

SCALE INSECTS WITH A HARD COVERING

By Douglas C. Allen

The insect world is divided taxonomically into approximately 31 different Orders or groups of insects that share certain general characteristics, such as type of mouthparts, wing structure and kind of metamorphosis. The latter refers to the manner in which an insect changes form as it grows. The Order Homoptera [*home-op-terra*] contains a very diverse group of sucking insects like aphids, adelgids, mealybugs, cicadas, leafhoppers, and scales. The most distinguishing feature of families that constitute this group is the presence of piercing-sucking mouthparts. Also, these insects undergo an incomplete metamorphosis which is defined by only three life stages (egg, nymph and adult). The more advanced insect groups like moths, beetles, wasps, and flies have four life stages: egg, larva, pupa, adult. Two of the most important types of homopteran pests of ornamental and shade trees are the soft scales, described in the Nov./Dec. issue of the NY FOREST OWNER, and a group known collectively as armored scales.

Importance - armored scales include many species that are serious pests of agricultural crops as well as trees and shrubs. Rarely do they kill woody plants, but their feeding can detract from the appearance of a tree by altering foliage color, reducing foliage density and occasionally killing individual branches within the crown.

The presence of an armored scale infestation often goes undetected due to the

insect's small size, their unusual appearance and the secretive nature of some species.

General Appearance - armored scales are highly specialized and, like the soft scales, do not resemble typical insects. Adult females are wingless and legless. Males (rarely seen by the casual observer) of some species lack mouthparts altogether and have a single pair of wings. In other species they are wingless and resemble a smaller version of the female. A single pair of wings is unusual as most adult insects (except wingless forms and true flies which also have only one pair) possess two pairs of wings. After settling down to feed, armored scales cover their body with secretion which, combined with caste nymphal skins, imparts a very characteristic appearance to each species. The covering protects the insect and its eggs. Winged males lack this covering and appear like a more conventional insect.

The first nymphal stage (the form that hatches from the egg) has legs and often is referred to as a "crawler". Other than winged males, it is the only stage capable of active dispersal. Once it locates a suitable feeding site on the host plant, the crawler settles down permanently and inserts its mouthparts into plant tissue. Of all the life stages, the crawler is most vulnerable to mortality. It is very susceptible to low humidity, temperature extremes, excessive rain, and lack of suitable sites for settling on the host. As it feeds, the scale excretes a waxlike material that covers its

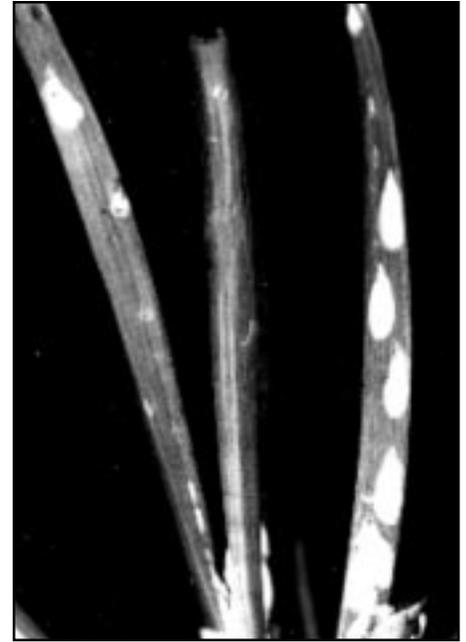


Fig. 2. Pine needle scales

body and, in the case of the female, eventually this structure is enlarged to form a covering which protects the eggs (Fig. 1).

Biology - many armored scales that are important pests of trees and ornamentals overwinter as eggs beneath the waxy covering. Eggs hatch from May to early June, depending on geographic location. Two or more generations a year often occur in southern parts of a species' distribution.

Scales feed by inserting their threadlike mouth parts into plant tissue and extracting plant juices that contain the products of photosynthesis.

Pine needle scale - this is certainly the most common armored scale infesting pines, most especially Scots and mugho, and it is very familiar to Christmas tree growers. The waxlike covering is bright white and very distinct on the green background of host needles (Fig. 2). It is a common pest of ornamental pines throughout the United States and Canada. The tan colored "head" of the scale is actually the caste skin of the first nymphal stage (crawler). The purplish body of the female resides beneath the waxlike covering immediately behind this structure (see Fig. 1).

High populations give host foliage a whitewashed appearance. Heavy and pro-

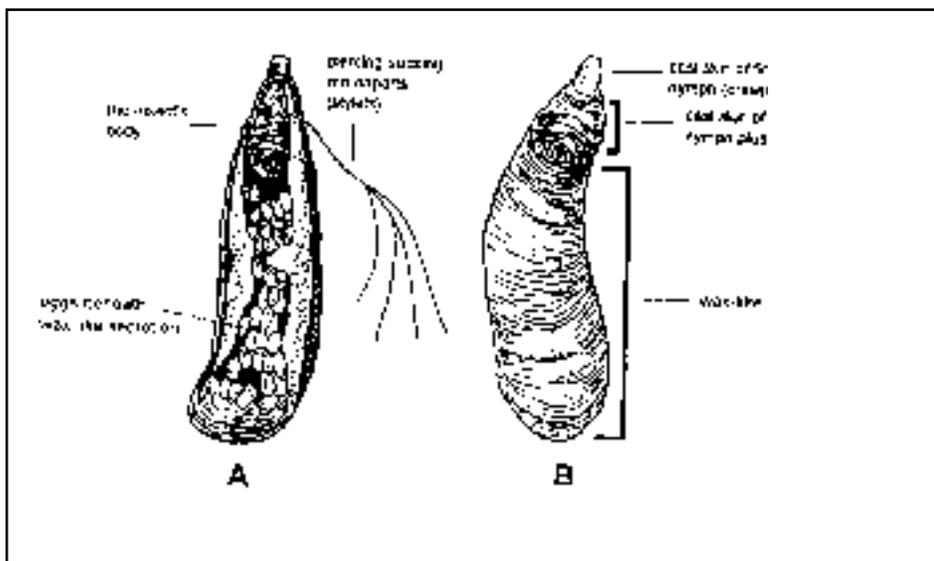


Fig. 1. A, ventral or bottom view of female oystershell scale; B, dorsal or top view.

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10 longed infestations may cause foliage to turn yellow or brown and needles may drop prematurely.

Oystershell scale - of all the armored scales, this species is probably the one most frequently encountered on broadleaved trees and shrubs throughout North America.

It has over 100 known host plants. Heavy infestations are especially commonplace on ash, beech, apple, aspen, and maple. The straight to slightly curved (oystershell-like) covering varies from chestnut to dark brown or may even have a distinctly grayish or black caste as it ages, depending on the host. This scale usually attaches to smooth bark, not foliage (*Fig. 3*). The body of the adult female is whitish and visible only if the covering is removed.

As with most species of scales, heavy infestations may result in discolored foliage, crown dieback or occasional death of a branch. A heavily infested branch or section of tree trunk that harbors a dense population often looks as if it is encrusted with coral or a thin layer of rough cement. Males of both species are wingless and have a covering which is similar in color to that of the female but much smaller. The "mature" female scale (insect plus covering) of both species is 1/16" to 1/8" long (*Fig. 3*).

Pest management - direct control is not practical under forest conditions but, fortunately, infestations are usually restricted individual trees or small groups. However, control may be important when infestations occur in Christmas tree plantations or on ornamentals.

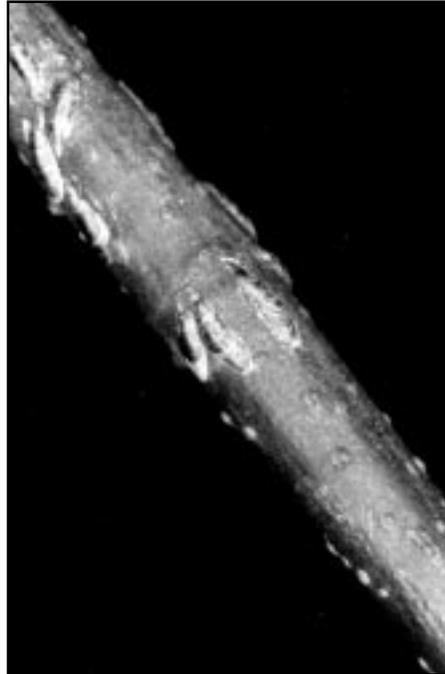


Fig. 3. Oystershell scales.

Both species are subject to mortality from insect parasites and predators, but generally these natural enemies are unable to contain populations when suitable hosts are available and environmental conditions favor survival.

Dispersal is passive compared to many insects, because adult females are unable to fly and movement from plant to plant relies mostly on wind that blows crawlers from one host to another. In dense plantings where branches from individual trees intermingle, however, crawlers are very likely to walk to adjacent plants. Therefore, careful spacing of susceptible landscape plants will reduce the likelihood of this movement.

Several synthetic organic chemicals, horticultural oils and insecticidal soaps are available for use, but several treatments may be required and timing is critical. ▲

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