

## Citrus Pests

**I**N this month's notes it is proposed to discuss citrus scale insects recorded in New Zealand, their recognition and control. Before doing so, a brief outline of their place in the classification of insects will be given.

Insects are characterised by the following points:—

1. Small size—not more than 3 inches across.
2. Body divided into three segments—head, thorax and abdomen.
3. Body covered by an external non-living cuticle or shell.
4. Three pairs of legs, jointed and attached to the thorax.
5. Wings, if present, also attached to the thorax.

The insect pests recorded in New Zealand can be subdivided into:—

1. Chewing insects.
2. Piercing and sucking insects.
3. Rasping and sucking insects.

1. **Chewing Insects**, by moving their mandibles from side to side actually chew the plant tissues. Citrus chewing insects are Dicky-rice-weevil, *Maleuterpes spinipes*, Leaf-roller-caterpillar, *Tortricid moth spp.*, and Citrus-borer, *Aemona hirta*.

2. **Piercing and Sucking Insects** have the mandibles and maxillae joined to form a proboscis which the insect inserts into the plant tissues and through which it absorbs the sap of the tree. Citrus piercing and sucking insects are: Black aphid (*Aphis citricidus*); Mealy bug (long-tailed) (*Pseudococcus adonidum*); Mealy bug (short-tailed) (*Pseudococcus maritimus*); Circular-black-scale (*Chrysomphalus rossi*); Hemispherical scale (*Saissetia coffeae*); Olive-scale (*Saissetia oleae*); Red-scale (*Aonidiella aurantii*); Hard-wax scale (*Ceroplastes sinensis*); Soft-wax scale (*Ceroplastes destructor*); Cottony cushion scale (*Icerya purchasi*).

3. **Rasping and Sucking Insects** have three sharp horny needle-like organs which rasp the plant tissues and then suck the sap from the wounds. In this category are Thrips, *Heliethrips haemorrhoidalis* and the Red-mite (a spider) *Paratetranychus citri*.

Scale insects are characterised by the fact that the adults have a sedentary habit and either live beneath a scale or have the upper surface thickened with a horny or waxy material. Male scale insects have 1 pair of wings or are wingless; the females are always wingless. Most scale insects lay eggs but the Red-scale, *Aonidiella aurantii*, is viviparous. Scale insects are spread from tree to tree at the "crawler"

stage by wind, birds, or by men through transporting infested fruits, prunings, young trees or implements. Rain also washes larvae from the higher to the lower parts of a tree.

Of all the scale insects, the two most serious in their effects on citrus trees are the Hard-wax-scale and the Red-scale.

The Hard-wax-scale, *Ceroplastes sinensis*, is becoming very common and is a serious menace not only to citrus trees, but also to ornamental and native trees and shrubs. The Hard-wax-scale is readily visible and is characterised by:—

1. Its waxy appearance.
2. The thick red blood-like juice it exudes when squeezed.
3. Honey dew being copiously secreted and on this the sooty-mould

fungus, *Capnodium citricolum* grows.

4. The star-shaped appearance of the young which may be seen along the main and side veins on the upper surface of the leaves generally in May.
5. The adults being usually found aggregated on the stems.

The Red-scale *Aonidiella aurantii* is relatively small and yellowish to reddish-brown in colour. Unlike the Hard-wax-scale, no honey dew is secreted so the presence of Red-scale cannot be detected by any Sooty-mould. The Red-scale infests the foliage, twigs, trunk and fruits of citrus, being more prevalent on lemon fruits than on the fruits of orange and New Zealand grapefruit. Red-scale thrives on sickly trees and its early detection is very important. The main trunk of a tree may be covered with Red-scale before the branches, twigs or fruits show infection. It may thus occur that an orchard which may appear to be free from Red-scale, is really severely infested and, when conditions are favour-

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