Pistachio Day – January 13, Day 2

Additional Resources

Leaching calculations:
http://cekern.ucanr.edu/Irrigation_Management/ANALYTICAL_CONVERSIONS_AND_LEACHING_CALCULATIONS/

Management of Navel Orangeworm (Lepidoptera: Pyralidae) Using Four Commercial Mating Disruption Systems in California Almonds: https://academic.oup.com/jee/advance-article-abstract/doi/10.1093/jee/toaa297/6063470

Other Questions Answered

Weed Control in Orchards
Brad Hanson, UC ANR CE Weed Specialist, Plant Sciences, UC Davis

Question: What is the prevalent mechanism of resistance for Glyphosate in CA? Target Site or Non Target Site? And what methods of Non Target Site have been used to id resistance?

- There are both target site and non-target site mechanisms of glyphosate resistance in California weeds but varies among species. Junglerice seems mostly target site, Conyza seems mostly non-target, Lolium has some of each. Varies.

Question: Any feeding studies done with alkali weed and gophers? Will they eat it?

- No feeding studies that I'm aware of. I do not know if they eat it, but I think the biggest challenge is the cover and protection from predators that the ground cover offers

Question: Any suggestions for Malva?

- First suggestion: control it when it's small with just a few true leaves - several of the contact herbicides are quite effective. As it gets bigger, it's harder to manage. A lot of oxyfluorfen (plus glyphosate) programs are aimed at malva. 2,4-D works well if you can use it in your situation (but has some crop safety risks if application is sloppy)

Question: Will acid in drip (PH 6) help reduce Alkaliweed?

- I doubt it because the effect of acidic irrigation water on soil pH is very ephemeral because of the buffering capacity of the soil.

Question: Gramoxone now NOI? Hard to use! Substitute Treevix, Rely, Clethodine?

- RE: Paraquat NOI. Yes, the paraquat products are becoming more challenging to use due to regulatory changes related to the acute toxicity of this active ingrdient. Glufosinate (eg Rely) is a good substitute b/c it works on grasses and broadleaf weeds. Treevix is very good on Conyza and many othe broadleaf weeds but doen't control grasses. Clethodim (eg SelectMax) works well on most grasses and is a translocated herbide, but does not control grasses.

Question: Can we alter ph in spray solution when spraying alkali weed to a better effect?

- I have not done this myself, but I think Kurt Hembree and collaborators did some work on spray on tank mixes. However, I don't know if acidifiers were part of that previous work.
  That is one of the areas I think research is needed. We know glyphosate doesn't work well on alkaliweed, but it is not clear to me how much of that is due to lack of sensitivity (at the target site) vs how much is due to uptake issues (hairy surface, salts on surface, etc). If the target site is sensitive and the problem is on the leaf surface, it seems like adjuvants or acidifiers might have some potential to help. But, I'm not aware of a systematic test of this.

Question: Suggestions for nightshade

- I haven't personally done any orchard herbicide work on nightshade. In other crops, many of the ALS herbicides are quite effective so I would think Matrix, Mission, PindarGT, Sandea would be ones to consider. Nightshade is a summer-emerging species, though, so its challenge with winter PRE programs is likely similar to what I described with summer grasses - just too long after the winter PRE program to remain fully effective. My expectation is that many of the POST contact herbicides such as glufosinate or saflufenacil *should* be effective if the nightshade is not too large. Make sure your timing relative to weed size is appropriate.

Question: Hi Brad, where can we get more information about successful natural weed controls as we need to reduce chemical controls as you mentioned?

- There are a few "spray" solutions but these are also chemicals. I think a lot of my thinking on this is related to adjusting your thresholds and expectations. For example, is it worth making a herbicide application or adding another active ingredient to control that last 0.1% of weeds in the field? Can we tolerate a few weeds in the orchard that are not actually having an impact on the crop? Particularly in pistachio (compared to almond/walnut) where we are not harvesting the nuts from the orchard floor - it seems like we could tolerate a few more weeds.

  Similarly, I've thought a bit about the width of our spray strips. If you're mowing or cultivating the middles anyway, it seems like we could make real reductions as an industry if our spray strips are as narrow as feasible given the width of our middles management tactic and equipment

Question: What pre-emergent herbicide provides the longest residual control on fleabane on loamy type soil? Thanks.

- Hairy fleabane germinates almost year-round but there are "peaks" the late fall and again in the late winter. I think approaches that get one of the effective PREs out relativly early. In recent years, two of the best programs have been based on Alion (often with Matrix as partner) and on Pindar GT. Those are probably the two strongest "foundation programs" for fleabane at this point. (that was what the sequential data I showed were based on - early winter foundation programs for fleabane and other winter weeds, followed by a second shot of Prowl to help with the summer grasses if needed).

Question: If well water with pH>8.5 is used for spraying herbicides, how many hours could Alion and Glyphosate remain active in the tank before being fully sprayed and still be effective? What pH control material (acid) and roughly at what dose would you recommend to reduce pH in the tank for Alion and Glyphosate? Based on your experience, If soil is dry when Alion is sprayed and there is no rain or water applied within 2-3 weeks following application, what would be the effectiveness percentage (compared to an ideal application practice)?

- I would buffer that water BEFORE putting glyphosate in the tank (primarily for salinity, but pH as well). Alion is probably somewhat more stable in the spray tank than glyphosate, but I would try to mix and spray within the same day as a general practice (sitting in a spray tank overnight will not improve any pesticide's performance!). Alion is pretty stable on the soil surface (with regard to volatility and degradation in light) but will have little weed control performance until incorporated. Two-three weeks probably doesn't reduce performance more than a few percent so I don't have great concerns for that timeframe. A few years ago, we had applications that sat for a month or two without significant rain, performance did drop to some degree (maybe 20% or so if I were to ballpark a number). As far as buffering recommendations, you should talk to your PCA and base it on your water analysis.

Botryosphaeira and Botrytis Management

Themis Michailides, Plant Pathologist, Plant Pathology, UC Davis

Question: Themis, what should a grower do if there is a lot of black rachis overwintering in the pistachio trees?

- Collect a sample and determine if they have Botryosphaeria. Usually are silver like close to the base. If they do not have Bot, no need to do anything, if they have Bot then you have Bot in your orchard. If then rains, you need to spray. The best will be to remove them but this is very difficult because Bot infected rachises are firmly attached to the shoots., and it is difficult to shake them.

Question: What percentages of budmons effect on crop loss at harvest?

- A 2% bud infection in BUDMON can cause some damage use the BUDMON graph. You will need to do a spray to avoid accumulation of the disease. From the graph 2% BUDMON Bot will results in in about 2% cluster blight (if the conditions become conducive for disease)

Question: Can you please explain how to collect samples for the BUDMON test? Should buds be flowering buds, vegetative buds, or a combination of both? Thanks!

- Mixed sample, mainly flower buds 100 buds collection from a block is sufficient. It is easier to collect buds direclty from the field; you do not need to cut shoots.

Question: What temp at least 32 or lower? For the ONFIT test.

- Freezing is done at -15. Our freezers were set at -15 to -16.

Question: What are the conditions for installing leaf wetness sensor?

- There is a panel that is placed on a 45 degrees angle to mimic a leaf surface. Usually the manufacturer gives you instructions how to install these sensors for leaf wetness.

Question: Will Botrytis infect and develop in cold weather? How cold?

- It can develop even at 41 F and that is a problem in cold storage of fruit. In Pistachio, temperatures below 41 F can be a critical limit. But remember it also needs free moisture (rain, dew).

Question: Does 2-4D control fleabanes?

- Yes, 2,4-D should control fleabane. Be aware of size, time of year, and notice of intent and other regulations related to fleabane, though.

Question: State Climate Change model says hotter and dryer, what does that mean for fungus?

- Dryer climate (no rains in spring) will predicate less fungal diseases. However drier and hotter climate during the summer in irrigated agricultural crops will favor other diseases (Aspergillus blight, or infections by Aspergillus that causes aflatoxin)

Question: Can you commonly find the tan, tuffed conidiophores on the Botrytis infected leaves?

- If a leaf with lesion is dropped on the ground, the underside of the lesion will have the sporulation. Or, if there are some foggy days in the spring, sometimes you find these large lesions, especially if there is a debris or cut in the leaf, where the Botryi will start and then invade the green tissues.

Mating Disruption Update

David Haviland, Advisor, UCCE Kern County

Question: Any organic fungicide available?

- None of any of the organic fungicides we tried really performed well.

Question: Do you know the difference between the Semios NOW and the organic NOW Eco?

- The inert products that allow the NOW Eco aerosol product to be OMRI certified is proprietary information at Semios. I am not privy to that information.

Question: Was Economic benefit analysis done at the 2 per acre rate for Suterra?

- The economic analysis included data on Suterra at 2 per acre, PacBio and Semios at 1 per acre, and Trece Mesos at 20 per acre.

Question: What is the value of preserving beneficials by using MD instead of insecticides?

- In almonds it probably isn't that important because natural enemies for NOW aren't extremely important. It might be more important in pistachios due to the value of phytocoris. The key point for me is that the main products used for navel orangeworm (Intrepid and Altacor) do not have negative impacts on natural enemies. Damage to natural enemies is from pyrethroids. I realize that pistachio growers use pyrethroids for NOW, but even if they didn't use them for NOW, growers would still use them for stink bugs, leaffooted bugs, and other small bugs in the spring. Therefore, even if you replaced insecticides used for NOW with MD, you still might have to use the pyrethroids anyways. However, less is obviously better.

Question: How effective is mating disruption if you have “dirty” neighbors? They have north of 7% damage on average.

- Reductions in damage from MD trials have not been density depedent. In other words, if you would have had 1% damage, MD should get you to 0.5%. If you would have had 10% damage, MD should get you down to 5%.

Comment: Fewer eggs in earlier flights mean lots less females in the dreaded 4th flight of the NOW....fewer bugs mean it is much harder for them to find each other. This is non-linear reduction in random hookups

- Definitely. If you use MD and get a 50% reduction in eggs from the first flight, and then a 50% reduction in eggs following the second flight, and so on, by the end of the season you will have less moths and make it harder for the moths that do exist to find each other.

Question: Sprayables: Is there a gallonage recommendation, is 100 enough (Is it coverage vs concentration material in the droplet), air vs ground? Did you get any data showing the duration the sprayable was effective?

- Gallonage is flexible because the goal isn't 'coverage' in the traditional way you think of it. The goal is simply to get it on the leaf. Ideally, 100% of the product lands on a leaf and sticks there. However, I suppose that droplets that fall on the ground will still release pheromone just the same (though ideally you want it in the canopy). The caution I would have is to make sure you don't have high pressure and tiny droplet size such that the droplets could desiccate in the air and float away.
  We collected weekly data following applications of pheromone and did not see trends that can be used to answer your question. For example, after an application, we saw about 50% reduction in pheromone trap captures each week for 4 weeks, not 100% reduction for 1-2 weeks followed by 0% reduction during weeks 3-4. Therefore, I can't answer the question of how long it was effective because I define effective as 'trap shutdown', and we never saw trap shutdown, even during the first 7 days after application.

Update on NOW Survey

Phoebe Gordon, Advisor, UCCE Madera County

Question: In general, in comparing pistachio and almond orchards, does one represent a great potential for NOW seasonal carryover?

- Both almonds and pistachios have great potential for NOW seasonal carryover. The difference is that preventing that seasonal carryover (sanitation) is much easier in almonds than in pistachios. Even if you shake and pole both crops, the percentage of nuts on the ground that are destroyed through traditional blow, row, mow programs is much higher in almonds.