

# Scale Insects

## European Fruit Scale and San Jose Scale

March, 2016

### European Fruit Scale

#### Hosts

Mainly apple, especially Newtown, McIntosh, Rome Beauty, Delicious, Winesap and crabapple; also on prunes and pears.

#### Damage

**Bark** - Only slightly discoloured, very light brown under scales.

**Fruit** - Red spot around scale on all varieties except Newtown.



*European fruit scales on Rome Beauty*

#### Identification

**Crawler** - Less than 0.5 mm long, wingless, yellow to orange in colour with legs and antennae.

**Whitecap** - Sedentary with white loose shell-like cotton.

**Blackcap** - Hard, gray to black cone-shaped shell on or under rough bark of trunk and large limbs or on fruit. Peak of shell is off-centre and has no grooves around it. Central area of underside of shell coloured black or deep yellow to orange. The shell covers a bright yellow immobile insect.

#### Life History

European fruit scale overwinters in the immature blackcap stage on or under rough bark of scaffold limbs. Adults mature in spring, and winged males emerge near the pink stage of apples. Males fly or walk to reach pheromone-emitting females. The sedentary, shelled females produce living young called crawlers. Crawlers move to new feeding sites on fruit or bark, insert their sucking mouthparts to feed, secrete wax to form a shell and then lose their eyes, legs and antennae. There is only one generation per year.

#### Monitoring

Inspection of fruit at harvest or in the packinghouse will indicate whether a problem exists. Also look under scaly bark for scales; use double-sided sticky tape to detect crawlers on branches.



European fruit scales ('shells' removed) on apple



Clusters of scales on apple

## Control

**Cultural** - Pruning to keep trees low and elimination of long pruning stubs will improve spray coverage.

**Biological** - Native predators and parasites are not adequate to prevent fruit infestation.

**Chemical** - Apply thoroughly one or more sprays to protect fruit in infested blocks. A single well-applied spray at tight cluster will give adequate protection in orchards where there is no encrusted scale. Blocks with large trees having encrusted scale under rough bark require careful attention to spray coverage. Recommended spray timings and products:

**Dormant to tight cluster** - See San Jose scale for recommended products and spray coverage.

**Pink** - Apply Diazinon against male scale to prevent mating and reproduction. Consider this spray as a supplement to tight cluster treatment. Note: last use for Diazinon is December 31, 2016.

## San Jose Scale

### Hosts

All tree fruits, many ornamental trees and shrubs.

### Damage

**Bark** - Dead areas in inner bark; twigs and branches girdled.

**Leaves** - Small, brown dead spots in summer.

**Fruit** - Red spots and deformed tissue surrounding scale.

### Identification

**Crawler** - Less than 0.5 mm long, yellowish, flattened, wingless, with legs and antennae.

**Whitecap** - Shell white and loose, like cotton.

**Blackcap** - This stage resembles a hard, gray to black, cone-shaped to oblong shell on smooth bark of twigs and small limbs, leaves or fruit, size variable. Peak of shell is central and ringed by one or two grooves. Central area of underside of shell coloured black or gray to yellow. The shell covers a bright yellow immobile insect. Inner bark on branch under the scale is coloured red to purple. A red spot forms around the scale on fruit.

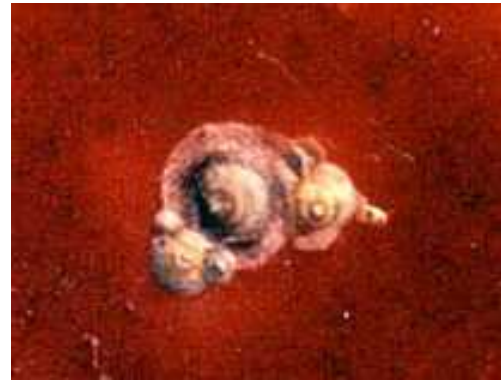
**Adult male**- 1.5 mm long, yellowish with a dark band on back and two transparent wings.



San Jose scale damage to apple

## Life History

San Jose scale overwinters in the immature blackcap stage on bark in tops of trees. Adults mature in spring and winged males emerge at full bloom to petal-fall of apples. Males fly or walk to reach pheromone-emitting females. The immobile females produce living young called crawlers. Crawlers move to new feeding sites on fruit or bark, insert their sucking mouthparts to feed, secrete wax to form a shell and then lose their eyes, legs and antennae. There are two to three generations per year.



*San Jose scale on fruit, "daughter and mother"*

## Monitoring

A pheromone trap is available to attract adult males, but may indicate a later emergence than actually occurs because in cold, windy spring weather males walk rather than fly to reach the females. Wrap double-sided sticky tape around infested branches to detect first emergence of males or crawlers. Inspection of fruit at harvest or in the packinghouse will indicate whether a problem exists.

## Control

**Cultural** - During harvest mark areas where many scale are seen. Prune out heavily infested branches and long pruning stubs that interfere with spray coverage. Consider removing large old trees with encrusted scale.

**Biological** - Native predators and parasites are not adequate to prevent fruit infestation.

**Chemical** - Infested blocks need one or more annual sprays to protect the fruit. A single well-applied spray at tight cluster will give adequate protection in orchards where there is no encrusted scale. Blocks with large trees having encrusted scale under rough bark require careful attention to spray coverage and additional post-bloom sprays.

**Spray coverage** - Complete spray coverage of the trees is extremely important in controlling scale. Because the scale caps lodge underneath rough bark, the spray material must run down behind loose bark to reach them. Effective control requires at least 2200L/ha of dormant or summer spray mixture.

On large old trees with encrusted scale under rough bark, an even higher volume of spray material is required. Apply the extra volume by handgun to ensure all limbs with rough bark are thoroughly drenched. Alternatively, the trees may be sprayed from four sides with an airblast sprayer using a total of 4500 L/ha of spray mixture. When spraying trees from four sides, use the same travel speed and the same nozzle arrangement as when spraying from two sides, but put half the amount of chemical in the tank. Apply the same amount of chemical per hectare with twice the amount of water.

For satisfactory control with airblast machines, spray at low speed and only under absolute calm. Keep trees as low as possible and remove long pruning stubs that interfere with spray distribution. Remove props from trees before spraying. Recommended spray timings and products:

**Dormant to tight cluster** - dormant oil alone or in combination with Diazinon (will also help control aphids, European red mite and European fruit scale).

**Petal-fall** - Application of Diazinon against male scales will prevent mating and reproduction. This spray varies in effectiveness from year to year because males sometime begin to emerge during bloom when sprays could interfere with pollination. Consider petal-fall treatment as a supplement to tight cluster treatment. Note: last date of use for Diazinon is December 31, 2016.

**Summer** - In orchards with encrusted scale where no petal-fall spray application, two summer sprays of Diazinon are required to prevent crawlers from infesting the fruit. Apply the first spray 5 days after the first crawlers emerge, usually in mid-June. Apply a second spray 2 weeks later. Apply an additional spray if cool weather prolongs crawler emergence. Apply, Movento, Closer, TwinGuard, or Sivanto when crawlers are active. A surfactant (eg. Agral 90) is required for Movento. For best control of scale insect problems use high volume sprays with recommended products to ensure thorough and uniform coverage of tree surfaces.