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Light Management in Orchards – Dormant Considerations

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Tree Fruit Advisor*

One of the goals of an efficient orchard system is uniform light distribution throughout the tree canopy. An emphasis is often placed on the role of summer pruning in developing, maintaining and improving this relationship, but the importance of dormant pruning should also be considered.

The dormant season allows growers the opportunity to encounter a different perspective on tree structure, limb placement and number, and tree height. A

great deal of information can be gained by observing how much of a shadow a dormant tree casts when its leaves are absent. In some instances just the scaffold structure of the tree – in the dead of winter – has the capacity to shade a large percentage of the orchard floor. This can translate into severe shading problems in the next season.

Such problems are most apparent in older plum and apricot orchards, but can also occur in peach and nectarine orchards. Much of the time these problems are most easily fixed by complete removal of several large secondary or tertiary scaffolds. This action has several benefits including: 1) immediate improvement of light penetration to the middle and lower parts of the tree, 2) reduction in growing points for interior watersprouts and suckers, and 3) reduction in per tree dormant pruning costs. Other tree responses can include a reduction in fruit set and subsequent thinning requirements, which can be either good or bad depending on the season, and improvement in shoot and spur vigor in the middle and lower parts of the tree.

Plan to spend some time in the orchard thinking about these concepts prior to making your dormant pruning decisions. Steps taken now toward improving tree structure and light distribution will go a long way toward benefiting tree performance next season.

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Meeting Notices

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Management of San Jose Scale with Dormant Applications of Horticultural Mineral Oil

Walt Bentley, Area IPM Advisor, Kearney Agricultural Center

San Jose scale (SJS), *Quadraspiotus perniciosus*, has been a serious pest problem for stone fruit growers in California since first being introduced to the state in 1870. Various insecticides have been used to manage SJS. These have ranged from calcium polysulfide, whale oil, horticultural mineral oils, organophosphate insecticides, and, most recently, insect growth regulators. Many types of dormant horticultural spray oils, Supreme oils, and Superior oils have generally given adequate control although not consistently in all geographic areas. This is especially true for late harvested stone fruits. Because of this organophosphate insecticides have been added to the oils to improve control.

Recently, resistance to organophosphates has been documented in local SJS populations. Even using the very effective insect growth regulator insecticides, such as pyriproxifen (Esteem®), resistance has occurred quite quickly in South Africa. In addition to the problem of resistance, organophosphates have been detected in the Sacramento River and San Joaquin River drainage systems. Studies point to runoff from orchards sprayed during the dormant season as being the cause of this contamination. Organophosphates have not yet been sampled for in the Kings River drainage system but this will occur soon.

Because of the problems mentioned above, the use of horticultural mineral oils applied alone in the dormant season to control SJS was reevaluated in the winter of 1999 and 2000. The results of these evaluations showed excellent control of SJS in four cultivars of plum. These cultivars included Rosemary, Royal Diamond, Black Amber, and Queen Rosa. Information on SJS management

with horticultural mineral oils in the July or August harvested Royal Diamond and Rosemary cultivars is presented here.

In the 1999 studies, 14 tree blocks of the Royal Diamond and Rosemary cultivars were divided into groups which had severe scale infestation, moderate infestation, and high infestation. These levels of infestation were based on the 1998 fruit harvest. The groups of 14 trees (each 14 group block was replicated 4 times) were sprayed with either Volck Supreme oil or Orchex 692 Narrow Range Oil on February 10, 1999. The rate per acre of both oils was 8 gallons in 400 gallons of water mixture. The application was made at 2 MPH. At harvest a total of 1600 fruit were examined for infestation.

Table 1 presents the results of that study. Overall, infestation was 5.75%. However, where scale infestation was lowest in 1998 (1.80% and 10.00%) the oil applications performed better in reducing 1999 infestation. Where scale infestation was highest in 1998 (31.2% and 44.15%), the horticultural oil control of SJS was not as good. Statistically this is termed “interaction” between the 1998 infestation and the results of the 1999 oil treatments. Where SJS populations are moderate to low the 8 gallon oil rates in 400 gallons of water should perform better than where scale populations are high.

In the 2000 crop year studies were done to evaluate whether 400 gallons of water are necessary for effective control of SJS. Groups of 14 trees (replicated 10 times) were sprayed on February 11, 2000, with Orchex oil at the rate of 8 gallons in a 100 gallon mixture of water per acre or 8 gallons in a 400 gallon mixture of water. No other treatments were applied to the trees for the remainder of the year. Harvest occurred on July 26, 2000. In this study a total of 2000 fruit from each cultivar was evaluated for infestation.

The results of 2000 trial are presented in Table 2. Quite clearly, the 400 gallon per acre mixture performed better than the 100 gallon mixture. Infestation on the Royal Diamond cultivar averaged 4.5% where 8 gallons of Orchex oil was used in the



400 gallon mixture and 11.2% where 8 gallons of Orchex oil was used in the 100 gallon mixture. Infestation in the Rosemary cultivar was slightly higher, but the 400 gallon mixture performed best. Scale infestation was 8.75 % where the 400 gallon per acre rate was used and 13.4% where the 100 gallon per acre rate was used.

Results of the 1999 and 2000 studies clearly indicate that properly applied dormant oil applications can keep SJS damage to acceptable levels. The use of horticultural mineral oils has two benefits. First, SJS does not develop resistance to the applications. Scale kill is achieved through smothering and not a biochemical mechanism that can be selected for

through reproduction of the survivors. This means, if scale populations begin to increase in an orchard, periodic application of organophosphate or insect growth regulator insecticide mixed with oil and applied during the dormant season can be used to reduce scale abundance and not speed the incidence of insecticide resistance. It also means that for most stone fruit farmers, oil alone can be used to manage SJS and not contribute to organophosphate runoff into surface waterways. This means fewer regulations that farmers must deal with. Care must be taken in the application and, even on late harvested cultivars, dilute applications will be consistently better than concentrate.

Table 1. Average % infestation of San Jose scale on Royal Diamond and Rosemary plum (combined).

Percent Infestation 1998 (previous year history)	Percent Infestation 1999*
1.80 a	3.45 a
10.00 a	3.95 a
31.20 b	8.67 b
44.15 c	6.29 ab

Numbers followed by same letters are not significantly different ($P>0.05$) Fisher's protected LSD test.

* Either Vock Supreme (8 gallons in 400 gallons of water per acre) or Orchex 692 (8 gallons in 400 gallons of water per acre) on Feb 10, 1999.

Table 2. Average % infestation of San Jose scale on plums where Orchex Narrow Range Oil is used (February 11, 2000).

Treatment, 8 gallons in:	SJS Infestation at Harvest (July 26,2000)	
	Royal Diamond	Rosemary
400 GPA	4.50 a	8.75 a
100 GPA	11.20 b	13.40 b

Numbers followed by same letters are not significantly different ($P>0.05$) Fisher's protected LSD test.



Meeting Notices

Stone Fruit Pruning and Training Seminar

Wednesday November 8, 2000

Kearney Ag Center

8:30 - 9:00 am Registration and Coffee

9:00 - 10:00 am Tree Physiology and Response to Pruning

10:00 - 11:30 am Field Demonstration of Pruning and Training Methods

Instructors:

Ted DeJong - Department of Pomology, UC Davis

Kevin Day - Tulare County Farm Advisor

Harry Andris - Fresno County Farm Advisor

Bob Beede - Kings County Farm Advisor

Scott Johnson - Extension Specialist, Kearney

This meeting is free and no preregistration is required.

Winter Tree Fruit Meeting

Wednesday December 6, 2000

Dinuba Memorial Building

8:00 am to 1:00 pm

Topics to be covered include:

- Pest and Disease Control
- Tree Nutrition and Soils
- Reducing Orchard Height

Additional details will follow in the next edition of Orchard Notes

For further information on these meetings please contact Kevin R. Day at (559) 733-6485 or email: krday@ucdavis.edu

5th International Peach Symposium – July 2001

This meeting is sponsored by the International Society for Horticultural Science and will be held on the UC Davis campus from July 9-11, 2001. A field tour of San Joaquin Valley peach production, packing, and processing will take place from July 12-14, 2001. For further information on this meeting contact Dr. Scott Johnson at (559) 646-6547, email sjohnson@uckac.edu, or visit the website at <http://conferences.ucdavis.edu>.

