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C. F. H. Jenkins

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INSECT *Pests* AND THEIR CONTROL

By C. F. H. JENKINS, M.A., Government Entomologist

THE SAN JOSE SCALE

Quadraspidotus perniciosus (Comst.)

By C. F. H. JENKINS, M.A., Government Entomologist

THE San Jose scale (pronounced San Hozay), sometimes known as the pernicious scale, has been described by American authors as potentially capable of doing more damage than any other insect occurring in orchards of the Pacific North-West. Fortunately the pest is not the scourge in this State that it is in many parts of Europe and America, but on account of the strict quarantine barriers raised by many countries against fruit even lightly infested with San Jose scale, the matter of its control is of paramount importance.

The original home of the scale is believed to be China, but the popular name is derived from San Jose, California, where the insect was inadvertently introduced about 1870 and from whence it spread to many parts of the United States. It is now widely distributed in many parts of the world and reached Western Australia some time prior to 1897.

DESCRIPTION

Like the citrus red scale the San Jose scale is what is called a hard or armoured scale, that is, the protective shell-like covering is relatively hard, and detachable from the living insect.

The scale of the adult female is about one-twelfth of an inch in diameter and so smaller than the majority of scales met with on local fruit trees. It is circular, ashy-brown in colour with perhaps a lightish centre or nipple. The insect that lives beneath the scale is a delicate pear-shaped creature yellow in colour. Like all

scale insects it possesses long hair-like mouth parts which are inserted deeply into the plant tissues. The half-grown scales are darker than the adults, appearing almost like black dots to the unaided eye. The male scale is smaller than the female and oblong in shape. The actual male insect is an active winged creature with thread-like plumes forming a kind of tail characteristic of many male scale insects.

LIFE HISTORY AND HABITS

The young of this scale are born alive and commence to make their appearance in the early summer. Accurate local figures are not available, but in America the average reproductive period for a female is about 40 days during which 400 offspring may be produced.

On first emerging, the young, or "crawlers," lead an active life, having well-developed legs and antennae or feelers. They soon settle down however, and with the first moult, or skin shedding,

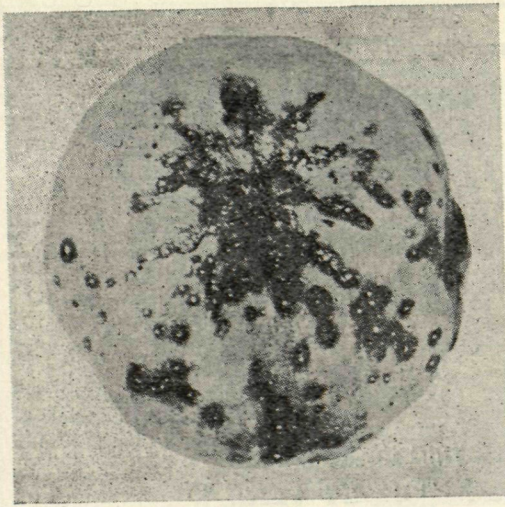


Fig. 1.—San Jose scale on apple, showing the scales themselves and the typical discolouration caused by them

lose all appendages and remain fixed for life. After a second moult, maturity is reached. The time required for this development varies from about six weeks in the summer to several months in the winter. The young are seldom active for more than a few hours or perhaps two days and usually settle near the parent. They then commence to cover themselves with cotton-like threads which finally mass and form with the cast skins a continuous scale covering.

Several generations may develop locally but development varies with individuals and so scales of various ages may be found at one time on a single tree. The winter is usually passed in the immature state, the scales of the last generation gradually developing so as to reach maturity by the following summer.

TYPE OF INJURY

Apart from the loss of sap endured by trees heavily infested with this scale, certain toxic effects are attributed to its attacks which aid in the killing of young shoots and limbs and finally of the tree. The scale infests all parts of its host, leaves, fruit and branches, and even when the scale has been knocked off, especially on fruits, the reddish discolouration of the skin and flesh beneath betrays the former whereabouts of the pest.

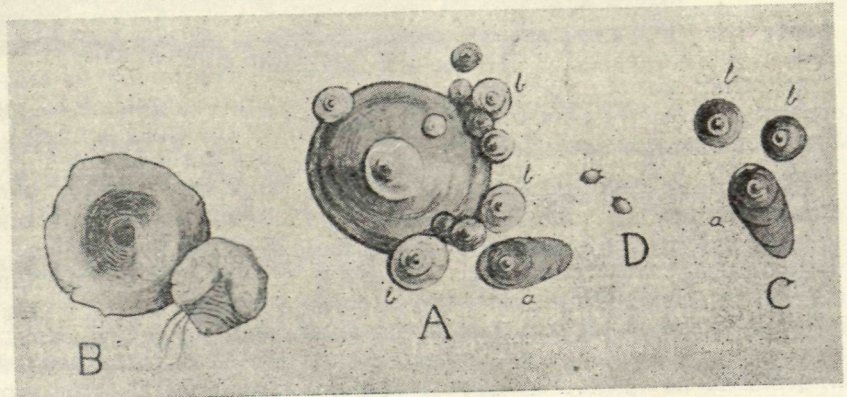
HOST PLANTS

The most seriously affected fruits in this State are apples and pears, but nectarines, peaches, plums and many other deciduous plants are also liable to attack. As previously stated, its importance is not so much on account of its uncontrollability or the actual damage done, as to the serious losses sustained by would-be apple exporters when a whole line may be condemned on account of a few infested fruits.

DISTRIBUTION AND MEANS OF DISPERSAL

The pest is by no means universally found in our local orchards but has a wide and scattered distribution. On this account it behoves all orchardists to take steps to control it where present and prevent its introduction where they are fortunate enough to be free. Infested nursery stock is undoubtedly the chief means of spreading this pest. As regards internal spread in an orchard, wind is probably the most important factor, but "crawlers" may

Fig. 2.—Various stages of San Jose scale, all enlarged about 15 times. A—Adult female scale with immature young of various stages settles around and upon her; B—An adult female scale turned over revealing the insect herself with the bristle-like mouth-parts exposed; C—An adult male scale with two immature winter-stage scales; D—Young crawlers soon after birth



also cling to the legs of birds and insects or to other foreign bodies and be carried certain distances.

INFLUENCE OF CLIMATE

The reason this scale has not assumed the role of a major pest from the point of view of actual damage done in Western Australia, is probably due to climatic conditions. It is possible that the relatively long dry summer is not congenial to the insect and so prevents it from reproducing to the maximum. The relative lightness of local infestation has sometimes been attributed to parasites and predators but unfortunately there is little evidence to support this contention.

CONTROL

Control measures, which are compulsory on orchards where the scale is present, must be taken in the late dormant period. Early September is the best time for applying lime sulphur or superior dormant oil to apple trees but an earlier treatment will be necessary on some stone fruits. Of equal importance to time of application is the need for a complete wetting of the trees by the spray. A thorough cover by the spray solution on every twig and in every crevice in the bark is necessary for, unless spraying is properly done, much time and effort may be wasted.

It should be remembered that San Jose scale will attack all kinds of deciduous

fruit trees, so that stone fruits such as peaches and nectarines must not be neglected. They should receive an early "spot" spraying in August to ensure application before blossoming.

Sprays recommended are:—

1. Dormant Period:

Superior dormant oil 3 gallons to 100 gallons of water.

Or lime sulphur 14 gallons to 100 gallons of water.

2. Summer Period:

White spraying oil 1 gallon; 50 per cent. Malathion.

1½ pints; water 100 gallons.

On badly-infested properties two dormant sprays, one of lime sulphur in August and another of superior oil in September are strongly recommended for the elimination of this pest in one season.

As well as dealing with San Jose scale these sprays are effective against other scale insects and various types of mites including the bryobia mite.

An important feature to remember in connection with any spray programme is that how you spray is just as important as the material you use.

Correct material applied thoroughly at the right time will give good scale control.

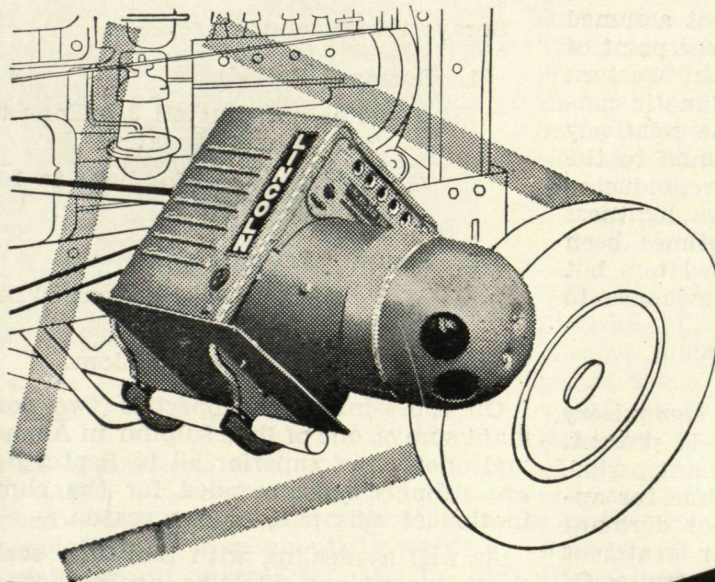
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