

PROVIDING GUIDANCE TO KENTUCKY FARMERS FOR GRID AND ZONE BASED CROP MANAGEMENT

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PROJECT INVESTIGATORS

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OBJECTIVES

- Provide data allowing Kentucky small grain farmers to evaluate zone-based and grid-based approaches to site-specific management of nutrients and seeding.
- Produce online support materials to guide farmers through management zone creation, using both commercial and free software options.
- Conduct workshops with hands-on training for precision agriculture.

SUMMARY

The Kentucky Small Grain Growers' Association funded this project to investigate precision soil sampling and to provide training for growers and consultants interested in developing zones to guide soil sampling. In 2020 and 2021, with KSGGA support, we have collected soil samples on 1/10th acre (20-m) grid from four fields representing ~250 acres of wheat – soybean double crop fields, generating 2500 samples. We are still waiting for lab results on approximately 700 samples. Even though the funding is expiring this year, we still plan to sample two more fields in Kentucky this fall using additional funds acquired (see below). Without the funding from KSPB we were unable to secure an unmanned aerial systems (UAS) for imagery in 2020 but received funds through a USDA grant to purchase a UAS to image fields. We are currently working to source the equipment and acquire necessary certificates. COVID-19 has hindered equipment acquisition. We plan to integrate aerial imagery into our analysis and delineation of zones for these fields during the spring of next year.

The situation with the pandemic limited our ability to host a hands-on training in 2020 and 2021 as originally planned. However, we are currently planning multiple training events for 2022 as part of this project. At the Winter Wheat Meeting on January 4, 2022 (UKREC, Princeton, KY), we will present the final results and data analysis for this project along with information on how to collect soil and use soil data for precision nutrient application. In addition, we plan to offer four programs through the KATs training program in 2022 generated from this project, including UAS pilot training, applied uses for UAS imagery, using software to develop variable rate prescriptions, and evaluating soil fertility using zones and grid-sampled data.

We have developed training videos to guide farmers and consultants through the process of zone delineation. We still need to edit the videos to produce high quality versions for release in 2022. We are currently developing additional videos on topics that include grid cell versus grid point sampling, strengths and limitations of grid-based soil sampling, and how to use high-density soil sampling for precision nutrient management. We anticipate completion of those videos later this winter after field activities conclude for the year.

Finally, we are excited to report that we leveraged the funding provided by KSGGA to acquire additional support from the Department of Plant and Soil Sciences, UKY for a Ph.D. student (Ms. Jennifer Frigden) and USDA-ARS funding for a post-doctoral researcher (Dr. Vaughn Reed). These funds will allow us to conduct more in-depth research and to develop better guidance for precision phosphorus, potassium, and lime management.