

Video Farm Tours: Be on the lookout next Saturday for a link to the first in a series of video farm tours. Would you like to show your farm to other RI growers? It isn't a beauty contest– it's a chance for you to show what you do and discuss any issues, your choice. If you are interested, contact ANDY– 401-256-7393

The Latest COVID-19 Resources: <https://web.uri.edu/coopext/coronavirus-resources/>

RIDEM Produce Safety Program: <https://mailchi.mp/46f6c8c54c77/psrri-gap-grower-training-december-5-6-register-now-8158952?e=adce649c0e>

--> Need to discuss? Got something you need looked at? URI Extension: 401-874-2967/andy_radin@uri.edu, hfaubert@uri.edu

Weeds between plastic-mulched beds: UGH!

There are few who grow warm season crops on plastic mulch who aren't driven crazy by weeds in walkways between plastic covered beds, and especially those that grow on soil that covers the edges. Besides making harvest more difficult, those weeds, if allowed to grow up high, block out light and block off air drainage, which is vital to minimizing disease problems. They can also rob the vegetables of water and nutrients.

In the last few years, more and more growers are using "landscape fabric", more generically known as Geotextiles.

These synthetic fabrics were originally developed for civil engineering applications and are now commonly also used in horticultural and agricultural settings. For intensive production areas, like the insides of high tunnels, or on small-scale farms, this material makes a lot of sense for weed control. Depending on which product you use, it can last a few to several seasons, though stony soils probably shorten the life of any of these fabrics due to constant abrasion.

I do have a question about how use of plastic mulch on beds plus fabric between beds affects soil qualities. I now commonly see sections of fields that are literally paved over with plastic film and plastic fabric. Plants exist to create the foundation of the soil's ecosystem every bit as much as soil serves to anchor

plants in place and supply water and nutrients. Plant diversity in fields encourages microbial diversity in the soil, and maintains carbon production through photosynthesis performed by that diverse assemblage of plants in a field. Right? Wouldn't it be better if living plants [A.K.A. Living Mulch] occupied the space between beds? Probably, yes, but that creates ANOTHER management problem. I have seen several growers' attempts at this, with so-so to poor results. Here are some condensed results of studies of such systems. [Turn to page 3]



Weed growth between black plastic mulched beds– serious trouble here

★ **STAR FARMER: Wild Harmony Farm, Exeter** ★

Rachel Slattery and Ben Coerper have been engaged in raising grass-fed beef, pastured pork, chicken in various forms, and supplemental vegetables at a most beautiful site in Exeter since 2012. They have recently added baby Milo to their family. They have built a finely honed business, with a diverse marketing plan that includes: wholesale accounts, their on-site retail farm store, local retail stores, CSA shares, and pre-order home delivery through WhatsGood.



One of their more successful “Silvo-pastures.”

According to Ben, pork plays the largest role in revenue, and they have some dedicated customers for it. This strongly influences their production system, which is an ever-evolving adventure. Ben and Rachel are constantly asking



One of the sows having a good scratch on the Eastern Red-cedar tree

themselves: “Are we doing this right?” They hold themselves to high standards with regard to animal welfare, environmental sustainability, financial solvency, and their own quality of life. Improving their soil quality is on their minds a lot.



It’s not an easy thing to do when much of it is loamy sand that is excessively well-drained and naturally low in organic matter compared to heavier soils. Can freely foraging pigs improve soil quality? This is the most central question in their farming endeavor. They have reached out to several people to help them to think through possible strategies, including URI folks. Meanwhile, they continue the hard work which has brought them great success.

In New Hampshire, Dr. Becky Sideman and students grew broccoli on black plastic mulch with and without an Italian (annual) ryegrass/white Dutch clover mix. [<https://journals.ashs.org/hortsci/view/journals/hortsci/50/2/article-p218.xml>]. They were primarily looking for effects of the living mulch on broccoli's ability to find nutrients. At high fertilizer (organic) rates, yields were similar between the plots with and without living mulch. However, where fertilizer rates were lower, they found lower broccoli yields in plots with living mulch vs those without. They determined that at least part of this was attributable to competition for nitrogen (yup, good ol' nitrogen.) Other factors were probably involved as well.

A really interesting study conducted at Michigan State [<https://projects.sare.org/project-reports/gnc17-251/>] involved both bell peppers and summer squash grown on plastic mulch with seven between-bed treatments: cultivated bare ground, winter rye residue dead mulch, mowed weeds, living winter rye (spring seeded), living annual ryegrass (spring seeded), and winter rye/white Dutch clover mix. They measured many responses to these treatments, including: weed suppression, labor requirements, crop performance, possible competition issues, soil nitrogen, and soil health in terms of microbial biomass and activity. The study was conducted two years in a row.

Annual ryegrass was the only living mulch that managed to suppress weeds, somewhat (reduced by half) but in only one of the two years. The winter rye dead mulch treatment did significantly reduce weed biomass in both years (70% to 80%). Mowing labor in living mulch and the weed check was significantly less than wheel-hoe cultivating between beds, though they did not include the time it took to hand weed the plastic edges [which is really a critical issue!!]. As for effect on yield, summer squash was unaffected by any of the treatments in both years, and the same was true for peppers in ONE of the years. But yield losses were very significant in one of the years, in comparison the clean cultivated middles. It's possible that this was the effect of low soil moisture- available water to the crops was less in all treatments other than the cultivated control. [This included the dead rye mulch, but they noted that there were lots of living weeds in that treatment along the edge of the plastic.] Apparently the plants in the middles transpire water out of the soil like so many drinking straws. They suggest that delaying planting of living mulches could reduce the competition for water, but I would counter that annual weed competition could be much greater with delayed planting, and it would be harder to establish a good solid mat of the desired living mulch plants. They did find that living mulch reduced leaching of nitrate, which would be expected. In their measures of soil health (microbial biomass and presence of enzymes that are indicators

of microbial activity), they surprisingly found no difference between the cultivated bare ground and all of the mulch treatments (dead rye mulch, mowed weeds, mowed cover crop plants.) In their words, their "expectations were challenged." They were flummoxed. And kind of disappointed. But they honestly reported their results. This happens. Overall, although the study provided many lessons, no big new set of practices came out of it that will be adopted by masses of vegetable farmers.

A study in Delaware [<https://www.udel.edu/content/dam/udelimages/canr/pdfs/extension/weed-science/INTEGRATING-COVER-CROPS-FOR-WEED-MANAGEMENT-IN-PLASTICULTURE-SYSTEMS.pdf>] looked at living mulch as weed control between plastic-covered watermelon beds. In this case, they looked at different species of spring-planted grasses in combination with broad-leaf herbicides for weed control, and grass herbicide to eventually terminate grass growth (at 5 weeks). Overall, they found that spring-seeded grass cover crops did not eliminate the need for additional weed control. I was disappointed that they did not use mowing as a treatment- this would have kept the rye (which begins to stunt in the summer anyway) under control, while also clipping the tops of lambsquarters and pigweed. As for weed control by rye, there was some... but there's



Photo: Judson Reid, Cornell Cooperative Extension

no doubt weeds would have gone out of control without herbicide, or by simply mowing. They did find that rye had a negative impact on average melon weight, which again, hints at competition for water.

A very useful part of the Delaware study was their trial of spring-planted cereal cover crops- annual rye, cereal (winter) rye, spring barley, spring oats, and sorghum sudangrass after 6 and 8 weeks of growth. Spring oats won in terms of biomass produced, and weed control in all of the cover crops was better than no cover crop at all... but there were still pigweeds and lambsquarters. Seeding densities of these grasses were NOT varied, so there may be more to look at here. And again, mowing was not employed.

Judson Reid, of Cornell, has done a lot of interesting work in this area. [<https://projects.sare.org/project-reports/one14-221/>]. He and colleagues did on-farm trials in which cooperating farmers grew spring-planted barley (alone), spring-planted rye (alone), and each of those mixed with white Dutch clover, in between plastic mulch-covered beds of peppers and onions. These were compared to clean cultivation. One farm used herbicides on the between-bed spaces while the others mowed regularly. While they looked at many parameters, a key finding is that rye/white Dutch clover mix was best at suppressing weeds. They did consistently find yield loss in living mulches in comparison to clean cultivation indicating, once again, that competition for water and possibly nutrients are real issues. You can look at a powerpoint presentation online (fantastic pictures) here: <https://jhawkins54.typepad.com/files/living-mulch-for-weed-control-in-plasticulture-vegetable-production-reid.pdf>.

CLOSER to home, John Eidson at SODCO in North Kingstown has been experimenting the last few years with planting vegetables into established sod that contains microclover, a type of white clover that does not grow as aggressively as white Dutch clover. As a sod mix, they have had huge success with it. John has been tilling strips and leaving sod

Your Input is Welcome

Please submit updates from your farm— a paragraph or two in an email is all it takes. Also, please submit suggestions for articles, meeting topics, and research needs from us at URI.

pathways. He's had some pretty good success, though such a system does not use black plastic mulch, so weeds end up being an issue within the tilled strip beds. Also, there's no doubt that the vegetables and sod strips compete for water. Soil warming is slower, too. But there is great potential for such a system. One is that tilling existing sod (which should be about 16 months old) provides a great green manure nutrient release. Such a system could work by shifting vegetable beds over, annually.

If YOU have been experimenting with any sort of living mulch systems, everyone want to see. How about doing a video farm tour?- we'll walk around and discuss your production system with all of its successes.



John Eidson (R), Outstanding in his field of tomatoes planted into Black Beauty sod