

## **Local research and demonstration for resilience at Quicksand, Kentucky**

The research station sits above the river, high enough to avoid most flooding, but not all. It's the 50-100 year floods that touch these test plots and field trials. The land is at an easy slope, a sort of stair stepping down towards the river with a final steep grade dropping into the river. The river is lined with some trees, fields are plowed in crisscrosses of new plantings and old. Near the entrance sits the brick building where we expect to meet Shawn Williams to discuss his research and his time in Kentucky.

We've arrived in the heat of the afternoon to find Shawn outside the office, conducting a field trial with his co-workers in the Department of Horticulture at the University of Kentucky Quicksand Research Station. He has clearly spent his years as much in the outdoors as possible, his wrinkles deep set by the sun around his persistent smile. A friendly man he's eager to take us around to show us the research plots and explain the trials they're conducting now as well as the history of the land itself

The Quicksand station has a long history in this area, originally as a timber processing site. The original owner some 100 years ago purchased this land as well as the majority of the surrounding forest in Eastern Kentucky. All the timber was brought to this spot, processed and sent down the river that remains constant/flowing along its borders. As the timber became sparse the land was made into a research institute for Kentucky State in order that the owner could avoid paying taxes on the land. Over the years the site hosted research on poultry, tobacco and a myriad of staple crops for the area. Reduced over the years to its current size, the grounds remain in high productivity through the year.

Today if you took stock of the land you'd find thriving blueberries, black raspberries a range of cucurbits, rye grass, hazelnuts, seeds start's in the greenhouse, whole fields which we didn't have time to explore and giant trees dating back to the original saw mill amid green grasses. A popular place for high school and wedding photos, Shawn isn't the one working to keep it beautiful, he's working to empower the people of eastern Kentucky to grown their own food with few pesticides, and relevant local knowledge to develop and share the strongest varieties possible. Each of these plots, even the ancient trees, has a specific purpose for Shawn and for the community he's been working to help for many years.

The day we meet Shawn he's standing beside some large equipment to plant variety trials. He has people coming out for a farm day soon and wants to get some cover crops in the ground to illustrate a no till method as well.

Near to where we're standing are two high tunnels, one larger than the other. Neither of them have crops in them right now but Shawn explains they've been tremendously successful, particularly the smaller of the two which features a low pressure, gravity fed watering system. This watering system also features gutters along the side of the high tunnel to collect rain water so they aren't reliant on municipal or otherwise pumped water. Shawn is extremely enthusiastic about this, highlighting the success and necessity in arid or remote parts of the world that need systems that aren't intensively reliant on water. The low pressure water is sent into drip tubes below the soil to provide water directly to the root bundle rather than risking evaporation on the exposed surface. The ground in Shawn's high tunnel has a very slight, almost imperceptible, slope that draws the low pressure water to the end of each row. He has had no trouble with over or under watering any of his plants. He remarks that even in other high tunnels with the same low PSI that a greater slope is OK, that people have had uniform water saturation even to the end of their high tunnels of greater length up to 90 feet.

The second larger high tunnel is also barren of plants during our visit and doesn't feature the gravity fed system built onto the other. Shawn is pleased with it, but clearly not to the degree of his smaller, gravity fed system.

As we continue in our walk, the next plot is the swath of blueberry bushes sitting to our left, slightly uphill following the easy slope of the hillside. They're covered in length by a fine white net intended to keep the birds out. As we peer in, the blueberries are bursting with ripeness, some feature large, sweet, disk-like berries. Others are clustered together, smaller and are more tart. These blueberries are part of a project to help track the spread of a newly introduced gnat like insect that differs from the common fruit fly in an important and significant way. It's mandibles are serrated and can therefore cut into the flesh of a ripe berry to lay its eggs rather than waiting for a rotted, open wound. This is particularly challenging for Kentucky growers as there are no known organic treatments for the pest, only a pesticide. Nor are there sufficient predators to control the population in the existing ecosystem. As Shawn points out, even if they release the wasp that would target the gnat the wasps wouldn't eliminate the problem, they would only reduce the population. In response to this challenge, Shawn and state entomologist have teamed up for an innovative solution on Facebook to report the first sightings of these insects. To do this, Shawn has set up a trap within the blueberries and checks daily. He has yet to spot one but expects it any day as the berries continue to ripen beneath their mesh shroud.

Once the gnats arrive, the only known solution is spot treatment of pesticide to stop the infestation. This last fact is why the Facebook group is so important. Shawn hopes that through early notice that farmers will only spray their crops when they have to, rather than spraying too early as a preventative measure or too late and missing their crop. The other solution he suggests is planting only blueberries that set early fruit to avoid the gnats and pesticide use almost entirely.

He then tells us about a group of blueberry growers in eastern Kentucky that he is concerned about. The growers have formed a kind of cooperative to provide organic blueberries for a buyer in the Midwest. On the surface it's a fine enterprise, high value crops to a reliable buyer. Except when it comes to the localized issue of these new gnats. The growers have agreed to plant more blueberries to satisfy the needs of the buyer for the future but Shawn isn't sure what season the blueberries will ripen. If they are early varieties like what he's growing on the research farm, he feels they'll have good success. On the other hand, if the buyer insists on mid-summer or late season variety, Shawn doubts their ability to produce truly organic berries, he just doesn't think it's possible. He highlights the necessity of people to be aware of their particular climate zone and the particular opportunities and challenges within. In this case, Kentucky seems on a map to be an excellent region for blueberries of most any season, if you don't know about the gnats.

Shawn is of the mind to work with plant varieties that work with Kentucky's climate and its pests both new and old. This brings us to both the hybrid hazelnuts beyond the blueberries, surrounded in their own mesh enclosure and the nearby cucurbit varieties that are planted within rye grass.

A long line of cucurbits of varying maturity, each has been planted at different times and are of different varieties to see which are most susceptible or most resistant to Kentucky's seemingly inescapable leaf blight. Whether the blight comes early or late, Kentucky is notorious for it and Shawn is searching for the best solution to avoid excessive pesticide use while maintaining high yields. The cucurbits are planted on the notorious black plastic, tucked into the dirt along the rows. Shawn likes the plastic, it keeps the weeds down and maintains moisture in the soil. However, the problem he is having

is with the rye grass surrounding the plants. Planted last fall, the winter was too warm to kill the grass off completely leaving the ground covered with mature rye grass that towers over his smaller cucurbits. Fortunately, the blight has yet to show itself, but Shawn is prepared putting out plants regularly to see what season is truly best to plant and exactly what varieties will perform under pressure.

Nearby the hazelnuts sit surrounded in a tall black plastic fence made of one inch squares to keep the deer out. In use for three seasons now the plastic is holding up well, only requiring patching occasionally along the base where groundhogs, raccoons, or other small critters have tunneled under. In the past, Kentucky's hazelnuts have been nearly wiped out by a disease causing a massive reduction of native varieties that have been unable to recover to previous population densities. This new variety is a hybrid that is showing promise against the disease.

The square black mesh protecting the hazelnuts is one of many efforts around the property to control the impact of deer. Perhaps the most obscure are the two and three-dimensional wolves placed around the plots to deter owls and coyotes. Shawn admits that they aren't totally effective but have been worth the test. Furthermore, Shawn uses some electric wire around his other crops with 2 strands, one low to the ground and the other at about 3 feet. He also uses peanut butter on the wire to train the deer to avoid the plots, re-treating the wire every 3 months or so. To date, it has been largely effective despite the towering oak trees that scatter acorns across the property and river bank.

Building fences, planting new varieties, hosting farm days on the property, these are all the highlights of Shawn's position at the research station. Unfortunately that isn't the full breadth of his responsibilities. Shawn is also responsible for managing the grants that keep projects and crop trials like the hazelnuts going. A meticulous and time consuming element for the avid horticulturalist.

For better or worse, it appears that Kentucky's agricultural research stations are falling victim to cuts in funding and resources, as universities tighten budgets and redirect funding. This causes researchers to spend more time grant writing than planting and harvesting. The funding cuts at this station have also resulted in Shawn losing an assistant that might have previously helped him in his grant writing.

The other, more subtle, result is that Shawn and his associates have less freedom in choosing what to plant, for whatever local or regional reason they might have. Their research now is guided more by available grants than by projects that make sense for the region. Certain companies and organizations are interested in particular results and it's up to Shawn to find ways to fund projects that are pertinent to the people around him. So far he appears to be largely successful in funding projects that make sense to the region. The question is, for how long?

As we discuss funding, finances and regional economics he reveals that he was raised in upstate New York, in the more wooded, hilly region of New York state that closely resembles the topography of Eastern Kentucky. He compares the loss of hard wood furniture companies in New York to the loss of the coal industry and tobacco production in Eastern Kentucky. He remembers the fallout of businesses and economic opportunities for the region of his youth. Similar to New York, Eastern Kentucky is hard to develop due to its steep hills and valleys. Shawn doesn't know what economy could reasonably replace either the hardwood industry in New York, nor the tobacco and coal industry in Kentucky. Both regions contain strong local pride and sense of place. Both are unique and beautiful, potential tourist destinations, but he feels that for one reason or another that Eastern Kentucky remains largely

overlooked as a travel destination. With a reputation of strip mining, welfare state economics and hard drug use, Eastern Kentucky remains a challenging place for out of state developers of any kind.

What Shawn does know is that the opportunities will necessarily be developed from within, for two big reasons. Firstly, Kentuckians have a strong disfavor of government involvement and given the amount of state legislators that have been indicted and imprisoned over the last few decades for embezzlement or fraud, it's easy to understand why. Secondly, there is a deep distrust of people from outside of Kentucky. People whom have lived in the area for generations have tended to band together, developing close knit communities aimed at supporting one another, often without financial incentive. It is likely these people, whom feel a strong sense of place and family will necessarily develop the post coal and tobacco economy. Though developers may come from the Midwest, east coast, or anywhere else, it is unlikely that much will take off without the involvement of those families whom have lived and died in Eastern Kentucky for generation after generation.

Until then, Shawn will continue his work with or without an assist to generate results from his crop trials. He will continue to search out grants that will support the development of the farms and businesses around him. One farm day after another, impacting the population around him to use the tools at hand to create, if not a living wage, a healthier lifestyle by producing their own fruits and vegetables. The research station will continue to offer itself as a place to take beautiful wedding photos while also offering its knowledge to future generations one success at a time.