

THE SOFT SCALES

By Douglas C. Allen

The assemblage of organisms referred to as “scales” consists of creatures so unusual in appearance it is difficult to convince people that they are insects. Several families (a family is a taxonomic subdivision of closely related groups of individuals) of these highly modified insects infest forest trees and ornamentals. All are specialized for an immobile life attached to some part of a host from which they remove large amounts of sap. The common name “soft scales” generally refers to members of one family, the Coccidae (cox-i-dee). The variety of forms and colors displayed within the family, however, has resulted in more descriptive common names for certain groups of coccids; for example the wax scales, lecanium scales and tortoise scales.

DESCRIPTION

Adult coccids are relatively soft-bodied compared to most other scales. Adult females of the most commonly encountered species are either slug-like (Fig. 3) or resemble a piece of popcorn (Fig. 1). Males are unknown for most species, and even when known are rarely seen.

Adult females do not have wings, legs or antennae, and their bodies lack the distinct segmentation typical of other insects. For most species, dispersal is accomplished by the first stage nymph (the immature that hatches from the egg). This stage is called a “crawler,” because usually it is the only immature stage of soft scales that has functional legs. The tiny crawlers can survive several days without feeding and can move



Fig. 2. Pine tortoise scale. Note sooty mold fungus at bases of needles (arrows).

surprisingly long distances on the host plant or from one plant to another.

FEEDING BEHAVIOR

Scales have very fine, threadlike mouthparts called stylets, which are inserted through the bark of a twig or the skin of a leaf or fruit and used like a straw to extract host sap. Because plant sap contains excessive quantities of sugar and water, far more than these insects need for nutritional purposes, scales have a specialized digestive system which allows large amounts of this sweet mixture to bypass the stomach. This material, called “honeydew,” is quickly excreted and often covers plant parts (and vehicles parked beneath infested trees!), creating a sticky surface and giving foliage and

bark a spotted or shiny appearance. Frequently, ants and wasps are attracted to honeydew and utilize it as a food source. Sooty mold fungi also may take advantage of this substance as a source of energy.

EXAMPLES

Three species of soft scales that the forest owner is likely to encounter are cottony maple scale, tuliptree scale and the pine tortoise scale. The general appearance of these examples typifies many of the common soft scales.

The most conspicuous stage of **cottony maple scale** looks like a piece of popcorn attached to maple twigs or the twigs of several other eastern hardwoods, including species frequently used as ornamentals. The female is flat and usually less than 1/4” in dia. with a median ridge. It is reddish-brown and often possesses a large, white egg sac that can be twice as big as the insect (Fig.1). Eggs are deposited beneath this waxy covering in early spring. Newly hatched nymphs (the crawlers) leave twigs in early summer and move to foliage where all nymphal stages feed. Adult females move back onto twigs in early fall to overwinter. At this time, they are not accompanied by an egg sac and are inconspicuous. They become more obvious by late spring or early summer after egg sacs have been produced. Rarely is cottony maple scale abundant enough to damage woodlot maples.

Pine tortoise scale prefers Scots, jack and Virginia pines but also occurs on red and white pines. This species can be es-



Fig. 1. Cottony maple scales (brown objects) with egg sacs. Arrow indicates the front (“head”) end of a scale.

(Cont’d)

8 pecially troublesome in Christmas tree plantations. The convex (slug-like) adults are approximately 1/4" in dia., dark reddish-brown or black, and marked on the back with reddish or cream colored blotches or spots (mottled) (Fig.2). The latter impart a "tortoise shell" appearance, hence the common name. It spends its life on twigs of seedlings and saplings. Adult females overwinter on host twigs where they deposit eggs in early spring.

Like the two previous examples, **tuliptree scale** is native to eastern North America. It prefers twigs and stems of yellow poplar and magnolia. Heavy infestations are common and the large (1/4" to 1/2" in dia.), convex, grayish-green to light orange adult females are very conspicuous (Fig.3). This species overwinters as an immature (nymph) on host twigs.

DAMAGE

Heavy scale populations have the potential to kill the host, especially young plants. Generally, however, scale feeding results in chlorotic (yellowish) foliage, dead twigs, sometimes early leaf fall, and/or extensive growth of a sooty mold fungus that develops on the honeydew. This mold may be heavy enough on foliage to inhibit photosynthesis. Generally, however, its principle



Fig. 3. A cluster of tulip-tree scales.

effect is to detract from aesthetic quality, because the black mold coats twigs and foliage making the plant look as if dusted with charcoal.

MANAGEMENT

It is impractical to consider chemical control of soft scales under forest conditions. However, heavy infestations in pine plantations (e.g., pine tortoise scale) or on ornamentals (many species, including all three examples described above) may re-

quire action to preserve the value and/or appearance of the host.

When chemical control is required, timing of the application is critical. Crawlers are most vulnerable to chemical control because of their mobility and exposure, which enhance the likelihood that they will contact spray droplets. Pine tortoise scale crawlers are present in late June and those of the cottony maple scale appear in late June to early July. Crawlers of tuliptree scale, on the other hand, emerge from eggs and search for feeding sites in late August to mid-September. In all cases, the chemical is applied to infested bark of twigs or stems.

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