



UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION:
EL DORADO AND AMADOR COUNTIES



FOOTHILL FARM AND ORCHARD NEWS

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Greetings from your local Farm Advisor! A question came up at my last annual fruit tree meeting: “Does anyone around here worry about chilling hours?” In a mild winter like this one, some people in other parts of the state are concerned they haven’t received *enough* chilling. Fruit trees require a certain amount of chilling (described by various models as “units”) in order for buds to properly break dormancy. Without enough chilling units, trees may develop physiological symptoms such as delayed and extended bloom, delayed foliation, reduced fruit set and reduced fruit quality. Growers and industry keep track of chilling hours beginning in November to get a sense of the orchard management practices needed and comparison of past year's weather and crop load. The approximate number of hours needed for normal development varies depending on variety and species. Apples and pears generally require about 1200 chilling hours $<45^{\circ}$. We have received 897 hours of chilling $<45^{\circ}$ from November 1 to February 16. Chilling hours are rarely a problem for us in the foothills to achieve, but we are 500 chill hours lower than we were at this time in the previous 2 years. Hopefully, our predictable cool late spring weather will provide chilling relief. Current chilling information can be found at the Fruits and Nuts Center website at: <http://fruitsandnuts.ucdavis.edu/>, click on “weather services”.

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AG. WAIVER UPDATE: WHAT’S ALL THE FUSS ABOUT DIAZINON?

Local water quality monitoring for toxicity to certain aquatic organisms and for a long list of ag. chemicals is one requirement of the recently implemented “Conditional Ag. Waiver for Irrigated Lands”, a law regulated by the Water Quality Control Board. Some of these pesticides, such as diazinon and chlorpyrifos (Lorsban), are extremely toxic to tiny aquatic organisms (“salmon food”) and have shown up in waters located in the Central Valley-causing concern and a mandate to expand testing to all watersheds, including ours.

Our El Dorado Watershed Group has taken responsibility for meeting the requirements of the waiver for those coalition member-growers that the watershed group represents. Our designated water quality

monitoring site, North Creek Canyon, was chosen because it met certain required criteria: perennial stream, adjacent to a number of local crops, public access and flow into the South Fork of the American River. With funds thankfully provided from the El Dorado Water Agency, the greater Sacramento Valley coalition, of which El Dorado is a member, has been monitoring North Creek Canyon since last winter on almost a monthly basis.

Our first year of water quality data turned up mostly good news: **no toxicity to any of the four organisms tested was found and almost no pesticides were detected in the water samples taken.** Only diazinon was detected in March, 2005 at 0.124 ug/l and in May, 2005 at 0.02 ug/l. The March sample was taken during a storm event. The Regional Water Quality Control Board has not set thresholds for diazinon limits for our watershed, but one limit (termed “objective”) they have used elsewhere is 0.05 ug/l. If the Board adopts this objective for our area, and diazinon levels are again detected above this level, an “exceedence” report may be issued to the Board.

The toxicity testing for water quality: 4 organisms tested

- *Ceriodaphnia dubia*- the “water flea”, a significant source of food for fish such as salmon
- *Pimephales promelas*-the flat headed minnow
- *Selenastrum capricornutum*-an algae
- *Hyalella azteca (sediment only)*-a crustacean that closely resembles a shrimp and lives in mud or sand.

Pesticides analyzed for in water quality testing (list may not be complete):

- | | |
|----------------------------|---------------------|
| ➤ Aldicarb | ➤ Malathion* |
| ➤ Azinphos-methyl * | ➤ Merphos |
| ➤ Bolstar | ➤ Methamidophos * |
| ➤ Bromacil* | ➤ Methidathion |
| ➤ Carbaryl* | ➤ Methomyl* |
| ➤ Carbofuran | ➤ Mevinphos |
| ➤ Chlorpyrifos * | ➤ Ethyl Parathion |
| ➤ Chloroxuron | ➤ Methyl Parathion |
| ➤ Demeton-S (Metasystox) * | ➤ Oryzalin |
| ➤ Diazinon * | ➤ Oxamyl |
| ➤ Dichlorvos | ➤ Phorate |
| ➤ Dimethoate | ➤ Phosmet* |
| ➤ Disulfoton * | ➤ Tetrachlorvinphos |
| ➤ Ethoprop | ➤ Tokuthion |
| ➤ Fenchlorphos | ➤ Trichlornate |
| ➤ Fensulfothion | |
| ➤ Fenthion | |

* Use reported in 2003 El Dorado PUR-includes ag., structural, rights of way and landscape use. Some materials may have been reported but inadvertently omitted.

WHAT GROWERS CAN DO TO ENSURE PESTICIDES LIKE DIAZINON DO NOT REACH OUR WATERS

- **Understand what pest you are using your pesticides for-and only spray if the pest is present. i.e. *Do you know if you have Rosy Apple Aphid?***

Monitoring and pest identification is a basic principle of IPM. Gone are the days of “calendar spraying” or spraying because “we’ve always done it this way”. Diazinon is a broad-spectrum organophosphate insecticide which has been traditionally used as a dormant spray targeting **rosy apple aphid**. Rosy apple aphid is a difficult pest if left uncontrolled, however, it is not a pest every year. **You can monitor for the shiny, black elongated aphid eggs on the dormant fruit spurs** and shoots using a hand lens. Collect 25-100 fruit spurs from dormant trees in each block and examine the spurs for the eggs using a hand lens. If you find any eggs, treatment is required as the aphid will spread quickly once hatched.

- **Consider an alternative pesticide to the organophosphates and use IPM to effectively manage pests.**

Most pests need to be controlled using many tactics, not just by using pesticides alone. For example, rosy apple aphid lives on alternate hosts such as plantain weed (*Plantago* sp.). Controlling the plantain in your orchard will help limit the spread of rosy apple aphid. Mature trees can tolerate more rosy apple aphid than young trees. But if you need to treat, consider using an alternative to diazinon such as oil alone, or oil plus a “reduced risk” insecticide such as pyriproxyfen (Esteem), an insect growth regulator. Keep in mind that Esteem only targets the aphid eggs, so thorough coverage and proper spray timing is critical for adequate control. Monitoring for eggs will help you make a treatment decision. Imidacloprid (Provado) may also be used as an alternative for diazinon, but needs to contact the aphids so must be applied prior to leaf curling to be effective. See the UC IPM website for more guidance: <http://www.ipm.ucdavis.edu>

- **Don’t spray an insecticide prior to forecasted rain.**

If you have had or have a heavy infestation and need to use a stronger pesticide to protect your crop, be aware of the weather forecast at time of spraying. Do not apply an insecticide like diazinon prior to forecasted rain, it will just wash off and you will lose your protection as well as possibly contaminate nearby waters. Distinguish between your disease applications of fungicides (like dithane for scab), and your insecticide applications. Understand for what and why you are putting in the tank. For scab control, you will need to apply prior to rain! So always watch the weather. If you have questions or are unsure, give me a call or contact your PCA for help.

- **Use the appropriate volume for good coverage-but be aware of drift.**

Most growers I have worked with are used to using high volumes and are afraid to reduce the volume because they think they will not get adequate control. But growers in other parts of the state and country (and all of Europe) have found it economically necessary to reduce volumes down to less than 150 gal/ac and have done so successfully, resulting in less time to spray and saving money in material and time. This can be done without sacrificing control when your rig is properly calibrated. Often the

“high volumes” of 200-300 gal/ac or more can result in “off site movement” (fancy speak for “drift”). I would be happy to help you calibrate your sprayer-contact me for an appointment.

- **Observe your irrigation system during the season and apply the appropriate rate to reduce run-off, or consider switching to money saving micros.**

Many of our clay soils do not have the capacity to absorb high volumes of water quickly, so run-off can occur when irrigating. This means your crop isn't getting the water, and run-off can carry soil and pesticides with it downhill and downstream. Make sure your irrigation system is working properly. Micro-sprinklers can help facilitate the proper application rate.

- **Consider planting a perennial ground-cover if you have bare ground in between crop rows on a hilly slope.**

I have seen some Christmas tree growers combat weeds and reduce potential run off by using a ground cover like Sheep's fescue in between tree rows. Mulch can also be effectively used to hold soil and water in place.

- **Remember that the law-mandated monitoring will continue-lets keep up the good work!**

Water quality monitoring and toxicity testing will continue at least through the next year. Many constituents (not just diazinon) will be monitored for, including herbicides, nutrients, bacteria like *E.coli*, and pesticides like Guthion. **Growers of all crops need to be careful with their pesticide use.** I was pleasantly pleased with our monitoring results from the past year-I believe the diazinon that showed up was due to poor timing prior to rain and if growers are aware and thoughtful about their pesticide use it should not be a problem in the future.

CODLING MOTH UPDATE: RESULTS FROM FIELD TRIALS WITH GRANULOSIS VIRUS

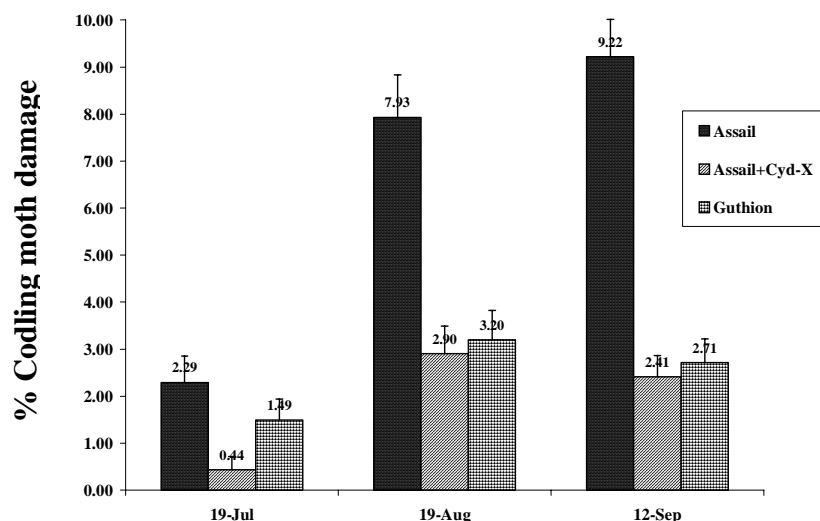


I conducted several field trials in apples and pears this past summer with cooperating growers to look at Guthion alternatives for codling moth control. One product that appears promising and will be an organically acceptable option is **Cyd-X, the Advan (formerly Certis) formulation of codling moth granulosis virus**. Cyd-X is not yet registered in California but is applying for a 24(c) local needs registration for this year. All of these trials were conducted on top of pheromone mating disruption, which is the foundation for effectively managing codling moth.

The granulosis virus is specific for codling moth larvae, the larvae must ingest it so to be effective it must be applied right at egg hatch and it should be reapplied in 7 days, it doesn't last as long as other pesticides. In the trials I have conducted we tank mixed granulosis virus (Cyd-X) with acetamiprid (Assail), and followed that one week later with a second application of virus alone, and got control similar to Guthion. When Assail was used without the addition of virus, however, damage was much higher than in the Guthion plot. Figure 1 shows the in season codling moth damage comparing the Guthion, Assail, and Assail + Cyd-X, followed by Cyd-X, plots. This work shows the potential of using reduced-risk materials for codling moth-near the end of the season: both the Guthion and Assail + Cyd-X plots had about 2-3% damage. The challenge will be to make this an affordable program-a season long program of Assail plus Cyd-X in this fashion would not be economical for the grower and I would not recommend it.

With the goal to determine an *economical* alternative codling moth control program, I plan to continue my work in 2006 with support provided by the California Apple Commission. I will be testing yet another alternative which is looking promising, **the insect growth regulator novaluron (Rimon, Chemtura, previously Crompton Uniroyal)**, used in rotation or tank mixed with granulosis virus. In preliminary trials this past season, Rimon provided excellent control of codling moth in low pressure blocks. I plan to challenge the product in higher population blocks this coming season. Rimon is not yet registered in California but it is expected to be in the next year or 2.

Figure 1. Percent codling moth fruit damage in Red Block, 2005, comparing Assail, Assail + Cyd-X followed by Cyd-X and Guthion. 1000 fruit/treatment were evaluated on 7/19 and 8/19, 1500 fruit/treatment were evaluated on 9/12.



Another alternative material for codling moth control is the **chloronicotinyl Calypso (Bayer)**, which is in the same class of insecticides as Assail. Calypso received a California registration in late fall so you will have this material available this coming season. Calypso will work best in low population orchards, and should be rotated with a different chemistry, something *other than Assail*, to prevent resistance.

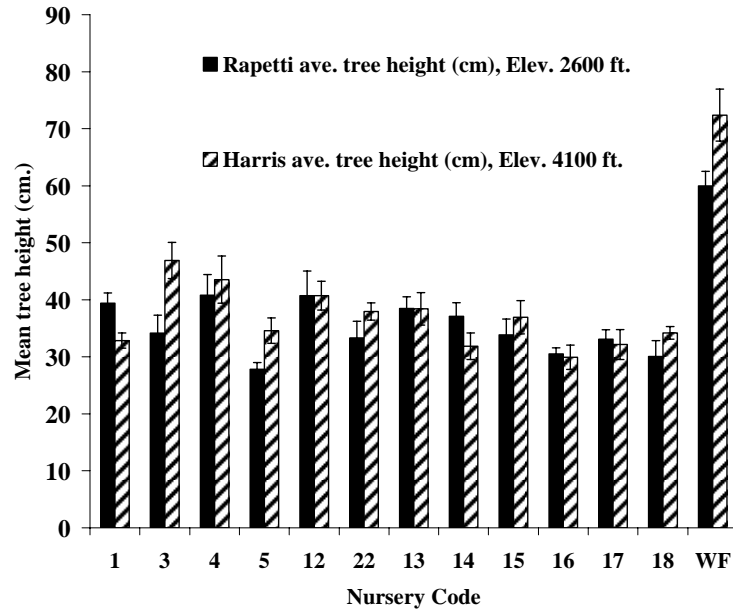


Christmas Tree Corner-Nordmann fir trials expanding.

This year I hope to expand the Nordmann and Turkish fir trials we began in 2004. Working with Washington State University plant pathologist Gary Chastagner, we have obtained specific progeny, grown from seed from specific provenances in Russia, that are supposedly well suited to “higher” elevations. These are the Bolshomi and Tluji provenances from the Republic of Georgia. These will join the 12 other provenance progeny we already have planted at several sites in the county. Prior to harvest (in 8-10 years!), I will ask Christmas tree growers to join me in a “blind” evaluation of desirable characteristics of these trees. Measurements of the trees planted in 2004, Turkish and Nordmann fir compared to a Grizzly Flat White Fir, are shown in Figure 2.

Now is the time to start controlling weeds!!-You can do much to control your weeds prior to bud-break of your Christmas trees. Weedy tree plantations suffer from poor initial survival and slow growth and weeds will compete for water, later. Weeds that are seedlings now will soon grow large and you can use several herbicides to control seedlings (Round-up, Goal, etc.) or a pre-emergent herbicide (Pendulum, etc.) to control weeds that are just germinating, prior to bud break. Light tillage and mowing are other weed control options. *Always read the pesticide label and follow directions.*

Figure 2. Tree height measurements (in cm.) of experimental Nordmann and Turkish fir from 12 provenances, compared to native White fir, at two different site elevations. Trees were planted in 2004.



Precipitation (in inches) comparison of the last 3 years

Month	2003-2004	2004-2005	2005-2006
October	0.04	6.61	0.75
November	0.83	4.49	2.72
December	8.86	0	20.63
January	4.21	0.28	7.2
February	8.58	0.59	1.69
March	1.77	1.03	
April	0.55	1.23	
May	0.16	4.65	
Total	25.00	18.88	32.99