

Walnut scale

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Walnut scale can be found at significant levels throughout the walnut growing areas in California. Recent observations have indicated increasing populations in some parts of the Sacramento valley particularly on Chandler and Tulare varieties.

Walnut scale is a member of the armored scale family of insects which have a hard waxy covering that is separate from the body. Walnut scale has two generations per year in the Central Valley. The eggs of the first generation hatch in mid-May and the crawlers move around the branches for a short time before settling down to feed. The second generation hatches in mid-August and will molt once before overwintering.

The scales insert their mouth parts into twigs and branches, then suck sap from the tree. Unlike soft scales they do not secrete sticky honeydew. Infested trees may appear water stressed and inside fruiting wood encrusted with scale may die back (fig 1). Heavy populations may cause the bark to split and twigs and limbs to dieback. Walnut trees can endure heavy populations without economic loss. The severity of these visual symptoms associated with heavy populations is used to determine if treatments are warranted.

It is important to be able to distinguish walnut scale from San Jose scale (SJS), another similar armored scale which can infest walnuts because SJS is more likely to cause dieback of branches and even scaffold limbs. Look for the characteristic “daisy” shape of the coverings of walnut scales that is formed as the elongated male crawlers settle under the margin of the female cover (fig 2) and deeply indented margins of the yellow female body that can be seen when the waxy covering is removed (fig 3).

Managing walnut scale

In many orchards, natural enemies will keep walnut scale below damaging levels. Predator beetles and small wasps such as *Aphytis* and *Encarsia* can be effective in controlling scales. This natural control can be disrupted in orchards using insecticides for codling moth and walnut husk fly. Even in orchards such as ‘Chandler’ where insecticides are rarely

used, many orchards have developed high walnut scale populations over the last several years.

Determining treatable levels and spray timing

The dormant or delayed dormant period is the best time for monitoring scale, when scale on limbs and prunings can be easily examined. However, you can still examine the trunk and lower limbs for scale and apply an in season spray if needed directed at the crawler stage. To determine crawler emergence and population levels, encircle a few limbs where scale is evident with double sided sticky tape in early May. Check frequently for the yellow crawlers with a hand lens. Apply a spray once crawlers are detected. Previous research has shown that a spray directed at the crawler stage may have longer lasting effects than the delayed dormant application spray timing.

In season control options

There are several control options available for orchards with heavy walnut scale populations, minimal parasitism, weakened or dying fruitwood, and crawlers detected on sticky tape:

- The insect growth regulator Seize 35 WP. Coverage is very important. Use rates are 4 to 5 oz product/acre and a nonionic surfactant may be used to increase efficacy. Because it is an insect growth regulator, it may take the summer for scale to cycle out.
- Supracide 25WP at 8 lbs product/acre. Do not combine with oil or use more than once per growing season.
- Lorsban 4 EC at 4 pts product/acre. Do not make more than two applications per season.
- Narrow range oils can suppress low to moderate populations during the summer. Do not apply to drought or diseased stressed trees or in temperatures over 90°F. This is the option for organic orchards.

Associated problems

In some orchards where heavy walnut scale and extensive dieback has been observed, we’ve been finding the fungal disease *Botryosphaeria* that causes cankers in infected limbs. Another fungus, *Phomopsis*, has also been isolated from dying limbs where scale was a problem. The general thinking is that the scale weakens these limbs and predisposes them to these fungal diseases. Dead and dying wood should be pruned and removed and scale should be treated in these orchards.



Figure 1



Figure 2



Figure 3