USDA

SMALL FARM RESEARCH AGRI-NEWS

Agricultural Research Service

Dale Bumpers Small Farms Research Center Newsletter

Greetings from the Research Leader, Dr. Phillip Owens

Just like all of you, we are ready for warmer weather and drier conditions. This has been an extremely wet season creating difficulties getting equipment in the field. We had a narrow window in late November to plant organic soft red winter wheat. This is a research project with WinRock International and the Natural Soybean and Grain Alliance. Next time you drive by the Research Center, you can see the field on the east end of the farm. Our team hosted a workshop for our cooperators on March 13th entitled, "Economic Opportunities for Small Farms in Organic Production". This workshop focused on the economics, agronomics, and the organic certification process. Nationally, there is a consumer trend for organic crops and livestock so we are focusing research activities to address this need. Additionally, we are working with the Poultry Production and Product Safety Research Unit in Fayetteville, to evaluate the production of sweet corn and edamame in the Petit Jean River Valley. Arkansas is blessed with natural resources and we are evaluating specialty crops and organic production to support this economic growth in this area. Another new addition to the Dale Bumpers Small Farms Research Center is the Stablizer cattle that was added to our herd. We acquired Stablizer heifers to evaluate their productivity within the Arkansas Valley region. We are continuing to focus on new technology and the application for improving economics for small farms. We are focusing research on auto-steer tractor guidance using Global Positioning System (GPS). Many of you may use GPS in your cars to get to your destination. We are using GPS in tractors for more precise applications in our fields and farmland. These tractors drive themselves (with a person in the cab) and can repeat a pass within the field to 1 inch accuracy. In December, we hosted the Booneville Robotics team to explain the technology and allow the students to see the tractors in action. My research spotlight will explain more of the research project in detail. We have a lot of exciting projects and a great team to carry out the research. We would really enjoy feedback from you and let us know what issues you deal with on your farm. We are here to help farmers with smaller operations be economically competitive and successful.

In this issue:

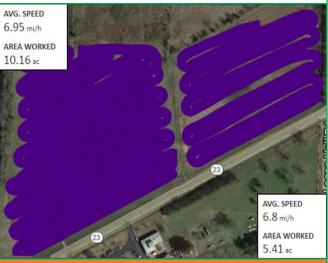## P. Owens' Research Spotlight

Quantifying Impacts of Precision Agriculture Technologies

Tractor guidance (TG) is a precision agriculture technology that allows for more spatially precise applications of seed, fertilizer, and agro-chemicals when compared with field operations conducted without GPS guidance. This leads to efficiency gains that are difficult to quantify at the systems level. Producer adoption of best management practices is complex, and so decision-support tools that help quantify costs and benefits may assist in technology transfer. Therefore, a decision-support tool called, "TG Analysis" (TGA), was developed to quantify environmental and economic impacts of this technology.

In an article recently published in *Agricultural & Environmental Letters*, our research team evaluated the economic and environmental impacts of TG based on three on-farm scenarios. Our researchers found that TG impacts are crop specific, scale dependent, and equipment or input-use specific. Agricultural sustainability can be improved with TGA by informing users of economic and environmental repercussions of TG.

Additionally, TGA can be used to estimate environmental implications (greenhouse gas emissions) of TG, as well as promote more judicious applications of nutrients that may enter water systems when over-application is due to swath overlap in non-TG systems. Further, by providing producers an estimate of both economic and environmental repercussions of TG, adoption of this technology is expected to increase.

Adapted from: Ashworth, A.J., K.R. Lindsay, M.P. Popp, and P.R. Owens. 2018. Economic and environmental impact assessment of tractor guidance technology. Agric. Environ. Lett. 3:180038. To read article click http://dx.doi.org/doi:10.2134/ael2018.07.0038

AVG. SPEED 6.95 mi/h
AREA WORKED 10.16 ac

AVG. SPEED 6.8 mi/h
AREA WORKED 5.41 ac

Field path with sub-meter tractor guidance technology (**left**) and without tractor guidance (**right**) on adjacent hay fields at the USDA-ARS Small Farms Research Center in Booneville, AR, 2018. Both fields used the same fertilizer spreader, tractor, and tractor operator.

J. Burke's Research Spotlight

Dr. Burke Receives SARE Grant

*Joan Burke received a Southern Region SARE (Sustainable Agriculture for Research and Education) grant with the **aim to increase the number of flocks with parasite resistance and show producers the value of sheep with high resistance.***
Infection with gastrointestinal nematodes (GIN) threatens economic viability of small ruminant production in the South and is the major health concern due to widespread GIN resistance to dewormers. Significant progress has been made in identifying sheep that are superior for parasite resistance in the last few years. Using these resistant genetics greatly helps with raising sheep sustainably, organically, and in forage systems on pasture. Coupling genetic resistance with better management will allow more producers to be economically successful.

Our research group has been providing guidance to encourage seedstock producers to identify resistant animals. Recent Expo sales of a relatively small number of sheep with very high parasite resistance indicates a willingness by several buyers to pay a premium. Farmer cooperators include five farms in the states of Arkansas, Georgia, and Texas.

Sheep Sale in April

There will be a sale of approximately 15 rams and 25 ewes born in spring or fall 2018 on April 18, 2019. All are considered re-placement quality and a sale catalog will be available that out-lines estimated breeding values (see www.NSIP.org for more infor-mation), and a summary of characteristics of each animal, which will be available April 8 (https://www.ars.usda.gov/southeast-area/booneville-ar/dale-bumpers-small-farms-research-center/). Animals will be available for viewing the week of April 8. Bid sheets must be sub-mitted by noon on April 8. For more information contact Erin Wood (erin.wood@ars.usda.gov or 479-675-5610) or Joan Burke (joan.burke@ars.usda.gov). Tentative date for next sale is August 1, 2019.

Staff Spotlight
Dr. Joan Burke, Research Animal Scientist

She received a Ph.D. in reproductive biology at Ore-gon State University, a Master's in animal science from the University of Maine and a Bachelor's degree from Cornell University. Dr. Burke has been with ARS since 1999 where she has conducted research on the control of gastrointestinal nema-todes in sheep and goats, and more recently cattle. Her pro-gram focuses on addressing problems of small and mid-size farmers including organic and grass-fed production systems for sheep and cattle, alternatives to synthetic anthelmintic, nutrition, and genetic selection for parasite resistant animals. She was co-recipient of a patent on the use of sericea Lespedeza to control parasites in animals, and her team received the 2016 Federal Laboratory Consortium Award for Excellence in Technology Transfer, and the 2015 ARS Southeast Area Technology Trans-fer Award for the development of technology to aid in the control of internal parasites in sheep and goats. She works closely with producers conducting research and disseminating results. She is one of the founding members of the American Consortium for Small Ruminant Parasite Control, which began in 2001.