plant species that are frequently infested by scale insects.

Damage: Scale insects damage plants by feeding on plants and extracting plant fluids. This can reduce plant growth and vigor, and spread disease. Common symptoms of infestation include premature leaf drop and branch dieback. Infestations are common on trees stressed by physical damage, drought, temperature, or improper planting. Heavy infestations might kill a tree or shrub.

Biology: The scale insect life cycle includes egg, pupa, nymph and adult stages. When eggs hatch, the newborns are called crawlers because they actively wander around to find a place to feed. They do not have covers for protection. Once they choose a spot, they either rarely move or stay put for the rest of their lives; at this point, they are referred to as

“settled.” As they grow, these settled crawlers quickly develop their waxy shell and, for some species, lose their legs.

Mature males are winged in order to find mates, but they are so tiny that they are rarely seen. Mature female scale do not have wings and die after laying eggs. Generally, soft scale insects have one generation per year, while armored scale insects have several, though there are exceptions. Females lay eggs either entirely under their protective covers or under an additional secretion of fluffy, cottony wax.

Although many scale species from many families can be pests of ornamental plants, the primary families are armored scales (Diaspididae), soft scales (Coccidae), and felt scales (Eriococcidae). The distinction between these families is important because behavior and management of each group can be different.

Types of common armored scales:

- **Euonymus scale** – Look for euonymus scale on leaves and stems of *Euonymus* spp. but also pachysandra, hollies, and camellias. The female scale cover is oyster-shaped, gray, and 1-1.5 mm long. Males are white (0.75 mm) with no cover and two visible wings. In North Carolina there are three generations per year with first crawlers emerging in early May then in 6-8 week intervals. Typical damage symptoms include yellow spots on the upper side of leaves where scales are present beneath and sparse foliage from leaf drop ([Figure 5](#)).
- **Tea scale** – Tea scale is most common on the underside of camellia and holly leaves. [Female tea scale covers](#) are brown and boat shaped. Males are soft and white with a ridge down the back. Hatching occurs through much of the year rather than in discrete generations. Symptoms include yellow spots on the upper surface of infested leaves on camellia. Infestations are heavier on interior leaves.
- **Gloomy scale** – Gloomy scales primarily infest the trunk and branches of red maple trees but can infest other trees. They are convex, gray, and occur in dense patches. [Mature female covers](#) have a dark spot (shed skin) just off center whereas male covers have a spot near the cover edge. They have one generation per year with crawlers active for 6-8 weeks in early and mid-summer. This complicates management by making it hard to target crawlers with a single insecticide application. Heavily infested trees have dark gray bark, sparse canopies, and branch dieback.
- **Obscure scale** – [Obscure scale](#) is most common on the trunk and branches of oak and hickory trees. It is relatively flat and gray. There is one generation per year. Crawlers are active for a variable and extended period in mid-summer.
- **Juniper scale** – Juniper scale feeds on stems and leaves of junipers, cypress, false cypress, and arborvitae. [Adult scale](#) covers are circular and white with a yellow center

1-2 mm in diameter. There is one generation per year with crawlers present in May or June. Damage includes needles that are off color and may turn brown or die.

Example of soft scale:

- The **terrapi scale**, *Mesolecanium nigrofasciatum* (Pergande), is an occasional pest of tree fruits and shrubs. Like other scale insects, this species remains immobile (sessile) throughout most of its life cycle and secretes a rigid, hemispherical covering over its body. This protective cover (called a derm) is brown or reddish-brown and distinctively marked with radiating black bands resembling the shell of a turtle. The derm increases in size as the insect grows, eventually reaching a diameter of 3 to 4 mm (about 1/8 inch). Terrapi scale populations can be detected at any time during the year, but they are most conspicuous in late summer when sooty mold coats the foliage or in autumn after the leaves have fallen. Young scale may be found earlier in the summer by examining the undersides of leaves.

Example of felt scale:

- **Crape myrtle bark scale** – Adult female crape myrtle bark scales, *Acanthococcus lagerstroemiae*, are dark red with short legs and antennae and long, thread-like mouthparts. The insect is usually hidden from view by the egg sac or ovisac, a white covering of felted or matted white threads. The sac is about 1/8 inch long and 1/16 inch thick. Pink to reddish purple eggs are laid within the egg sac, occupying the void left by the female's shrinking body. Eggs are laid in late April. They hatch about 3 weeks later in early May. This new generation matures during the summer and produces eggs that hatch in September. Newly hatched nymphs, called crawlers, are pink, tiny and crawl out of the egg sac onto the bark where they settle especially near twig crotches. Crawlers soon penetrate the bark and begin to feed by sucking out sap. They begin excreting honeydew and secreting white threads. These nymphs are inconspicuous and practically free of any waxy covering when very young. Mature females tend to feed in crotches and on twigs. Adult males have two wings and are tiny gnat-like insects. Male nymphs tend to feed on leaves. Crape myrtle bark scales overwinter as nymphs feeding through the bark. Look for crape myrtle bark scales in rough areas around branch collars which is where populations usually start. However, as the population increases all the bark may be covered. These scales are often noticed because trees become covered in black sooty mold. If you notice unusually heavy honeydew and sooty mold on crape myrtles take a closer look at the bark.



Crape myrtle bark scales on a branch collar of crape myrtle. Photo: SD Frank (<https://entomology.ces.ncsu.edu/wp-content/uploads/2020/04/cropped-single-scalereduced.jpg>)

Control: Scout for scale insects in early spring to monitor any crawler activity. Many natural enemies help reduce scale abundance and damage. If evidence of predation (scales chewed open) and parasitism (circular holes in scale covers) are present, you may decide to monitor the population rather than treat them with insecticides or use a product with less impact on the beneficials. When insecticide applications are necessary, dormant oil applications can be made in winter to kill scales on trunks and branches. During the growing season target the scale crawler stage with horticultural oil (most effective during temperatures of 50 – 55 degrees Fahrenheit), systemic insecticide, insect growth regulator, or other insecticide labeled specifically for armored scales. Imidacloprid does not kill armored scales even though it will kill soft scales and felt scales. Insect growth regulators can be used during the peak scale crawler stage to inhibit the formation of scale exoskeletons.

There are efficacy data available reporting drench applications of neonicotinoids are typically effective against crape myrtle bark scales. However, since crape myrtles flower continually and attract a slew of pollinators be sure to read the labels for restrictions on using them. Insect growth regulators such as pyriproxyfen and buprofezin are effective for many other scales and may be a good option. Horticultural oil, especially the heavier dormant rate, is also generally effective and a low toxic option. Crape myrtle bark scales are fed upon by many lady beetles and other predators so be cautious with insecticides.

It is nearly impossible to control the terrapin scale with insecticide treatments applied during the growing season because the scale covering is impervious to most materials. The best results are obtained when applications are timed to coincide with the active period of the crawlers or when dormant oil sprays are applied before bud break in the spring. Careful pruning can also help control light or scattered infestations of scale insects. See the North Carolina Agricultural Chemicals Manual for specific management information. Also see [NC State Extension PDIC sheets](#) for information on specific scale identification, life cycle and control methods.

Recommendations for the use of agricultural chemicals are included in this publication as a convenience to the reader. The use of brand names and any mention or listing of commercial products or services does not imply endorsement by NC State University or N.C. A&T State University, nor discrimination against similar products or services not mentioned. Individuals who use agricultural chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Be sure to obtain current information about usage regulations and examine a current product label before applying any chemical. For assistance, contact your local N.C. Cooperative Extension county center.

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References:

[Armored Scale Identification and Management on Ornamental Plants | NC State Extension Publications](https://content.ces.ncsu.edu/armored-scale-identification-and-management-on-ornamental-plants) (<https://content.ces.ncsu.edu/armored-scale-identification-and-management-on-ornamental-plants>)

[Introduction to Scale Insects | University of Maryland Extension,](https://extension.umd.edu/resource/introduction-scale-insects/)
<https://extension.umd.edu/resource/introduction-scale-insects/>

NC Extension Gardener Handbook ([Insects Chapter](#))

[Time to Scout for Crape Myrtle Bark Scale | NC State Extension](https://entomology.ces.ncsu.edu/2020/04/time-to-scout-for-crape-myrtle-bark-scale/)
(<https://entomology.ces.ncsu.edu/2020/04/time-to-scout-for-crape-myrtle-bark-scale/>)

Crapemyrtle Bark Scale PDIC Factsheets <https://content.ces.ncsu.edu/crapemyrtle-bark-scale>

[Terrapin Scale in Blueberries | NC State Extension](https://entomology.ces.ncsu.edu/terrapin-scale-in-blueberries/)
(<https://entomology.ces.ncsu.edu/terrapin-scale-in-blueberries/>)

Scale Insects Life Cycle and Management presented by the NC Cooperative Extension Cabarrus County Center <https://www.youtube.com/watch?v=Ktwqsb8Lemk>
<https://www.youtube.com/@CabarrusCE>

Potential scale video site: Landscape plantings with host plants; *Euonymus* spp., pachysandra, hollies, and camellias.