Questions & Answers
2020 Climate and Agriculture Symposium Webinar: Soil Health
UCCE San Diego • May 21, 2020 • 1:00 pm – 3:45 pm

Questions submitted during the webinar 'live chat.'
Answers provided during/after presentation, in 'chat pod,' or post-webinar.

Q. Any studies for commercial production of antifungal properties of chemicals in plants with natural fungal suppression?

A. One example I know of is the mustard seed meal, a byproduct of biofuel production, that is known to suppress some soil-borne fungal pathogens. After being incorporated into the moist soil, mustard seed meal releases isothiocyanates that trigger microbial community shifts in the soil. Through this biological process, some soil-borne pathogens and nematodes are suppressed. The effect has been well studied in apples in Washington state by Dr. Mark Mazzola (USDA-ARS, retired). Mustard seed meal is commercially available. (Joji Miramoto)

Q. What is the problem of applying [mulch] 2-3 inches every year for, say, 3 years?

A. It's the cost. Spreading often costs more than the material and it's cheaper and easier to spread a thick layer that persists for a long time, than to do multiple applications. Also the tree's roots adapt to the mulch layer being there, so it's important that after 18 months or so, it disappears and the roots are exposed. Given time, the trees will start creating sufficient mulch on their own, and it won't be necessary to continue mulching. (Ben Faber)

Q. Can you talk about spreading polyphagous shot hole borer via mulch and what precautions we should take?

A. This is a question that has multiple approaches depending on the situation. What volumes are being addressed? Where is the orchard? Where is/are the tree (s)? How far does material have to move? Where does it reside before it is shipped to an orchard? Lots of other questions.

It gets really complicated. But here's a spreading scenario for a commercial orchard.

To mulch an orchard in the tree row, 6 inches deep, takes about 400 cubic yards of mulch. That's a lot of material. A big sycamore might produce something like 10 cubic yards. So it takes a lot of trees to mulch an orchard. It costs a lot of money to spread mulch, so it's most efficient to have mulch piles stockpiled for easy distribution. Those stockpiles "cure" and get hot and can do a sufficient kill of both Fusarium and beetle even if the piles are left alone – static. If they are turned, the kill should be pretty thorough.

Then the question comes of what happens to the infected tree on the way to the orchard. If it's chipped on site, it will be thrown into a truck holding 4- 10 cubic yards of material or something like that. It heats up in the truck. How long does it sit in the truck? It gets complicated, but if there is a heating period from the time the tree is taken down, not necessarily composted, because the kill happens before a true composted is created – the chips are still recognizable as chips. So get it hot and turn it, to make sure all parts of the pile get heated. (Ben Faber)

Q. What is the method of differentiating mulch from compost? Compost can also be applied on the surface and not incorporated, what is then the difference from mulch? Is the C:N ratio used as a definition of mulch? NRCD/CDFA seems to be working with differentiation based on C:N ration.

A. Mulch can be anything, just about. You don't have to worry about C:N ratio, because you're putting it on the surface and it's doing a natural decomposition – it's composting in the field and releasing it. When you're using a true compost, you're incorporating it into the soil where the roots are going to see it. You have to have a high quality material. Compost that's going to be incorporated in the soil needs to be a good quality; mulch does not need to be as good.
(Ben Faber, *answering during live webinar)*

Q. Dr. Bachie, what are your thoughts on the idea of using high diversity of cover crop mixes.. also ... are there any CA natives that can be used as "cover crops?"

A. Cover crops can be used as mixes or solo as long as they are compatible with each other and the main crops. The book "Cover cropping in Vineyards" and SARE publications are good sources of the types of cover cropping, how they may be used, etc. (Oli Bachie)

Q. Dr. Bachie, does the pest suppression and other benefits of the cover crop make-up for the cost of irrigating the cover crop during the summer?

A. The cost benefit analysis must be made before recommending cover cropping. The benefits and costs must also be considered not only from the economic benefit, but also from ecological and health of human and other organisms. At this point, I have not come across on cost benefit analysis on the basis of these factors. Some information may be available out there. (Oli Bachie)

Q. Dr. Fox and Phillips: How many years did you monitor the practices?

A. I was going to add something. We are looking at 1 or 2 years. It may be that these two practices (compost and cover crop) have a benefit that is realized in the long term, that is, after multiple years. (Jon Phillips)

Q. Dr. Fox and Phillips: Will planting a barley cover crop on heavy clay create water channels for better drainage?

A. I do not know the answer to that specific question but cover crops in general can help a lot in soil moisture issues. Some kind of grass cover crop can improve issues you may be having with soil moisture – infiltration – percolation - retention, but it may end up being a kind of long term thing. It may take a few years for you to see those benefits.
(Aaron Fox, *answering during live webinar*)

Q. Aaron Fox: Do you have any physical documents for your Citizen Scientist project. We would love to see them!

A. Yes, these resources are available. We are working on a website over the summer but contact me directly and I'll be happy to share them with you. (Aaron Fox, *answering during live webinar*)

Q. Dr.'s Fox and Phillips: It would interesting to learn crop yields in the composted rows in subsequent years as the compost releases additional nutrients over time.

A. We will be doing another year of this study. (Jon Phillips)

Q. Dr.'s Fox and Phillips: Are there any summer internships available?

A. There are no summer internships at the moment, but send me an e-mail and I can send you info about potential future opportunities. (affox@cpp.edu) (Aaron Fox)

Q. Can you recommend sources for cover crop seeds?

A. Regarding cover crop seeds... it is really interesting how no one is breeding cover crop seeds adapted to southern California climates! All cover crop seeds are typically bred for colder climates. (Aaron Fox)

Q. Dr. Mosase: Is there a difference between non-aerobic and anaerobic? If so, what is the difference?

A. Anaerobic is the correct word. In the slides it should have been non-digester manure management practices NOT non-aerobic. (Esther Mosase)

Q. Tyla, I assume "urban users" are landscaping companies rather than individual homeowners? Are there ways to encourage individual homeowners to spread compost on their yards?(Or is it even worth going after the individual homeowner?)

A. Urban users can be both landscaping companies and individual homeonwers. We encourage and incentivize home composting and use, but would be interested in exploring ways to encourage greater compost use on residential properties. (Michael Wonsidler)

Homeowners tend to purchase bagged compost, which is largely imported from outside SD County. Yes, urban users are the landscapers and would also include parks and green space. (Tyla Soylu)

Q. I think one obstacle to individual homeowners is getting the compost and mulch to urban yards .. delivery can be tricky.

A. Our local facilities need to produce the "fancy" compost mixes in bags and sell to our local retail outlets. This would be one way for homeowners to buy local product. (Tyla Soylu)

Q. How is the compost being used in rangeland situations....for land reclamation, erosion control?

A. Compost can be used on rangeland for multiple purposes, such as those described today: soil health, water conservation, erosion control, carbon sequestration, etc. (Michael Wonsidler)

Compost is not currently being used on rangelands at scale. We identified this as an opportunity, such as via carbon farming. (Tyla Soylu)

Q. Tyla: When will final report be publicly available?

A. The report will be posted on the County's website https://www.sandiegocounty.gov/content/sdc/dpw/recycling/composting.html (Michael Wonsidler)

Q. Does the process of making compost release CO_2?

A. Yes, however it is a biogenic process. When composting, it is important to follow best composting practices to maintain a balance of carbon to nitrogen (C:N ratio) and minimize GHG emissions. Information on composting basics may be found online:

https://ucanr.edu/sites/UrbanAg/files/285018.pdf

https://ucanr.edu/sites/Nutrient_Management_Solutions/stateofscience/Compost/

https://www.sandiegocounty.gov/dpw/recycling/composting.html

(Jan Gonzales)

Q. Define "Prescribed Grazing"?

A. Prescribed grazing is the method of moving the cattle based on observation of the vegetation. It is an NRCS practice with the same name. (Martina Skellerudsveen)

Q. Martina: Is this showing that compost practices (versus mulching, cover cropping) show the highest soil carbon sequestration potential?

A. Yes, it does, but we don't know for sure that it is the compost that is the actual reason for this result. Time will hopefully show a clearer result. (Martina Skellerudsveen)

Q. Ellee: How deep are you measuring carbon accumulation in your soils? Also how many sub-samples per treatment are being taken?

A. We worked with Martina at Greater SD RCD and Lance at Mission RCD on the sample protocol. We took at 0-15, 15-30, 30-45 cm. And I believe we took 3 samples per 9 foot (randomly selected) treatment/control plot. (Ellee Igoe)

Q. Ellee: Where are you sending your test samples?

A. The last analysis was done at UCR. Previously we went through S and L Labs (I believe!). (Ellee Igoe)