



# your Lake County HORTICULTURAL NOTES

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## DORMANT OIL PHYTOTOXICITY TO PEARS

A great concern before "Miracle March" was dormant oil phytotoxicity to dry trees. This was a key reason for the earliest winter irrigations, although filling the root zone prior to bloom was the main reason. Though largely a moot question now (though a possibility), some discussion about dormant oil injury to pears is useful for future reference. Unfortunately, there is very little anecdotal, much less data-based, information for pears, mainly because they are normally considered among the most oil-tolerant deciduous tree crops (unlike walnuts and prunes, which are highly sensitive to dormant oil when moisture-stressed). In most years, the benefits of dormant oil applications in integrated pest management programs, rather than the probability of minor spur or bud damage, biases any decision to spray. However, in consulting with experienced field people, some symptoms of oil injury (at any time of year) that have been observed are:

- delayed and slower bloom and leaf out (growers often manipulate budbreak by selectively timing oil sprays).
- fewer and weaker buds.
- shorter vegetative shoots.
- overall tree decline over time.

Before blaming oil, however, it is important to assess other possible causes of similar injury, e.g. pear psylla (are spurs and wood encrusted with sooty-mold?), late/excessive NAA, etc.

An interesting question posed by one grower contemplating whether to spray this winter was "What is a 'dry' tree?" This is another ill-defined concept. According to UC Extension Entomologist Jack Dibble:

"Apparently, if the above-ground tissue cells are turgid, either from a satisfactory post-harvest irrigation (prior to xylem and phloem inactivity) or from satisfactory rain (or irrigation - re) the chances of dormant oil injury are confined only to plum, prune and walnuts."

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One may interpret this to mean that both above-ground and below-ground cells should be considered. Although unobservable and subtle, dormant tree root activity continues, albeit slowly, during the winter. Moisture stress can thus adversely affect above-ground cellular moisture status by debilitating root function. The 1990 growing season was very long and many orchards received fewer irrigations than needed to carry them through winter without supplemental water. The greatest danger to pears then, would be dry roots unable to deliver adequate water to above-ground cells. This is a rare event in California pear districts, but means growers should be VERY aware that ROOT MOISTURE STRESS is probably the fundamental factor involved in dormant oil phytotoxicity in pears and that ROOT FUNCTION MUST BE MAINTAINED ALL YEAR, INCLUDING WINTER.

As of now (April 7), Lake County orchards are from 25-80% (some more) of full bloom. Although somewhat strung out (weather-related), there are more-than-adequate flower clusters to set a good crop, barring frost, hail, etc. If you suspect oil damage, check for and discuss other possibilities with your PCA, or give me a call and I will certainly try and "sleuth it out" with you.

SPRING IS A GOOD TIME TO LOOK FOR - AND PLAN TO  
CORRECT - WINTER INJURY

As new growth emerges, injured or dead wood and buds become apparent. Grapes and walnuts are more likely to show symptoms than pears and apples. Symptoms of winter cold damage include:

Grapes

Mature Vines - Unless excessively vigorous or weak, these are unlikely to be too affected. Look for delayed/erratic budbreak, failed/weak shoot emergence, perhaps some spur death back to the cordon.

Young vines - If growing vigorously late into fall 1990, shoot growth may be delayed, weak, and/or eventually fail. Retraining may be necessary. If grafted in 1990, the bud union was vulnerable.

IN ANY CASE, CROWN GALL MAY BE A BIG PROBLEM IN 1991!

Walnuts

Mature trees - Look for delayed bloom/leafout, terminal dieback, discolored and/or streaked inner tissue and shriveled outer tissue with accompanying limb dieback. Dry-land orchards will probably show more symptoms than fall-irrigated.

Young trees - Vigorously-growing trees may be the most damaged. Look for delayed/failed leafout, inner bark discoloration and shriveled woody shoots. As growth hastens, new shoots will break on the lower part of affected limbs and continue up the limb. Retraining may be necessary.

#### Winter Injury Management Tips (all crops):

- WAIT UNTIL JUNE TO DO REMEDIAL PRUNING - dormant buds will have pushed by then.
- Paint south and southwest-facing scaffolds and trunks with white, water-based latex paint to prevent SUNBURN where canopy is sparse.
- Watch for problems that accompany/followup winter kill: CROWN GALL (grapes and walnuts), branch wilt in walnut (especially if sunburn occurs) and borers.
- Irrigate and fertilize normally. Don't "shock" plants even more while they recover.

#### CURRENT RESEARCH ON GRAPE/WALNUT DISEASES (3 articles)

##### 1) WALNUT CROWN GALL CONTROL

(by Bill Olson, Butte County Farm Advisor)

I continue to remind you to use the biological control agent Agrobacterium tumefaciens (Galltrol or Norbac) when planting trees on paradox rootstock. In our area, crown gall is the only drawback to this rootstock, and the use of Galltrol or Norbac is an opportunity to reduce or eliminate the occurrence of crown gall.

Some growers have told me that they tried Galltrol and it didn't work, so I decided to test it on 200 above ground injuries on paradox nursery trees provided by Stuke Nursery. On 120 injuries, I sprayed the crown gall disease commonly found in walnut called C58. Then on forty of these trees I sprayed Galltrol, on another 40 I sprayed a 10% bleach solution and the final set of 40 got no treatment (check). Three months later I was able to evaluate the test by counting the number of galls formed. Following are the results:

<u>Treatment</u>	<u># Galls Formed out of A Possible 40</u>
C58 Crown Gall then Galltrol	0
C58 Crown Gall then 10% Bleach	28
C58 Crown Gall Alone	36

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CONCLUSION: Galltrol Works!

There may be other strains of crown gall on walnut which should be tested, but this is not known for sure yet. For now, I recommend you use either Galltrol or Norbac when planting paradox rootstock trees. It's safe, it's a biological control agent and it works.

\*NOTE TO GRAPE GROWERS: Unfortunately, Galltrol/Norbac is ineffective in grapes due to 1) CG strain susceptibility differences and 2) CG is systemic (internal) unlike deciduous tree CG which is a surface problem (RE).

2) ARE THE NEW POWDERY MILDEW FUNGICIDES INVINCIBLE?

(by Doug Gubler, Dave Ouimette, Larry Bettiga, George Leavitt and Don Luvisi)

In 1985 and 1986, control of grapevine powdery mildew using the sterol biosynthesis inhibiting fungicide Bayleton was less than adequate in many California vineyards. In many vineyards, yield loss resulting from diseased berries was significantly increased over previous years. This same loss of efficacy was observed in several University field trials in 1985. Isolates collected in 1986 and tested for sensitivity to Bayleton showed significant variation and it was concluded that resistance to the product had developed. However, because baseline sensitivity data for Bayleton had not been developed for California isolates prior to its introduction into California, it was difficult to conclude that all problem sites were due to resistance. Disease control recommendations made in 1987 included shortening the application interval when Bayleton was used and to incorporate sulfur into the spray program as a tank mix or alternate spray.

Continued work on suspect isolates in 1988 and 1989 showed that many could successfully attack grape leaves on the same day a 4 oz. application of Bayleton was used and this confirmed the presence of resistance. In 1989-90, a more in-depth sampling of

isolates from throughout California was initiated to determine the sensitivity of isolates to Bayleton, Rally and Rubigan, to identify the intensity of resistance, to establish baseline sensitivity data for Rally and Rubigan and to determine if cross resistance to the latter materials existed or could be a potential problem. The data was generated by studying 30 isolates per vineyard from 10 vineyards. Each isolate was tested against concentration range of each product and effective concentration (EC<sub>50</sub>) data was developed. The EC<sub>50</sub> figures represent the concentration of fungicide in ppm that resulted in 50 percent control of disease when compared to non-treated controls. Sites chosen for this study included vineyards with a history of control problems as well as vineyards in which control of powdery mildew had not been a problem. One isolated vineyard with no history of SBI use served as a wild isolate control, i.e., with no SBI use the isolates were extremely sensitive to all three products.

### Results

Data obtained from this study revealed that resistance to Bayleton occurred in 5 of 18 sites studied. Table 1 lists selected vineyard sites and comparative EC<sub>50</sub> figures for the three SBI fungicides. The Renaissance (Yuba County foothills) site is considered to be populated with wild isolates because of the lack of SBI use over the 15 year life of the vineyard and its isolation from other vineyards. EC<sub>50</sub> values of 0.14, 0.46 and 1.4 ppm for Rally, Rubigan and Bayleton, respectively, are considered valid for wild California isolates of Unicinula necator. Isolates from the Madera, Kern 1 and Kern 2 sites showed a slight decrease in sensitivity to Bayleton only, while isolates from the Kern 3 site showed a further decrease in sensitivity to Bayleton and cross resistance to Rally. Later isolate sampling from this vineyard also showed cross-resistance to Rubigan.

Though the resistance to Rally and Rubigan was significantly less than to Bayleton, the fact that cross resistance did occur in this and a few other sites means only prudent use of these products will allow continued efficacious use.

University of California recommendations for grapevine powdery mildew control include 1-3 wettable sulfur applications beginning at budbreak and using 10-day intervals in cool, wet springs. Switch to SBI fungicide according to labels. In addition, mid-late season sulfur also is recommended regardless of SBI product used.

Table 1. Vineyard sites and comparative EC<sub>50</sub> values for Rally, Rubigan and Bayleton.

<u>Vineyard Site</u>	<u>Variety</u>	<u>Rally</u>	<u>Rubigan</u>	<u>Bayleton</u>
Renaissance	Chardonnay	0.14	0.46	1.4
Madera	Carignane	0.45	0.16	<del>0.49</del> 4.9
Kern 1	Emperor	0.71	0.24	5.82
Kern 2	Thompson	0.44	0.22	4.16
Kern 3	French Colombard	0.57	0.19	9.44

### 3) EUTYPA CONTROL

(by Paul Verdegaal, San Joaquin County Farm Advisor)

Current research is studying the biology and possible alternate controls of Eutypa dieback. This fungal disease infects pruning wounds of grapes and other crops such as apricots. There is some indication that cherries may harbor infections that release spores even if they may not be susceptible. However, this is being investigated in more detail.

Doug Gubler, Extension Plant Pathologist and Jim Marois, Department of Plant Pathology, U.C. Davis, are conducting studies on alternate controls in the protection of pruning wounds. Currently the recommendation is to prune as late as possible to avoid spore-laden rainstorms and promote faster healing of wounds.

In addition, benomyl fungicide applied immediately after pruning can help reduce incidence of infection.

The following is a brief explanation and caution about current research on soaps:

#### **"Use of Detergents for Eutypa Control" by Doug Gubler**

Use of detergents is currently being investigated as a potential means of controlling infection by Eutypa lata in grapevine and apricot. I am writing this note to keep the facts straight as to what I am doing and when results might be usable.

Several detergents including Ivory, Ajax, Dove, Phisoderm and a couple of lab cleansers were placed in agar at various concentrations ranging from 0.1 - 2.0 percent. Eutypa lata from grape was inoculated onto each plate and rate of growth was recorded. In summary, all detergents when used at 1 percent solution or higher resulted in death of E. lata.

A disease assay system was developed in the laboratory. Detergent treated grapevine and apricot wood blocks were placed in cultures of actively growing Eutypa lata. In summary, when used at full concentration, these products protected wood for 8 weeks while lesser concentrations resulted in 100% infection. These tests are being repeated using products that are already registered on grape but for different purposes.

Eight field trials will be established in January to test the most efficacious materials under field conditions.

Regarding the legality of using detergents for Eutypa control, one CDFA pesticide registration official stated that it would currently be illegal to apply any of these products as a fungicide. As a grower, you should keep in mind that these results are preliminary and we have a long way to go before a University of California recommendation can be made.

UC PUBLICATIONS AVAILABLE (contact our office)

**1991 Grape Pest Management Guidelines**

March 1991 52 pages \$2.60

INCLUDES NEW WEED CONTROL SECTION!

**California Farm Record Book**

Publ. #3342 76 pages \$5.00

Instructions and record space for farm income and expenditure accounts

**Growers Weed Identification Handbook,**

Set 20: Sheets WI-248 to WI-263

Publ. #4030 32 pages \$5.00

Like the previous 19 groups of sheets, this group covers weeds infesting a variety of environments from roadsides and irrigation ditches to orchards and cultivated crops. Includes sheets for the following weeds (not sold separately):

perennial ryegrass	cutleaf nightshade	snowy thistle
quackgrass	common St. Johnswort	European heliotrope
foxtail barley	female fluvellin	houndstongue
jointed goatgrass	cow parsnip	gray mule ears
buffalobur	dyer's woad	birdsfoot trefoil
	bladderflower	

The price of the entire Growers Weed Identification Handbook, including binder and sheets WI-1 to WI-263 is now \$65.00.

**Directory: Information Sources for Marketing California**

**Fresh Fruits and Vegetables**

Publ. #21480 \$1.50

UC PUBLISHES NEW ILLUSTRATED GUIDE TO PESTICIDE SAFETY

A new UC publication expressly designed to help employers meet new state pesticide training requirements is now available from our office.

The Illustrated Guide to Pesticide Safety, a product of the UC Statewide Integrated Pest Management (UCIPM) Project, is a bilingual publication written in an easy-to-read style with cartoon-like illustrations. Captions are written in both Spanish and English.

The pocketbook-size worker's edition takes employees through each step of safe pesticide handling and application and can be kept for future reference. A larger format instructor's edition provides space for employers to customize training data to each operation. Ready-to-use training records and other required forms are contained in the booklet.

Other supplemental information for instructors includes tables of acute toxicities, special hazards of many pesticides, medical monitoring requirements for workers, re-entry level restrictions, and protective clothing and equipment requirements.

The guide was written by Melanie Zavala, farm worker pesticide training coordinator for the UCIPM Project and was reviewed by experts from industry, regulatory agencies and UC to ensure its accuracy and completeness. Financial support was provided by several chemical formulators.

The Illustrated Guide to Pesticide Safety is available in two shrink-wrapped packets. The \$5 Instructor's Packet (#21489) includes the 80-page large format edition for instructors, plus five copies of the worker's edition. The \$4 Worker's Packet (#21488) contains five copies of the 48-page worker's edition.

TO ALL FRUIT AND NUT GROWERS, HAVE A GREAT SEASON!

Sincerely,



Rachel Elkins  
Farm Advisor