**High Tunnel Advisory Panel Meeting Report – 3/3/20**

Summary of key actionable items:

* **Major revisions to the observation forms for the grower assessments needed:**
	+ Tomato assessment observation forms:
		- Include fruit color because this is a critical factor for consumers
		- The rating scale for plant vigor indicators (e.g., total leaf area) should be modified to reflect whether the observation is positive or negative: insufficient, acceptable, excessively vegetative
		- Eliminate weed coverage because weed management is done regularly in the High Tunnels [HT]
		- Symptoms would be more useful for participants to rate than separate categories for pest and disease damage because they look very similar. A visual aid for participants would be useful.
	+ Pak choi assessment observation forms:
		- Include color because is a critical factor for consumers.
		- Clarify how categories are defined on the observation form and distinguish between definitions of plant vigor, fullness of head and number of leaves. Also, consider how these are associated with color.
		- Focus the assessment categories on marketability of the plant.
* Panel members will be asked for input for improving on-farm trial data collection.

Q&A following researcher presentations

* **Fogging:**
	+ Fogging is not generally practiced by growers on the panel.
	+ In the Southern region, growers use fans successfully to help with high temperatures.
	+ Fogging may have more impact in drier areas with lower relative humidity.
* **Shading:**
	+ Shade alone is not a good option because of pest pressure in the region. Also, shade lets in moisture, so having poly on the HT provides more moisture control.
	+ There is potential for small growers to use shade with there was positive results with using shade in Georgia.
* **Certified organic grafted tomato seedlings:**
	+ A feasibility assessment should explore the need for this and if there is a market for it.
	+ The cost of shipping is a barrier to providing seedlings.
* **Top pest problem:**
	+ Stink bugs are a potential problem.
	+ In both Florida and Georgia, soil borne diseases have been the most consistent issue and worse than pests.
	+ Viruses and fungal diseases are additional issues in HTs.
	+ Cover crops are a potential management strategy for alleviating the soil borne disease.

Discussion portion

* **Grower assessments:**
* The main objective of the grower assessments is to involve farmers in the research design of treatments and data collection (not just implementation or outreach) to speed up the innovation process: to get from problem and idea to solution.
* So far, there have been two grower assessments in Citra, FL, one for tomato and one for pak choi.
	+ The grower assessments are a two-step process:
		- Step 1: Individual observations of treatments in HT. Participants are blind to what plot got what treatment (and variety if applicable) so prior experience does not impact interpretation of independent observation
		- Step 2: In a meeting room, ask the participants what treatments looked the best, what treatments looked the worst and why. The purpose of the group discussion is to drive consensus about what we should add to what we are currently doing (e.g., new treatment, different variety, different economic data), what we should quit doing and what we should keep doing.
* **Tomato assessment observation forms:**
	+ Add color to fruit characteristics:
		- Include different varieties having their own unique ideal colors. Consumers pay a lot of attentions to color and this is very important in different varieties.
		- Include in color criteria: attractive, uniformity throughout the fruit
		- Different plots harvested at different times and these dynamics perhaps present too many confounding factors. Participants should be informed how many days have elapsed since harvest.
		- Another option is leaving color off the observation form and bringing it up in the discussion instead. Harvested samples could be used as a visual tool.
		- Color of canopy (including how that is defined) could be a good indicator.
	+ Leaf area is more helpful than the number of leaves.
	+ The rating scale for total leaf area should be modified or all categories under plant vigor because the current categories do not capture whether it’s positive or negative: insufficient, acceptable, excessively vegetative.
	+ Add taste potentially, although this adds an extra procedure.
	+ Stem size is important for plant vigor.
	+ Weed coverage doesn’t work well because of weed management already happening in high tunnels.
	+ Difficulty distinguishing pest damage versus a virus:
		- Pest damage looks like disease damage.
		- Presence of beneficials are important to include, maybe with an abundance score with visual aid of what the categories are.
		- Include things difficult to recognize and unknowns (suspect disease or nutritional) because viruses look like nutritional deficiencies (e.g., present, absent or never seen before).
		- Ask about symptoms of something going wrong in general (e.g., healthy v. not healthy).
		- Chlorosis is a good indicator because it could be because of insect pests or diseases.
		- Participants tend to report on pest presence in real time during the assessment instead of overall pest damage on the observation form. The observation forms should reflect which we are asking participants to identify or if they are to identify both. Assessment report of pests and diseases are not as accurate because they are only measured at one point in time.
		- Color of the plant indicates a problem (e.g., too green, green, yellow).
		- Include different types of damage on the observation form.
		- For symptoms, show what are common indicators on a printed picture of a tomato leaf or people can put what they think they saw on a blank leaf (potentially a good group activity, also).
* **Pak choi assessment observation forms:**
	+ In general, the color of stalk, size of stalk and the degree to which it’s a stalk you’re buying versus a green was discussed.
	+ Perhaps, change the focus from plant to stand: uniformity of stand, uniformity of vigor, uniformity of size (you could have large plants, but not uniform).
	+ Only one cultivar used in Citra, FL because of heat tolerance that is a lighter green.
		- Provide participants ideal color beforehand so they don’t suspect a nitrogen deficiency.
	+ Clarify how the categories are defined on the form (e.g., plant size = height, vigor = speed of growth):
		- Distinguish between definitions of plant vigor, fullness of head and number of leaves. Also, consider how these are associated with color.
			* Wilt versus stand, good turgor pressure (for vigor) are both associated with color.
			* Vigor standards should not be established for participants ahead of time with visuals.
		- Focus the assessment categories on marketability of the plant.
	+ Pak choi can be harvested at two different stages, so inform participants when harvest happens.
* **Benefits, challenges and limitations of using cover crops and compost:**
	+ So far on research station at Citra, no clear results in promoting yield in using cover crops, but there were clear results in using compost (yard waste stood out).
	+ Compost:
		- There were mixed successes on the panel with compost.
		- Some FL growers use mushroom compost, but it can be cost prohibitive.
	+ Cover crops:
		- Farmers need to be aware that crop rotations are necessary.
		- Incorporating cover crops provide huge benefits to breaking intensive cropping cycles for a Georgia grower using HTs for 15 years.
		- In Georgia, there is a challenge in finding optimal and economically viable window because year-round growing conditions are good.
		- Certifiers are not always vigilant about cover cropping in HTs.
		- Sunn hemp helps with nematode issues but information is still being collected on the effectiveness of this. Also, this is difficult to manage because you need to have tractor in the HT.
		- Improvement in soil organic matter, although the focus is more on cover cropping for pest management and soil quality.
		- Cover crop choice is determined by soil profile in top layer and ultimately depends on what you are working with and what your goals are.
* **On-farm trials:**
* A discussion about the data collection for farmer managed on-farm trials was planned, but time ran out. Calling panel members individually for input about this in lieu of conversation was proposed.
	+ The on-farm trials are not a fully replicated station trial. Their purpose is to expose the treatments to variance in management.
		- The farmer picks 1 or 2 treatments or components of treatments and compares this to current practices (grower continues to do what they already do for pest management, for example).
	+ Current data collection too laborious for farmer and not useful for researchers.
		- Trials go fine, but the data collection needs help.