UC Citrus Entomology Monitoring Program **Citrus E-Newsletter**
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University of California Kearney Agricultural Center Cooperative Extension

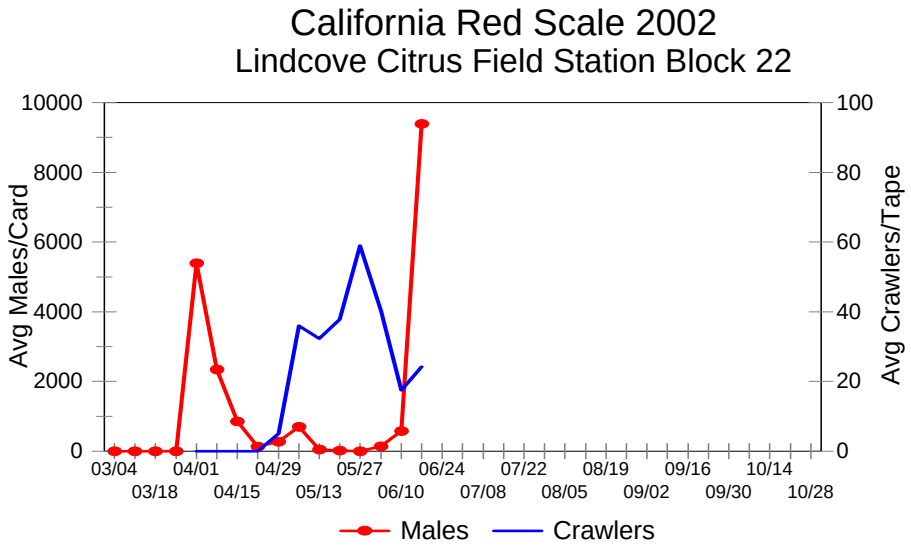
California Red Scale

The second flight of California red scale began in the foothill growing region the week of June 10. On the basis of accumulating 125 to 150 DD per week, which would be average for June, we are predicting second-generation crawler emergence (1650 DD from the start of the first male flight) to begin the week of July 8 for Kern County and eastern Tulare County. The current degree-day totals for the various San Joaquin Valley citrus growing regions are:

Phenological events of California red scale and current accumulated Degree Day units for the various regions

Region	Biofix	First crawler activity	Second male flight	Current DD
Predicted	Male flight	550 DD	1100 DD	
Kern	March 18	May 13	June 10	1340
Foothills	March 18	May 13	June 10	1300
S. Tulare	March 25	May 13	June 10	1250
N. Tulare	March 25	May 13	June 17	1270
Fresno	March 25	May 13	June 17	1250
Madera	April 1	May 27		970

As can be seen in the graph below, the 2nd flight of male scale has begun at the Lindcove Field Station.



New Insecticide Registrations

Applaud 70 W (buprofezin)

Pests Controlled: California red scale
Dosage: 2.14-2.86 lb (1.5-2 lb ai) per acre.
Method of Application: Apply by ground application using 750-2000 gallons of water per acre. Do not apply more than 2 applications per season. Allow at least 60 days between applications.
Timing of application: Apply when peak crawler emergence occurs. More effective at the beginning of the season when the population is fairly uniform.
REI: 24 hours
PHI: 60 days
Comments: Buprofezin is a chitin synthesis inhibitor that prevents molting of scale insects. It is most effective if applied when most of the population of California red scale is at the same stage (early in the season, especially during the first generation) and when the crawlers have become whitecaps (just before they molt). It can slow the growth of citricola scale, however, the best time to apply it for red scale (May-July) is too early for control of citricola, which doesn't begin molting until August-Nov. It will also slow the growth of cottony cushion scale. It is toxic to vedalia beetles, but the effect is shorter lived (3 months) and affects fewer stages (pupae only) compared to Esteem which lasts for 6 months and affects both egg hatch and pupation. Thus, it appears to be more IPM compatible and more useful in situations of multiple scale species. However, because it is slow acting, it should not be used in situations that have very heavy populations of California red scale, citricola scale, or cottony cushion scale.

Full Registration expected the week of June 24th

Assail 70 WP (acetamiprid)

Pests Controlled: citricola scale, glassy-winged sharpshooter, citrus thrips
Dosage: 1.7-2.9 oz per acre for GWSS and citrus thrips and 3.4-5.7 oz per acre for citricola scale.
Method of Application: Apply by ground application using 100-200 gallons of water per acre for GWSS or citrus thrips and 300-750 gallons of water per acre for citricola scale. Allow at least 7 days between applications. Do not apply more than 5 applications or a total of 12.5 oz per season.
Timing of application: Apply when nymphal or adult GWSS are active and citrus thrips are infesting susceptible fruit (<25 mm). For citricola scale, apply March-September. More effective for citricola scale in Aug-Sept when the population is primarily nymphs on leaves.
REI: 12 hours
PHI: 7 days
Comments. Acetamiprid is a neonicotinoid insecticide similar to Provado. It is effective against citricola scale, but does not show consistent control of California red scale and shows no control of cottony cushion scale. It is fairly broad spectrum, killing both parasitic wasps needed for red scale control and vedalia beetles needed for cottony cushion scale control. Thus, it should not be used in situations where red scale or cottony cushion scale are a problem. It is effective for 3-4 weeks against glassy-winged sharpshooter and may be recommended for that use in areas where glassy-winged sharpshooter populations are being suppressed. However, because of the problems that Assail can cause for California red scale and cottony cushion scale biological control, the systemic neonicotinid Admire is a more long-lasting and somewhat less disruptive insecticide for glassy-winged sharpshooter control. There is limited data on the effect of Assail on citrus thrips, however, it seems to have some efficacy.

Mixed Scale Infestations

Lately, there have been many questions about how to deal with mixed infestations of citricola scale, cottony cushion scale, and California red scale. As the chart below indicates, insecticides are not equally effective on all scale pests. The organophosphates and carbamates tend to reduce all species of scale, however, many populations of red scale have resistance to them. Narrow range oil is effective primarily against red scale. The insect growth regulators work best against red scale but can help reduce cottony cushion scale if the timing of application is right (late season). The neonicotinoids work best against citricola scale. Depending upon the mixture of species in your orchard and your approach to biological control, one or more of these insecticides can have a fit. The organophosphates, carbamates, and neonicotinoids are broad-spectrum insecticides and so are toxic to most natural enemies. The insect growth regulators and neonicotinoids are very toxic to vedalia beetles.

Target Pest	**Lorsban, Sevin, Supracide, and Malathion**	**Narrow Range Oil**	**Esteem**	**Applaud**	**Provado**	**Admire**	**Assail**
	Organophosphate and Carbamate	Petroleum Oil	Insect Growth Regulator	Insect Growth Regulator	Neonicotinoid Foliar	Neonicotinoid soil application	Neonico-tinoid Foliar
Citricola scale	Excellent Control	Short-term control	No Control	Variable, slow Control	Excellent Control	Good Control	Excellent Control
California red scale	Excellent control if resistance is not a problem	Good Control	Excellent Control	Good Control	No Control	Variable Control	Variable Control
Cottony cushion scale	Variable Control	Poor Control	Variable, slow control	Variable, slow control	No Control	No Control	No Control
Impact on natural enemies	Kill most natural enemies, especially parasitic wasps. Lorsban is the least toxic of the group	Kills only those natural enemies it comes in direct contact with	Kills vedalia eggs and pupae for 6 months	Kills vedalia pupae for 3 months	Kills most natural enemies for 1 month	Kills vedalia larvae and adults for 4 months	Kills most natural enemies for 1 month

Citrus Peelminer

Citrus peelminer has been infesting grape stems and various other crops for several weeks. We have only begun to see citrus peelminer attacking citrus fruit in a few orchards. During 2001, we saw mining of pummelos and grapefruit in early July. Insecticide treatments were ineffective in controlling this pest during 2001. Native parasitic wasps are attacking citrus peelminer, but, so far, they are not in high enough numbers to control it. A species of wasp (*Cirrospilus coachellae*) from the Coachella Valley is reared at UC Riverside and was released in 2001 in >30 locations in the San Joaquin Valley. However, we do not yet know if the parasite has survived the winter and if it will do as well in the San Joaquin Valley as it did in other regions. We plan to continue to release parasites starting in July and would appreciate hearing about the locations of citrus orchards with fresh mining of the fruit, especially pummelos and grapefruit.