

Urban and Small Farms Conference – March 1st 2021

Microfarming Session (morning)

**Presentation slides, handouts, and other materials used in the session are available on the [schedule page](#)*

***Video recordings of the sessions will be available on [diverseag.org](#) soon*

Fruits for Small Acreage

1. How can we best locate the case studies and links referenced in this presentation?
 - Here is the direct link to our cultivar trial fact sheet:
https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=2657&context=extension_curall
2. Specifically, for berries, what is the water pH requirement? Will I need to get water testing done for production?
 - The closer to neutral the better. How well they tolerate alkaline soils depends on the crop. Raspberries are less tolerant than blackberries. If you get above the high 7 range, then all of them will struggle.
3. What variety of strawberry is most salinity tolerant?
 - Strawberries are notoriously sensitive to salinity; there isn't a cultivar that I am aware of that has more salinity tolerance than others. If you have higher salinity in your soil, you may want to consider a different crop. You might want to read through this fact sheet:
https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1042&context=extension_histall
4. What blackberry varieties are better adapted to intermountain climates?
 - The colder hardy semi-erect types and the coldest hardy upright types will typically do well. We have information on blackberry variety comparisons on our website: www.fruit.usu.edu
5. How do I protect strawberries grown in a food forest context?
 - There are several approaches. You can either try and delay the bloom to reduce the risk of spring frost damage, or you can use hot caps, row covers, or frost blankets to protect the blossoms when they emerge. The trick they use in the Midwest is to wait until mid-winter when the soil temperatures are as cold as possible, then heap on some straw mulch to slow down the soil from warming up, which then delays bloom.
6. You quoted 30-40 inches of water for fruit. In Colorado we only get 10-15 inches of rainfall. We are growing apples with drip irrigation, but not adding that much water.
 - The seasonal water-use for apples, if you are going to not limit your fruit size and quality, is about 36 inches of water. Some of that is coming from accumulated water in the soil, some is applied through irrigation, and depending on your condition, some may be getting pulled from ground water. At our research farm, we have some large old sweet cherries that have been growing for at least 30 years. We haven't irrigated them in 15 years because they have tapped into ground water that is down about 5 feet deep. However, on some of our farms there is no ground water within reach.

7. Where do we get information for liability? For example, if my strawberries or raspberries make someone sick somewhere.
 - You will want to talk to an insurance agent; there are insurance plans that will cover your operation in a situation like this.
8. You mentioned commercial kitchen: where can I find more information about commercial kitchen requirements?
 - Contact Dr. Karin Allen, one of our extension food scientists.
Karin.Allen@usu.edu
9. What are the studies indicating between organic vs non-organic in profit?
 - Some information is found in the economics section on the extension.usu.edu website.
10. My serviceberries have been hit hard by an insect the last few years. Do you know what would be a new insect feeding on them?
 - There are several insects that can cause problems. Spider mites are common. You can send in photos of insects and damage to your local Extension office and they can help you identify the insect that is causing the problem and give you information for treating it.
 - If the insects are affecting the berries, this could be a pest called the saskatoon sawfly. The adults lay eggs in the flowers, so it is difficult to control. I have this pest too, but it seems to have diminished over the years. I make sure to pick all the infested berries all summer, and this has reduced the population.
11. Any tips for keeping deer out of blackberries?
 - Fencing can help. Deer are tough! When they decide to start eating something, they are pretty persistent!
12. Is it beneficial to plant more than one variety for cross pollination, like for blueberries?
 - Blueberries are not well adapted to Utah soil conditions, and you won't get much of a crop. I would suggest that you tune into the haskap presentation tomorrow in the berry track if you are interested in growing something like a blueberry. Some crops like apples do need cross-pollination.
13. Any thoughts on the economics of growing pinyon pine?
 - This is an interesting question. I am not sure about the economics regarding it; not much work has been done on this crop through USU. A lot of people simply forage this crop and don't necessarily plant it as a crop.
14. Question about strawberry production: Any varieties that did really well in your studies? We are in Escalante and will begin production this year. Any suggestions for that 6,000 elevation? We will be using high tunnels for growing, looking to ensure we are growing the best Utah varieties.
 - We focused our efforts on several June-bearing and day neutral types: Chandler and Allstar for June bearing, and Seascape as a day neutral. These are some of the most adaptable cultivars to the widest range of conditions. However, there are better cultivars out there for specific situations. You should maybe look at testing a few different cultivars to see which might be best adapted to your temperature and soil conditions.

15. Is there a measure to marketing as locally grown that can assist in evaluating costs of production?
 - This is an excellent question for the marketing track of the conference. I would definitely tune in and ask Ruby Ward about this topic.
16. If my raspberries are turning white, are they getting too much sun?
 - Yes, it is likely sunburn. You can use a 30% shade fabric over the raspberries and it will not impede growth but will greatly reduce sunburn injury.
17. Can you take cuttings for starts, elderberries?
 - The black-fruited elderberries grow well from cuttings. The blue elderberry won't grow as well from cuttings. Even with overhead mist, rooting hormones etc., we only get about 5% survival of our cuttings. That's why we are working with some local nurseries to start propagating and selling local elderberries.

Using Cover Crops to Improve Soil Health

1. When we're talking weed suppression, does this refer more to suppressing annual weeds? We struggle with perennial weeds (bindweed, specifically). Will spring cover crops in particular be able to out-compete bindweed?
 - Perennial weed management with CC's is hard, particularly in organic systems. You till and cut them up and then they spread. I've been trying for a few years and find that winter wheat (dense plantings) and summer buckwheat probably do the best, but that means the veggies get left out for a year. We also recommend solarization (clear plastic over an area from mid-July to mid-Aug). Again, this means part of the farm is fallow for the summer.
2. What is inoculum?
 - Inoculum are specific bacteria that form a relationship with a legume root. The legume feeds the bacteria carbon and the bacteria produce N in return. But the relationship is very specific, so buying inoculate specific to each legume ensures the right bacteria are there to begin the process.
3. With radish cover crop do you dig up the radish tap root when you're ready to move on to a new crop?
 - No, you do not need to dig it up. You can turn the soil and it will decompose and break down, or allow it to winter kill and break down.
4. So how do you 'kill' the cover crop using a permaculture approach?
 - Killing in a permaculture system is not easy. One approach is to "mow" the cover crop. With wheat, as the head extends upward, mowing will kill the crop because you cut off the growing point. This works well for anything that has a main growing point. For things like vetch, which is vine-y in growth, you may have to mow several times to kill (suppress) it.
5. If using radish as a cover crop, do you harvest the radish or let it decompose?
 - It is a special radish (fodder radish), with a big tap root. Plant it in early September, and then it penetrates the soil and during the winter dies out, leaving a channel for water to move. Garden radishes don't do this so we don't use them as a CC.

6. Can you talk about optimizing seeding rates in mixtures, especially for rates of legumes in the mix, to maintain N benefits?
 - The resources mentioned have rates to seed. Most grasses and legumes are seeded at 75-125# seed/acre (or 0.15-0.30 #/100 sq.ft.). Things like radish and other brassica CCs are planted at 20-24#/A (0.05-0.10 lb./100 sq. ft.). The cover crop book is full of suggested seeding rates.
7. How do you recommend inoculating your cover crop? Seed or soil?
 - Before seeding, mix the inoculum with the seed. This is the best way to mix two together. Once in the soil, we find the plants get inoculated again and again.
8. What are the risks of cover crop components affecting the subsequent crop with disease/pests? Can one mitigate these risks by altering the mix or the timing of termination?
 - Cover crops will usually minimize the risk of pests. Usually the only time they can make pests worse is if the cover crop is a host of a soilborne pathogen that has been identified on your farm on your cash crop.
9. In St. George we have a longer growing season. If I planted a fall cover crop in November, would that give me enough time to benefit from it? We are ready to plant again in February and March. I've been confused on how to incorporate a cover crop, but I know my soil could use the nutrients.
 - Later plantings work better, 4-6 weeks. Water may be an issue. Some of these could be planted again in spring. One issue is that CC's use stored (winter) water and can dry out the garden. In Nth Utah, we like this at times as it dries soils so we can plant or work it for the crops of choice. I like to first mow then rototill it in.
10. Can any crop be used as a cover crop/green manure if reseeding is not an issue? For example, can I cut down my zinnia plants at the base at the end of their season and leave the plant material on the surface to break down into a mulch?
 - Yes, all plants can be CC's and used to enrich the soil. We just know more about the one's I have discussed.
11. Would you consider chickpeas as a cover crop? Can they be started earlier than beans?
 - Legumes are all those plants that produce nitrogen when inoculated with bacteria. So, in my examples, beans are legumes and legumes all work well. So, use chickpea if they fit your system. They do grow better in cooler dry conditions so earlier planting is possible. We have not tested these locally.
12. Do you use silage tarps to kill off cover crops and help them break down?
 - I assume you are talking about solarization. Clear plastic works the best to trap heat to kill off a crop. A non-clear covering will kill an annual crop due to lack of sunlight, but not necessarily a perennial crop.
13. Can you direct me to additional information on using a cover crop as a wind break?
 - In the book on Managing Cover Crops, it discusses this. Otherwise, plant rows of the CC between every 3-4 row of crop of choice. Or, plant in fall, till out strips in spring for the veggies, and leave strips of your CC

14. Is there a cover crop that is recommended for Randolph, or is it too short of a growing season (for help on weed control)?
 - I'm partial to wheat, and sow it thickly so it produces a lot of cover. Timing for seeding in the fall in Randolph would be late August or early September. Using CCs in short growing areas is more of a challenge. Using a strip cropping approach where you till out the planting areas and leave some CC will let it grow more biomass and in those areas suppress weeds too. Later on, these are mowed down for later season incorporation.
15. Where would you purchase seeds for the cover crop?
 - You can purchase online from many different retailers. There are also some local nurseries that provide seed for some covers. You will want to call around to the larger nurseries around you. Also, you can do a quick internet search. I always look at reviews when I purchase online to make sure I get a quality product. Some local companies that sell CCs include Utah companies like Granite Seed, Wheatland Seed, Mountain Valley Seed just to name a few.

Using Compost to Improve Soil Health

1. I have about 12–14 chickens, and a relatively healthy supply of chicken manure each month or so. What are your thoughts regarding chicken manure in gardens?
 - I highly recommend composting it first. It can burn crops when added directly. This also helps you have more control over when it is added.
2. Would you please explain your salinity unity dS/m?
 - deci-Seimens/meter. Salinity is measured like electrical conductivity. We want a reading of less than 2.0 in soil. We start to see decreases in yield as we approach 2.0.
3. If your state doesn't have a lab, will the University of Utah accept out of state tests? We border with Utah.
 - Yes, just tell them when you send the soil sample in where you are located.
4. How full is your "wheelbarrow" measure?
 - Most wheelbarrows hold 2-3 ft. I assumed a 3 ft³ wheelbarrow filled to the top, but not mounded.
5. What is the pH and salinity and NPK content of compost tea?
 - It is going to depend on the water that you are using as well as the plant material.
6. How do you suggest incorporating plant mulch? Till or dig it in?
 - I like to till it in as it is easier. First mow it, and then till it in.
7. If you have 6 separate garden beds would a soil test have to be made from each ?
 - If you are managing them vastly differently, then it could be a good idea. Otherwise, you can take samples from each, mix them together, and get the average from the lab. If one is underperforming, it is good to isolate its soil test.
8. Given the high P and K in our native soils, should we only use straight nitrogen fertilizer (such as urea)?

- Yes, if you have high P and K, select an N-only fertilizer. There are many options, from urea as one of the most concentrated (use less) to less concentrated forms (use more).
9. Do many compost providers do npk analysis or do you have to get it tested?
- Many do. There is variability in every batch of compost, but an analysis gives a general idea.
10. Any info on adding biochar?
- We have tested biochar for tomato production and found that there are benefits in yield after about 3 years, with one application.
11. If filling beds, how do we start to consider soil health and compost ratios for fresh beds?
- USU recommends creating raised beds with equal parts: organic matter, native or topsoil, and materials that increase drainage (such as coarse sand, vermiculite, etc). For OM, compost can be a source; just check into what you are buying or using. Consider other sources of organic matter in addition to compost. This fact sheet has great info on creating raised beds:
<https://extension.usu.edu/washington/files/RaisedBedGardening.pdf>
12. Could you briefly touch on no till/no dig farming?
- No till is just leaving things on the surface. You then just dig sites where you are going to plant. For transplants, NT can work; for seeded veggies, this is a bit harder as creating a good place for the seeds is a problem.
13. Do other forms of mulch, like wood chips, add salts?
- Wood chips generally do not add salt - they can be a great carbon source. However, for woodchips to break down and turn to soil organic matter, nitrogen needs to be added.
14. If we are making our own homemade compost, should we have that tested to know what's in our own compost?
- That is the best way to find out what your compost is like and what it is adding to the soil. I provided averages across different compost types, but compost results vary so much.
15. What about adding peat for increased OM? Our soil tests have high K so we've always avoided our local compost sources. I'd like to add some OM to our sandiest soils with 2.5% OM.
- Peat is a form of organic matter that can add to the water holding capacity of soils. There is some debate about its sustainability as a material. Depending on the size of the area, it could be cost-prohibitive to use as a soil amendment. Cover crops and mulches are also great options for sands.
16. What's the best way to add nitrogen to your soil?
- There are a lot of great ways, from fertilizers to cover crops. You can add some compost and manure for N, but that isn't the only place it should come from because if you add compost based on your N needs, you will overapply P and K.
17. Where would kitchen scraps tumbler composting fall with levels of salinity, P,K ?
- That would fall around the plant-based compost results (less P and K, lower salinity).

18. Over a large area like 3000 sq ft, how do you prepare and take soil samples? Just from one spot?
- It's ideal to take several subsamples and mix them into 1 sample to send them to the lab. This will give you the average across the area. You never know what happened in 1 spot. Here is a fact sheet for more info:
https://digitalcommons.usu.edu/extension_curall/2116/
19. Can you talk about humic acid as a source of organic matter?
- Humic acid is a natural product that is created during the humification of organic matter (the decomposition of OM into a very stable form, called humus). Humic acid isn't such a source of OM, as it is something that can increase a soil's CEC (ability to hold positively charged nutrients), and act as a chelator, making some metals like iron more available. It contains some nutrients, but most are not very available (locked up). So, it can add some benefits (research in the Midwest has found it to not increase crop productivity), but other options could increase OM more efficiently if that was the main goal.
20. Distance between Netafim emitters?
- 6-inches

Growing More in Less Space – The Urban Farm Demonstration Garden

1. Do you have your drip system attached to a hose or to a hard line for your personal garden?
 - Hard line - we are hooked to a main line secondary water system.
2. How do I manage drip irrigation that seems to get clogged?
 - It depends on if it is getting clogged with minerals or debris/silt. Filters can help with debris and silt. Minerals are difficult to manage and it often results in replacing parts as needed.
3. With the Netafim system, can you plant more than one plant per emitter? Like on both sides, 12-inches apart?
 - Yes, you can plant closer than 12-inches. As the emitters run and emit water, the water spreads out over a larger area - each emitter covers roughly a square foot.
4. Does the direction of the rows really matter? North/South vs East/West?
 - It really doesn't matter, especially with vegetables. Know that vegetables on the north side of the trellises may be shaded a bit, so plant accordingly.

Tools for Small Acreage

1. I have 10 acres, most of which I want to put in pasture. It's overwhelming to do without a tractor or similar tool. What do you recommend? Is it best to just rent, and where can I rent near Lehi?
 - For planting: rent or contract the work. Unless there are a lot of other tasks that will require the tractor.
 - If you are haying that pasture you may want to consider an older but gently used tractor with used hay making equipment.

- I would try to have the animals do a lot of the work for you. You are unlikely to make your (implicit) money back on the tractor unless you are doing snow removal and other work on your place.
2. What sizes of seeds will the seeders handle? Can it handle from carrots to corn or bean seed?
- We bought a Jang seeder and it is excellent, even with the small seeds like carrots and lettuce. We sent a few of our actual seed varieties to the vendor and they got us the exact rollers needed. They are expensive but very worth it.