



CALIFORNIA DRIED PLUM NEWS

Integrated Prune Farming Practices

IPFP NEWSLETTER

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INTEGRATED PRUNE FARMING PRACTICES (IPFP)

What Is IPFP

IPFP is the “umbrella” title for the array of statewide projects developing environmentally sensitive cultural programs for California dried plum growers. IPFP addresses public concern for agriculture’s impact on environmental quality, human health, and worker safety. IPFP responds to inevitable restrictions the federal Food Quality Protection Act, Clean Air Act, Clean Water act, and California ballot initiatives, Propositions 65 and 204, will have on agriculture, particularly prune culture.

IPFP Goals

Develop and evaluate reduced environmental risk practices for pest control, irrigation and tree nutrition for California dried plum growers. Educate dried plum growers in environmentally sensitive farming practices and encourage widespread implementation and adoption of IPFP practices.

IPFP Funding Coalition

California Dried Plum Board (CDPB)
Sustainable Agriculture Research and Education Program (SAREP)/Biologically Integrated Farming Systems (BIFS)
Water Resources Control Board (WRCB) 319h
CalFed Bay-Delta Program

IPFP Management – a team effort

The IPFP management team consists of 15 University of California farm advisors, specialists, and experiment station personnel, 6 industry representatives, 9 pest control advisors, and 33 grower/cooperators.

EXCELLENT TIME TO INITIATE IPFP PRACTICES

ALTERNATIVES TO THE TRADITIONAL DORMANT SPRAY FOR DRIED PLUM APHID CONTROL

Franz Niederholzer, Carolyn Pickel, Bill Olson, U.C. Cooperative Extension Farm Advisors, Sutter/Yuba and Butte Counties



Franz Niederholzer

Summary:

The dormant spray, traditionally applied in January or February, controls aphids, scales, peach twig borer (PTB) and mite eggs. Of this complex, the aphids, mealy plum aphid (MPA) and leaf curl plum aphid (LCPA), are commonly the most economically important dried plum pests, often the only pest requiring control. High aphid populations can reduce fruit set, fruit sugar content (increasing dry-away), tree vigor and shoot growth, and increase fruit cracking. Dormant sprays are preferred to in-season sprays because no fruit residue occurs and beneficial insects and mites are not harmed.

The conventional dormant spray is moderately costly and has come under environmental scrutiny as the pesticides find their way into river systems. U.C. has addressed this issue showing that MPA and LCPA can be controlled with reduced rates of pesticides and alternative timings; spraying either in early November or in the late delayed dormant period (early March). This means dried plum growers have lower cost options and can time dormant sprays for dry conditions to reduce potential of pesticide runoff into rivers and streams.

THE DORMANT SEASON – AN

A good dormant spray, applied in January or February, was the cornerstone of Integrated Pest

Management in dried plum production. Dormant oil and a full rate of synthetic pesticide (diazinon, etc.) controlled several pests (particularly aphids, scales, mite eggs, and peach twig borer) without harming beneficials or leaving pesticide residue on the fruit. Today, the traditional dormant spray is not so appealing. Fuel, labor, and material costs are up and restrictive environmental regulations are threatened following findings of dormant sprayed pesticides in California water ways. What hasn't changed, however, is the need to control these orchard pests when needed. This article reviews dormant season pest management options in prune orchards with a focus on economic management of mealy plum aphid (MPA) and leaf curl plum aphid (LCPA).

Aphids, the primary target: MPA and LCPA are key pests in dried plum production. High aphid populations can reduce fruit set, fruit sugar content (increasing dry-away), tree vigor and shoot growth, and increase fruit cracking. Usually, scales, PTB, and mite eggs are relatively minor problems when compared to aphids.

Controlling aphids before petal fall can be important for several reasons. First, there is no effective, registered material for LCPA control after bloom -- except diazinon. However, spraying diazinon on prunes after bloom creates a marketing problem due to pesticide residue on the fruit. Second, post petal fall application of pesticides (including diazinon, Asana®, and Warrior®) may also cause mite flare-ups by harming beneficials, creating a need for an expensive mite spray. Narrow range spray oil at high rates (6-8 gallons per acre in 100 GPA) can suppress MPA after bloom without affecting beneficials, but repeat applications may be needed. Oil can't reach and control LCPA protected by rolled leaves.

Use monitoring and orchard history to determine need for treatment: Because aphids leave the orchard in summer for other hosts, and fly/blow back into the orchard in fall, it is very hard to predict from one year to the next, if an aphid problem will occur in a particular block. U.C. recommends growers monitor dormant spurs (see below) and use orchard aphid history to predict potential aphid problems and need for spraying.

For dormant spur samples, the pre-petal fall (dormant) treatment threshold for aphids is one egg per orchard (an aphid egg contains a pregnant female that can give birth to 500,000 living young). However, aphid eggs are hard to find in orchards, creating a dilemma for dried plum growers wondering whether or not to control aphids before petal fall. In this situation, consideration of an orchard's aphid history is important to treatment decision. Growers with a history of no aphids in a block plus no aphid egg finding in the dormant spur sample should not have an aphid problem the following season. On the other hand, if either an egg is found or the orchard has a history of aphids, treatment is recommended. If there is no history of aphids in the block (perhaps due to regular dormant sprays, new ownership, etc.) and no aphid egg is found in the spur sample, growers must decide if they are prepared/willing to take the chance that aphids may appear in the orchard after bloom if no dormant spray is applied.

Dormant spur monitoring is a simple, once a year activity that can tell a great deal about the pest control needs of a block. Details and data sheets for dormant spur sampling as well as other monitoring protocols are available on the UC IPM website or by contacting your local UCCE Farm Advisor. On the web, go to <http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html> and click on "prunes".

Timing, materials, and rates: Pre-bloom pesticides now primarily focus on aphid control. Recently, UC researchers and farm advisors, with support from state and federal agencies and the dried plum industry, have been working to economically control aphids pre-bloom while avoiding possible environmental contamination. The remainder of this article reviews their work and offers California dried plum growers several cost effective options for aphid control prior to bloom. The materials, rates, and timings presented below target MPA and CPA. These may not provide effective scale or PTB control.

Try spraying early: Aphids begin returning to

dried plum orchards in early October. Research conducted in two orchards in 2003 showed pesticide sprays applied at the end of October/early November give excellent aphid control the next season. U.C. farm advisors are confident growers could experiment with this timing in fall, 2004. Potential advantages include: dry ground for spraying (time and fuel savings?), the ability to plan for a spray instead of waiting for good spray weather in January or February, and pesticides sprayed on dry/unsaturated ground are less likely to be lost from the orchard in storm runoff to pollute streams or rivers than those sprayed when saturated soils exist. Early spraying can also help to schedule in different blocks.

Or, think about spraying late: Aphid eggs hatch right around bloom. A late delayed dormant spray (early March) can give excellent aphid control at reduced pesticide rates (see below). Effective materials at this time include diazinon, Asana®, and Imidan®. [Note: Imidan® can control plum aphid in early or late spray timings – and it breaks down quickly to non-toxic materials in soil and water, making it an attractive material from both a pest control and an environmental stand point. For example: The half life* of Imidan® is 18 hours in neutral water compared to 21 days for Asana® and 180 days for diazinon.] If scale is a problem, based on dormant spur sampling, adding 4 gallons of narrow range oil with the reduced-rate pesticide (using a finished spray solution of 100 GPA) will control low to moderate scale populations and aphids. Note there is less risk of “oil burn” at this time compared to full dormant. Beekeeper notification is required to avoid harming bees at this time.

What about reducing the rate? Growers can use reduced pesticide rates for cost-effective aphid control. Several years of U.C. field research in commercial orchards using growers’ equipment have shown light rates of the pesticides diazinon (1-2 pints/acre) or Asana® (1-3 oz/acre) can give excellent aphid control. In addition to less cost, lower pesticide rates mean less pesticide is available to runoff following heavy rains.

Spraying less than labeled rates is not in conflict with labeling as defined by California Department

of Pesticide Regulation (see California Code of Regulations (Title 3, Section 6000). However, manufacturer liability is, in all probability, eliminated when growers use pesticides below the labeled rate. Make sure pesticides are carefully and responsibly applied, especially when seeking the economic and/or environmental benefits of low pesticide rates. This includes applicator training, sprayer maintenance, calibration, and application.

What about using no hard pesticide at all? Four percent oil (by volume) at bloom can control LCPA and MPA to the point that no further control is needed for the rest of the season. Best success with oil at bloom has resulted from two applications approximately 10 days apart. In many years, this works out to a spray at green tip and again at petal fall. This practice (without synthetic fungicides and using an organically approved oil) is an option for organic growers. For conventional growers, oil in the tank at bloom improves spray coverage and penetration (of systemic fungicides). Coverage is crucial (slow sprayer speed – 1.5 mph) for effective control. With proper application, there is no oil burn on flowers from this spray.

*A half-life is the time it takes for a certain amount of material to degrade to half of the original amount. For example, phosmet, the active ingredient in Imidan® has a half-life of 18 days in neutral water (pH=7.0). If you start with one pound of phosmet in neutral water, there will be half a pound left in 18 days.

VEGETATION MANAGEMENT CAN REDUCE DORMANT SPRAY RUNOFF

Bill Krueger, UC Cooperative Extension Farm Advisor, Glenn County



Bill Krueger

Orchard floor management affects the amount of pesticide that runs off dormant-sprayed orchards. Vegetation improves infiltration, thereby reducing total runoff volume and may reduce pesticide concentration in the runoff water, further reducing the total pesticide load leaving the

orchard.

Concerns related to impact of dormant spray runoff on surface water quality have resulted in several studies investigating the effect of vegetative cover within the orchard on dormant spray runoff. One such study, funded, in part, by the CalFed Bay-Delta Ecosystem Restoration Program was conducted in a flood irrigated dried plum orchard in Artois California as part of the Glenn County Surface Water Stewardship Program. This study compared effects of perennial sod, annual clover, resident vegetation and bare ground on dormant spray insecticide runoff. Resident vegetation is defined as what was growing in the orchard without having been planted and, in this case, consisted largely of perennial clover, burr clover and annual grasses. Total runoff was measured by using automated flumes to measure runoff volume. Samples were collected and analyzed for insecticide concentration. As a backup measurement of infiltration, a rainfall simulator was used to measure time required for surface ponding with specific application rates on all treatments.

The total pesticide load running off the different treatments, determined by multiplying total runoff volume by the runoff water insecticide concentration, was reduced for all of vegetation types by approximately 50% compared to the bare ground treatment. There were no differences between vegetation types. The reduction was due mainly to increased infiltration. While not always statistically significant, insecticide concentrations generally lower in the vegetative treatments compared to bare ground. Infiltration rates measured by the rainfall simulator showed that in early February (a critical time for dormant spray runoff but before the cover was well established) annual clover, while still better than bare ground, did not increase infiltration as effectively as the other two cover treatments. However, by mid March (after most dormant sprays would have been applied) it was equal to or better than the other covers.

Conclusions

From this study and others we conclude that:

- Vegetation on the orchard floor is beneficial in reducing the total volume of pesticide leaving the orchard in dormant runoff. This is accomplished primarily through increased infiltration but there may also be some reduction in pesticide concentration in the runoff water. The total pesticide load may be reduced by as much as 50% compared to bare ground.
- There does not appear to be a big difference between different types of vegetative cover in terms of pesticide runoff reduction. It is important that the cover is well established during the time of runoff in order to have maximum effect.

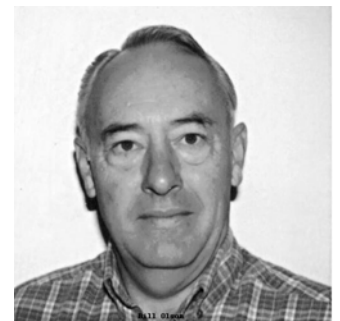
The choice of vegetative cover will be influenced by things other than the effect on dormant spray runoff. There may be many reasons to choose a planted cover crop over resident vegetation, such as weed control, fertility management etc.

Filter Strips

While work on filter strips (vegetation between the end of the orchard and the surface water body) is ongoing in California, it is clear from what has already been done that filter strips are beneficial in much the same way as vegetative covers in the orchard. They slow water movement and increase infiltration and thus reduce runoff and total pesticide load reaching the surface water body.

COVER CROPS FOR PRUNE ORCHARDS

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Farm Advisor,
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Bill Olson

While dried plum growers can plant almost any of the diverse and different cover crops available, they really only plant two basic types of cover crop. If they are on a non-tillage system of managing their middles, most plant a

permanent sod cover crop of dwarf ryegrass, creeping red fescue, and perhaps white clover. If the prune orchard is regularly disced then most growers plant some form of green manure crop usually a mixture of vetch, peas, bell beans, or oats every year. The most commonly asked questions of orchardists considering using a planted cover crop system are; 'What does it cost?', 'What will I get for my expense?', and 'How will a cover crop help me be more profitable growing dried plums?'

Perennial Sod Systems

Description: A 'lawn' of dwarf ryegrass and fine fescues for non-tillage orchards. Some growers adapt resident Ladino clover or plant a mixture of white clover and strawberry clover and use it in place of the grasses when they want the cover crop to also be a source of nitrogen.

Cost: \$75/acre
Stand Life: 10 years or more
Planting Date: October through November
Planting Depth: ¼ inch

Benefits:

- A strong orchard floor for winter operations.
- It only needs mowing 3 to 4 times per year.
- Weed suppression of most annual winter and summer weeds.
- Very good for water infiltration and soil building
- Reduced dust and sunburn.
- Continuous year round habitat for generalist predators for mite control.

Problems:

- The sod will use 25% or more irrigation water to maintain the cover crop.
- Extra nitrogen use, up to 30 or 40 pounds annually.
- In thick clover sods gophers can become a problem if not controlled.
- Permanent clover is very difficult to control with herbicides on the berms.

Green Manure Systems

Description: An annual planting of vetch, peas, bell beans, and often oats for orchards that are disced. When incorporated and irrigated, a good stand of green manure will usually release over 100 pounds of nitrogen to the prunes through the growing season.

Cost: \$30 to 40/acre
Stand Life: 1 year
Planting Date: Mid-September to November
Planting Depth: 1 to 2 inches

Benefits:

- Nitrogen fixation with legumes.
- Water infiltration, especially when grains are added to the mixture.
- Abundant generalist predators in spring.
- Suppresses most winter weeds and can help smother early summer weeds.

Problems:

- Must plant every year or can skip some years.
- The tall cover increases risk of frost damage.

Tips for Successfully Establishing a Cover Crop:

- **Plant early after harvest.** October is the ideal month for cover crop planting.
- **Locate and arrange seed equipment early.** Many orchard growers do not have either the equipment for seeding or the experience with calibration, seed bed preparation, and depth of planting.
- **Remove weeds beforehand.** For perennial sods it is essential to control Bermuda grass and Johnson grass before a ryegrass/fescue mix is planted. Green manures on the other hand help to control winter weeds and often suppress summer weeds, too.
- **Inoculate legumes.** Apply nitrogen fixing rhizobial inoculate when peas and vetch are part of the mixture.

- **Plant at the right depth.** With small seeds

like grasses and clovers planting too deep is the main cause of failure. The larger seeded green manures are more vigorous and forgiving.

- **Mow to favor the cover crop.** When establishing a perennial sod planting, the first spring the weeds should be mowed to keep the slow growing cover crop from being smothered.
- **Protect the orchard floor.** In the first season of a long term perennial sod, care should be taken to avoid driving on the floor until it is firm enough to prevent ruts, likewise pushing brush can damage the small grasses the first winter.

Where can I get more information?

Cover Cropping in Vineyards, A Growers Handbook by Chuck Ingels, UC DANR Publication #3338, available or easily ordered from the local UCCE office. A just released 140 page manual on cover crops with extensive color photographs and management guides for vineyards. The Handbook is also very useful to dried plum growers as the culture of the two crops is often identical.



“INTEGRATED PRUNE FARMING PRACTICES DECISION GUIDE” AVAILABLE IN COUNTY COOPERATIVE EXTENSION OFFICES



Integrated Prune Farming Practices Decision Guide



In response to environmental and regulatory constraints, the IPFP program has developed monitoring protocols and alternatives to a considerable number of traditional pest control, irrigation, and fertilization practices. These protocols and the decision guides have been included into one comprehensive publication now available to dried plum growers at your local U.C. Cooperative Extension office. The cost is \$32.00 + tax and also includes pest identification cards for field use and a Windows compatible computer data base, with tutorial, to store and organize field monitoring data, aid in various orchard management decisions, and in pesticide use reporting.

For additional information on the IPFP program, visit http://agresearch.nu/ipfp_wsrld.htm or contact Gary Obenauf at (559) 449-9035.

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