CSU Agronomy Agents Corner Number 4

Not in Muck

The biggest hurdle to implementing innovation is people stuck in their ways. Scientific research finds improvements using methodical efforts to test the validity of potential changes. For these improvements to be effective, people who practice in the effected field must accept and expand the use of the improvements to a commercial scale.

In my research experience I have been lucky enough to study under some greats. After accepting a transitional retirement program, Elmer Gray continues to work pro bono to improve agriculture and public health knowledge of students. During his crop improvement class, he mentioned the ideal grain would have the amino acid profile of soybean, the volume of corn, the baking quality of wheat, and the drought tolerance of sorghum. To do so requires an all hands-on deck approach to breeding. Traditional breeding, mutation breeding, and genetic modifications are all required. Another dream of his is to market grain not on volume, but on nutritional quality. We are moving closer to this by grading wheat on protein content, specifying waxy corn for the ethanol market, and developing food grade sorghum hybrids.

Marvin Russell is a WWII veteran, inventor of the Doppler sensitive proximity fuse, a thermodynamics expert, dean emeritus, corn farmer, and education consultant. When he was a few months shy eighty years old, Marvin came back to the campus of Western Kentucky University looking for a graduate student who was interested in applying theoretical models of grain yield to corn population density. Without a thesis project at the time and equipped with a bachelor’s in mathematics, I started working with Marvin.

Part of a Ph.D. program is to become less dependent on faculty to guide your choice of research projects. Starting off I had several ideas to run with, I had assistantship offers from both the sorghum breeder, Tesfaye Tesso, and the cropping systems professor, Scott Staggenborg. I chose cropping systems with a promise to include some aspect of sorghum genetics in my projects to ensure a relationship with Tesfaye. At first, I looked for a way to incorporate soil microbiology in my projects as well. Having Nobel laureate soil microbiology professor Chuck Rice as a graduate committee member would impress many, but it didn’t pan out. Near the end of my Ph.D. work I became closer to Mary Rezac, the principal investigator of the interdisciplinary biofuels group which I was involved. The graduate school assigned her as the outside chairperson of my group. She is now the dean of engineering at Washington State.

A frequent subject in the crop production lab group at Kansas State was sweet sorghum. We had sweet sorghum trials in density, rotation, nitrogen application timing, tillage, and harvest timing. One moment in sweet sorghum plots occurred when the farm manager told Scott he had to either remove the lodged sweet sorghum with a silage chopper or till under an abandoned plot if he expected to be able to grow there the next year. He replied to the nature of nothing inspires me more than hearing something cannot be done. The next spring, we planted soybean through the thick biomass of the abandoned sweet sorghum. A crop of around forty bushels resulted.

The event inspired me to push for ideas that many would consider unlikely to be successful. I began looking for experimentation that Marvin Russell would call search and discover instead of the more common practice in research of neatening and straightening. Neatening and straightening can grow low hanging fruit, but search and discover finds the big prize. Search and discover projects will frequently fail, but when they succeed the prize is grand.

Arriving in Florida, I went straight into suggesting implementation of several tools used in the corn belt, most importantly no-till. The concept of no-till was not new. Adoption of it rapidly grew in the late 90s with the introduction of Roundup Ready corn, Liberty Link soybean, and Clearfield canola. The reaction I received was usually it won't work in muck. Undeterred I brought a no-till proposal up for consideration no less than six times in my seven years in the sugarcane industry. Every proposal included a citation of "Influence of tillage and plant residue management on respiration of a Florida Everglades Histosol" among other articles. The largest hurdle to sustainability in any histosol is soil subsidence due to aerobic respiration. Well over half of the Florida sugarcane industry is in a histosol. Histosols are colloquially referred to as muck. Maintaining a high water table and replacement of oxidized organic matter are tools that are used to slow subsidence, but another important tool was staring the industry in the face and a scientist with experience with it was working in the fields. Yet no-till was never considered.

As time went on, "not in muck" became as much a symbol of resistance to change to me as it was a legitimate objection to experiments. I would frequently bring preproposals to senior members of either the production or R&D teams. The most common response was not in muck. I was tempted to walk into a few peoples' office and state something universally understood as basic science like "objects are attracted to each other at a rate directly proportional to their mass and inversely proportional to the square of the distance between them" just to see if the response was not in muck.

As I begin the CSU portion of my career, I am looking forward to working with producers who are more likely to say "It hasn't been tried in Rago and kuma silt loam, but let's give it a try" than "It won't work around here" without any empirical evidence of previous failed attempts. After all the latter just sounds like not in muck.

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