High Tunnel Fertility Research Update: Questions & Answers

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Managing Ca and pH in High Tunnel Soils

- **Where can I get my high tunnel irrigation water tested?**
  Here is a region-wide map of water testing labs:
  https://www.google.com/maps/d/u/0/viewer?mid=1C8KHM6jJszj9auYQttUbVtPKtb4eEBSJ&ll=42.30766417747545%2C-72.04010640290613&z=10

- **Can you elaborate on removing high tunnel plastic to counteract calcium and salt buildup?**
  Removing the plastic that covers a high tunnel structure for a period of time will allow rain and snow to flush salts and calcium in the soil. The most reasonable way to do this is to leave the plastic off of the tunnel when you are replacing the plastic. High tunnel plastic begins losing its light-permeability qualities after about 3 years, so it's recommended to replace the plastic at that interval, and if you can leave it off for an entire winter or fall, that will help flush the soil.

- **Do you attribute increasing organic matter to excess compost application? I often see organic matter declining in high tunnels constructed on existing cropland.**
  I see the opposite. Most high tunnels tend to trend upward in organic matter due to continual compost applications.

- **Is there some concern over the mobility and availability of the calcium?**
  Not really. Our data suggests that the calcium in the soil is fully available for plant uptake.

- **How about designing a high tunnel that harvests rain water?**
  Rain water quality is often better than that of well water for irrigation, but depending on the source of the water being collected (e.g. high tunnel, the roof of a house, etc.), the water may contain metals and/or pathogens that could pose risks to the consumer. This study from Rutgers found that in some cases, *E. coli* levels in harvested rainwater can exceed federal irrigation standards. It would therefore be important to regularly test harvested rain water that was going to be used for irrigation or to apply it to your crops in a way that would reduce the risk of pathogens contacting the harvestable portion of the crop.

- **For growers who choose not to grow a cash crop in their tunnel(s) year round, are there specific recommendations for cover crops to use in unplanted tunnels in summer? In winter?**
  There are lots of possibilities, with summer of course having a wider suite of available species. For summer, buckwheat and oats+clover are options, as well as sun hemp and Sudan grass, although these may be too "stemmy" to break down before a winter crop. I like buckwheat in the summer.

A winter crop needs to be winter hardy. Think grains like barley, triticale, etc. We've also had success with Austrian field peas.

Early fall can include tillage radish and oats, which will winter kill in most of New England.

Note from Rebecca Brown, URI, on this: Remember that if you are cover cropping in your tunnel in the winter with plastic still on the tunnel you are not going to have temperatures as low as outdoors. So things which normally winter kill may not. Especially in SNE where we are on the edge for winter killing cover crops like oats and radish.

- **If our soil is already acidic (like in RI), and peat moss would increase soil acidity, and if you are not suggesting compost because of the addition of calcium, what would be another additive to help with soil structure instead of peat?**
  Cover cropping in high tunnels can increase organic matter content and therefore soil structure (see previous question). However, if your soil is truly acidic (pH<5.8), adding some calcium would be fine. Coconut coir is another soil amendment that some growers use to increase organic matter.

- **Having never used peat moss, how is it usually applied and/or incorporated?**
  Usually square bales are distributed on the surface and then tilled in.

Developing Customized Nutrient Management Plans for High Tunnels

- **Is saturated media the same as saturated paste test?**
  Yes, it is the same test. It's called a saturated media test when it is used to test soilless container media. High tunnel soil is often so heavily amended with compost that it behaves more like a soilless media than soil.

- **Would you recommend avoiding potassium sulfate if sulfur levels are high? I know it's a low sulfur add but curious if it would be enough to make things worse**
  Yes—there aren't too many organic potassium options that don't come with sulfur contributions. It is a relatively low % and we haven't found any data suggesting high sulfur levels are a problem to crop or human health. It also might help nudge down pH levels over time. Generally, potassium deficiency is a much bigger risk than sulfur toxicity. Over time, we tend to be a bit more concerned with salt levels building up from potassium additions over time.