THE SOFT SCALE (COCCUS HESPERIDUM) INFESTING HOLLY ON VANCOUVER ISLAND

(A Preliminary Report)

by Harry Andison*

The soft scale (**Coccus hesperidum** (L.)) has become very prevalent on holly trees in many parts of the southern Vancouver Island district during the past year. It was first noticed in the vicinity of Victoria, B.C., during February, 1938; specimens were forwarded to the Division of Entomology at Ottawa, and were subsequently determined by Dr. Harold Morrison of Washington, D.C. Additional holly trees were examined during the course of the 1938 season when we observed the soft scale spreading very rapidly. A black fungus (probably **Meliola camelliae** Catt. with which this scale is associated) was found to be present wherever the scale infestations occurred. Specimens were found as far north as Duncan.

The establishment of the soft scale and the sooty-mold fungus on holly in British Columbia is a serious menace to the production and exportation of holly for the Christmas season. Plant quarantines restricting the free movement of the scale-infested holly, focussed the attention of the commercial growers upon this pest and created an immediate need for information upon its life habits and control.

Nature and Extent of Injury

The injury caused by the soft scales is due not only to the feeding by extracting of the juices from the plant but also to the sooty-mold fungus which develops in the honeydew that the scales secrete. This honeydew falls upon the upper surface of the leaves, stems and berries of the holly and such areas eventually become almost completely covered and blackened with the sooty coating of the fungus. Holly so affected is unsightly and is not saleable. Where infestations are severe, the smut-like covering is injurious to the tree by interfering with its respiration. The sugary exudation is also a means of dispersal of the scale, by causing them to adehre to the feet of perching birds which will then carry the scales to other trees. Ants constantly seen about the infested trees feeding on the honeydew during the spring and summer are also responsible for the rapid spread of the scale within an orchard.

Host Plants and Distribution

This species of scale, which was formerly placed in the genus **Lecanium**, has long been known to science, being one of the first of the soft scales to be studied and described. It is the commonest, most widely spread member of the sub-family **Coccinae** (9), occurring out of doors throughout the world in the tropical and sub-tropical regions,

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and in greenhouses in the cooler regions. Originally from Europe, it is also reported from Algiers, Japan, Australia, New Zealand, Chili, Hawaiian Islands, South Africa and North America (6). In North America it is common on ornamentals in the south west, infesting chiefly oleander in Arizona, Texas and New Mexico; in the coastal zones of Florida (9) and southern California (4) it is often a pest to young citrus trees. In northern regions, the soft scale has been present for a number of years as a major pest of greenhouse crops. Its establishment on holly in the Victoria district appears to be the first record of its occurrence in Canada as an economic pest of plants grown out of doors.

The food plants as recorded in literature number approximately seventy-five. Those of most economic importance are as follows: apple, apricot, box elder, clematis, citrus, grape, holly, English ivy, laurel, peach, pear, phlox, plum, poplar, rose and willow. Since February 1938, when this scale was first reported infesting English holly (**Ilex** sp.) at Victoria, B.C., we have also observed it on sweet bay (**Laurus** sp.) in this district, and on a species of ivy **(Hedera colchica)** at Duncan, B.C. Further survey work may disclose its appearance on some of the other hosts mentioned.

Life History and Habits

There appears to be more than one generation of the scale each year under Victoria conditions and many adults and nymphs in various degrees of maturity are present throughout the season on the same branch. In the citrus areas in California the soft scale has as many as four generations each year (8) and it is principally the trees less than six years old that are attacked. In contrast to this we find holly trees 15 years old and more are severely infested.

The females of this species are oval, flat, soft, turtle-shaped scales, changing in color with age, from transparent yellow to deepening shades of brown. The mother or adult female scale which gives birth to living young is very much swollen, becoming a stationary cap filled with small nymphs. The young nymphs are thin and transparent so that they are scarcely noticeable on the surface of the leaf or branch. The male scales are very slender, smaller and lighter in color than the mature females. The adult males are yellow, exceedingly minute two-winged flies.

These soft scales suck the sap from the tissues like the armoured scales do, but they move about and are able to withdraw their beak and insert it at will. All the immature stages are gregarious and migrate to and attack the tender new leaf and stem growth during the spring and early summer. During this period the insect develops and spreads rapidly, congregating along the midribs and large veins on the stems and on both sides of the leaves. As many as 140 scales of various sizes have been found developing on a single holly leaf, frequently becoming so thick as to overlap.

A concise report on the description and distinguishing characteristics of this scale is contained in "Scale Insects of Missouri", by Hollinger (5).

Control

In the citrus areas in some parts of the United States, natural enemies play an important part in keeping the scales from becoming a serious pest. The internal hymenopterous parasites **Aphycus flavus** Howard, **Microterys flavus** (Howard), **Coccophagus lecanii** (Fitch) (4), and **Coccophagus scutellarius** (Dalman) (1) are probably the principal ones. The fungus parasite Cuban Aschersonia (**A. cubensis** Berk. and Curt.) has also effectively controlled the scale in several places in southern Florida (9). Where the parasites do not check the scale infestations on citrus trees, the application of oil sprays is recommended as the best method of control.

Extensive tests conducted during the months of September and October at this laboratory, showed that an oil emulsion containing 2 per cent oil (viscosity 55, unsulfonated residue 80) in combination with nicotine sulphate 1 to 800, was not injurious in any way to the holly trees, and gave 95 to 100 per cent control of the soft scale.

Summary

The Soft Scale (**Coccus hesperidum** (L.)) was observed as an economic pest of holly in the southern region of Vancouver Island during February 1938. This is the first record of its occurrence in Canada as an economic pest of plants grown out of doors. Infested leaves, stems and berries eventually become covered with a sooty-mold fungus which develops in the honeydew secreted by the scales. Holly so affected is unsightly and is not saleable. Up to the present time in this region holly and sweet bay are the only plants found to be attacked and there appears to be more than one generation of scale developing. Additional survey work and life history studies are required to secure complete data. Spraying the infested trees during the fall months, using a 2 per cent oil emulsion with nicotine sulphate added, proved to be an effective method of control.

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