UC Citrus Entomology Program — Citrus E-Newsletter

October 2007 — No. 6

University of California — Kearney Agricultural Research Center — Cooperative Extension

California Red Scale – End of Season

	1st male flight (observed)	1st gen. crawlers (observed)	2nd male flight (observed)	2nd gen. crawlers (observed)	3rd male flight (observed)	3rd gen. crawlers (observed)	4th male flight (observed)	4th gen. crawlers (observed)	5th male flight
Estimated Degree Days	Biofix	550 DD	1100 DD	1650 DD	2200 DD	2750 DD	3300 DD	3850 DD	4400 DD
Kern	March 12	April 30	May 28	June 25	July 23	Aug. 6	Aug. 27	Sept. 17	*
Tulare	March 12	April 30	June 4	July 2	July 23	Aug. 13	Sept. 3	Sept. 26	*
Fresno	March 17	May 7	June 11	July 9	July 30	Aug. 20	Sept. 10	Oct. 1	*

Red Scale Lower Developmental Threshold: 53°F
Current DD (as of October 1) - Kern: 4050 DD, Tulare: 3980 DD, Fresno: 3850 DD

Cooler temperatures have brought the degree-day accumulations for most of the citrus growing region to 10 or less per day, meaning that it is unlikely a fifth male flight will occur this season. At this point, orchards will have all stages of California red scale present on twigs and fruit. Evidence of parasitism by *Aphytis* and *Comperiella* should be easily seen in scale infesting orchards where *Aphytis* have been released or where broad spectrum insecticides have not been used. Degree-day calculations for CRS as well as weather summaries for selected weather stations are maintained on our website: http://citrusent.uckac.edu/DegreeDay.htm.

Citrus Peelminer – Seventh Flight

	1st male flight	2nd male flight	3rd male flight	4th male flight	5th male flight	6th male flight	7th male flight	8th male flight
Estimated Degree Days	biofix	580 DD	1160 DD	1740 DD	2420 DD	3000 DD	3580 DD	4160 DD
Host Plant	Stems	Stems	Pummelo grapefruit	Pummelo grapefruit	Susceptible oranges	Susceptible oranges	Susceptible oranges	Susceptible oranges
Tulare	March 12	May 10	June 18	July 9	July 31	August 28	Sept. 26	*

Citrus Peelminer Lower Developmental Threshold: 55°F
Current DD (as of October 1) – Tulare: 3670 DD

Our lab will be starting the annual survey of peelminer infestations throughout the Valley immediately. We currently monitor 40+ sites from Kern to Fresno Counties to determine the percentage of infested fruit. This gives us a better representation of the distribution of citrus peelminer than pheromone traps have been able to accomplish. If you would like to have your orchard surveyed for peelminer damage, or if you use our on-line system to report peelminer populations, we need that information now. The protocol involves examining 250 fruit in each quadrant of the orchards, for a total of 1000 fruit and reporting the percentage that are damaged by peelminer.

An updated version of our on-line peelminer moth trap count and fruit damage reporting system is now available for use at http://arcims.gis.uckac.edu/CitrusMiner. We are asking that growers and PCAs who are noticing peelminer activity in their orchards use this system to report their finds. We use this information to create and refine population models of citrus peelminer so that better control of this pest can be achieved. Growers that have used the system already will find a streamlined interface and faster response time. One-on-one demonstrations of the system will be offered for both experienced users and growers that are using it for the first time. Please contact Greg Montez at (559) 646-6597 or gregm@uckac.edu for further information.

Micromite registration for pummelos! Chemtura was recently able to obtain a supplemental label for Micromite to be used for peelminer and other pests on pummelos. See the CDMS web site for that label: http://www.cdms.net/LDat/ld55U010.pdf

Citrus Leafminer

Citrus leafminer numbers are lower than expected for this time of year throughout the state. We think the freeze may have dampened their numbers. However, be on your guard, we are starting to see an increase in moths and may see larval activity in the fall flush.

A moth trap catch reporting system similar to the one we are using for citrus peelminer has been developed for citrus leafminer and is now active at http://arcims.gis.uckac.edu/CitrusMiner/. Growers who wish to use this system may request a one-on-one demonstration from Greg Montez (contact information above).

While the damage that the leafminer causes to flush of mature citrus trees is ugly, insecticides are not very effective and leafminer will not affect yield (except perhaps for lemons on the coast that are continuously flushing and producing multiple crops). Therefore, we recommend that you ignore this pest in mature citrus. For information on identification see our web site: http://citrusent.uckac.edu/leafminer.htm. Citrus leafminer will heavily damage flush of nursery citrus and newly planted citrus and could affect growth and development of young plants. Therefore treatments may be necessary in these situations. In foreign countries, such as Israel, growers apply Admire for the first three years to newly planted trees to reduce leafminer infestations and maximize growth of the trees. We have both SLN and IR4 requests to gain registration of the insecticide Intrepid (methoxyfenozide) for nonbearing citrus and are testing new insecticides for their efficacy against this pest. Additional management guidelines are posted on the UC IPM web site: http://www.ipm.ucdavis.edu/PMG/r107303211.html.

Dr. David Headrick (Cal Poly San Luis Obispo) is collecting parasitized leafminer larvae and pupae to determine which parasites are attacking the leafminer in coastal and central California. If you would like to assist with this project, instructions for collecting and shipping parasitized larvae are located on our web site: http://citrusent.uckac.edu/Collect_leafminer_parasites.htm. This pest should eventually be controlled by natural enemies. Some of the same parasites that attack leafminer also attack peelminer (for example *Cirrospilus*) and so having both pests present should improve biological control.

Insecticide Modes of Action

Below is a list of the insecticides and acaricides used for pests of California citrus classified by their mode-of-action (In part from IRAC [Insecticide Resistance Action Committee], Sept. 2005, www.irac-online.org).

This table is available on our web site: http://citrusent.uckac.edu/IRACtable.htm

To avoid selecting for resistance in citrus pests, try to use insecticides from different groups (modes of action) during the season.

Group	Primary target site	Chemical sub-group or [exemplifying active ingredient]	Pesticides in the group
1A	Acetylcholine esterase inhibitors	Carbamates	Sevin (carbaryl), Lannate (methomyl), Carzol (formetanate hydrochloride)
1B		Organophosphates	Lorsban (chlorpyrifos), Supracide (methidathion), Cygon (dimethoate), Dibrom (naled), malathion, Guthion (azinphos-methyl)
3	Sodium channel modulators	Pyrethroids; Pyrethrins	Baythroid (cyfluthrin), Danitol (fenpropathrin); Pyrethrins & Pyrethrum
4	Nicotinic acetylcholine receptor agonists / antagonists	Neonicotinoids	Admire (systemic imidacloprid), Provado (foliar imidacloprid), Assail (acetamiprid), Platinum* (thiamethoxam), Venom* (dinotefuran)
5	Nicotinic acetylcholine receptor agonists (not group 4)	Spinosyns	Success/ Entrust (spinosad), Delegate* (spinetoram)
6	Chloride channel activators	Avermectins	Agri-Mek/ Zoro/ Clinch (abamectin)
7C	Juvenile hormone mimics	[pyriproxyfen]	Esteem (pyriproxyfen)
9A	Compounds of unknown or non-specific mode of action	[cryolite]	Kryocide (cryolite)
10	Compounds of unknown or non-specific mode of action (mite growth inhibitors)	[hexythiazox]	Onager/ Savey# (hexythiazox), Zeal# (etoxazole)
11B2	Microbial disruptors of insect midgut membranes	Microbial pesticides	Dipel, Javelin/ MVP (*Bacillus thuringiensis* products)
12	Inhibitors of oxidative phosphorylation, disruptors of ATP formation	[propargite] Organotin miticides	Omite (propargite) Vendex (fenbutatin oxide)
15	Inhibitors of chitin biosynthesis, type 0, Lepidopteran	Benzoylureas	Micromite^^/ Dimilin* (diflubenzuron)
16	Inbibitors of chitin biosynthesis, type 1, Homopteran	[buprofezin]	Applaud (buprofezin)
20	Mitochondrial complex III electron transport inhibitors (Coupling site II)	[acequinocyl]	Kanemite^ (acequinocyl)
21	Mitochondrial complex I electron transport inhibitors	METI acaricides	Nexter (pyridaben), FujiMite (fenproximate)
23	Inhibitors of lipid synthesis	Tetronic acid derivatives	Envidor (spirodiclofen), Movento* (spirotetramat)
25	Neuronal inhibitors (unknown mode of action)	[bifenazate]	Acramite# (bifenazate)
27	Synergists	P450-dependent monooxygenase inhibitors	Piperonyl butoxide
--	Unclassified	[dicofol]	Kelthane (dicofol)
--	Unclassified	[NR-415 Oil]	Various petroleum oils
--	Unclassified	[Spray Sulfur 97%]	Various sulfur formulations

* Check registration status; not registered for use on California citrus as of September 2007.

Check registration status; registered for use only on non-bearing citrus as of September 2007.

^ Registered only oranges, grapefruit and lemons.

^^Registered only on oranges, grapefruit, tangerines and pummelos.

2007 Pesticide Registrations for Citrus

See our web site for updates: http://citrusent.uckac.edu/NewInsecticideRegistrations.htm

Fujimite (fenpyroximate) - Miticide/Insecticide (group 21)
(This is a summary, please see the product label and supplemental label for more details)
Fujimite 5 EC
Pests Controlled: Citrus rust mite, Asian citrus psyllid, other mites, leafhoppers and mealybugs
Dosage: 1-4 pints formulated/acre
Method of Application: For best results use 100-400 gpa. Do not apply more than 2 times per season or apply more than 8 pints/acre per season. Allow 14 days between applications. Do not apply by air.
Timing of application: When pests reach treatment thresholds.
REI: 12 hours
PHI: 14 days

Zoro (abamectin) - Miticide/Insecticide (group 6)
(This is a summary, please see the product label and supplemental label for more details)
Pests Controlled: Broad mite, citrus bud mite, citrus rust mite, two-spotted spider mite, citrus leafminer, citrus thrips, Asian citrus psyllid
Dosage: 10-20 oz formulated/acre
Method of Application: For best results use 150-300 gpa with a minimum of 0.5% horticultural oil. To manage resistance, do not use in citrus nurseries. Do not apply more than 1 time per season or apply more than 20 oz per season. **Timing of application:** When pests reach treatment thresholds.
REI: 12 hours, **PHI:** 7 days

Envidor 2 SC (spirodiclofen) - Miticide - lipid biosynthesis inhibitor (group 23)
(This is a summary, please see the product label and supplemental label for more details)
Pests Controlled: Citrus flat mite, citrus red mite, Texas citrus mite, Two-spotted spider mite, Yuma spider mite
Dosage: 12-20 oz formulated/acre without horticultural oil and 18-20 oz/acre with oil.
Method of Application: If applied by air blast, use a minimum of 100 gpa. If applied using high air velocity, low volume or air curtain sprayers use a minimum of 30 gpa. Do not apply more than 20 oz per season or more than one application per crop season. Can not be used in enclosed structures such as greenhouses. **Timing of application:** When mites reach treatment thresholds.
REI: 12 hours, **PHI:** 7 days

The Citrus IPM Newsletter is published by the University of California Citrus Entomology Laboratory at the Kearney Agricultural Research Center.
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