Regulatory Services News

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Feed - Fertilizer - Milk - Seed - Seed Testing - Soil Testing
Ag Lime Testing - Industrial Hemp Testing

Spring 2022

Director's Digest

Western Kentucky Soils Lab Destroyed

Most of you are aware of the destructive tornadoes that swept through parts of Kentucky on December 11, 2021. In the path of one of those tornadoes was the UK Research and Education Center located at Princeton, Ky. One of the functions of our Division is soil testing. We analyze 40,000+ soil samples per year with about 40% of these being performed at Princeton.

As you can see from the picture below, we will not be doing soil analyses at Princeton for quite some time. UK will rebuild this important center but until then all soil samples will be sent to our laboratory in Lexington. Turnaround times will be longer since we can only perform so many samples per day. We are encouraging our clients to pull samples earlier to allow for extra time in the lab.

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Director's Digest, continued

Agriculture Economy Barometer

Dr. Jim Mintert is an Agriculture Economist at Purdue University that helps administer the Ag Economy Barometer. The Barometer sentiment index is calculated each month from 400 U.S. agricultural producers' responses to a telephone survey. The most recent survey was conducted from Dec. 8 to Dec. 14, 2021 and showed some interesting thoughts on the 2022 crop year.

When asked what their biggest concerns are for their farming operation, the top answer was higher input costs. Forty-seven percent of respondents chose it from a list that included lower crop and/or livestock prices, environmental policy, farm policy, climate policy and COVID's impact. In addition, nearly four out of 10 respondents said they expect farm input prices to rise by more than 30% in 2022, compared to 2021. Close to 40 percent of producers in the survey said they've "experienced difficulty" in purchasing crop inputs for the 2022 crop season. As for which inputs cause the most concern, fertilizer availability was the No. 1 response. It's significant that not only are farmers concerned about cost of inputs but also availability. The graph below shows inputs that farmer's reported finding in short supply.

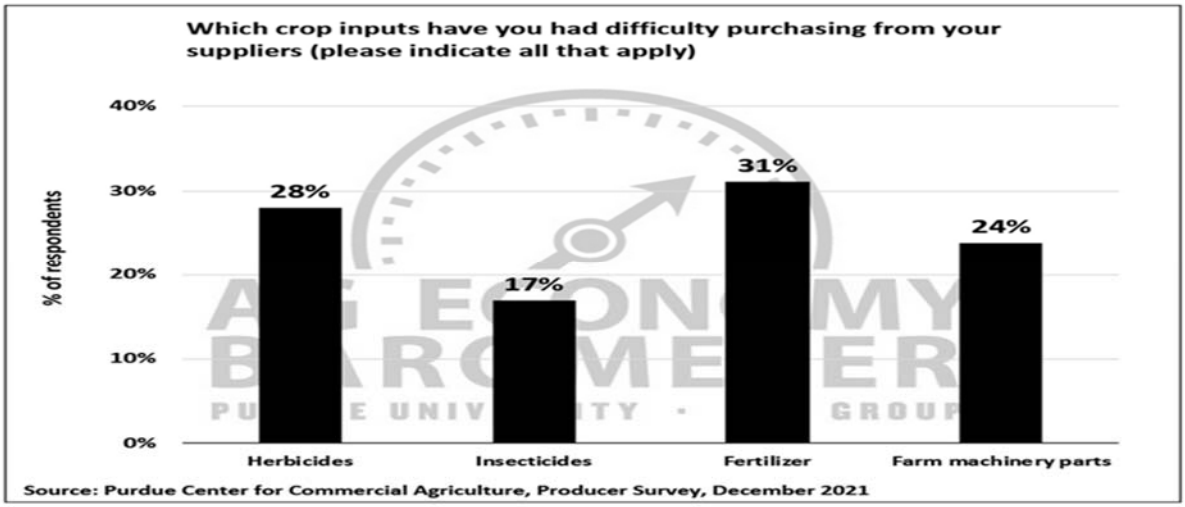

Figure 7. Crop Inputs Producers Have Had Difficulty Purchasing, December 2021.

Farmers indicated they expect land prices to continue rising in 2022. When asked the reason, 61% indicated because of non-farm investor demand. Dr. Mintert indicated that response was a surprise to their group and he isn't of the same mindset. He feels that price drivers will more likely be other farmers and possible increases in interest rates. The main reasons farmers feel farmland values will rise are shown in the table below:

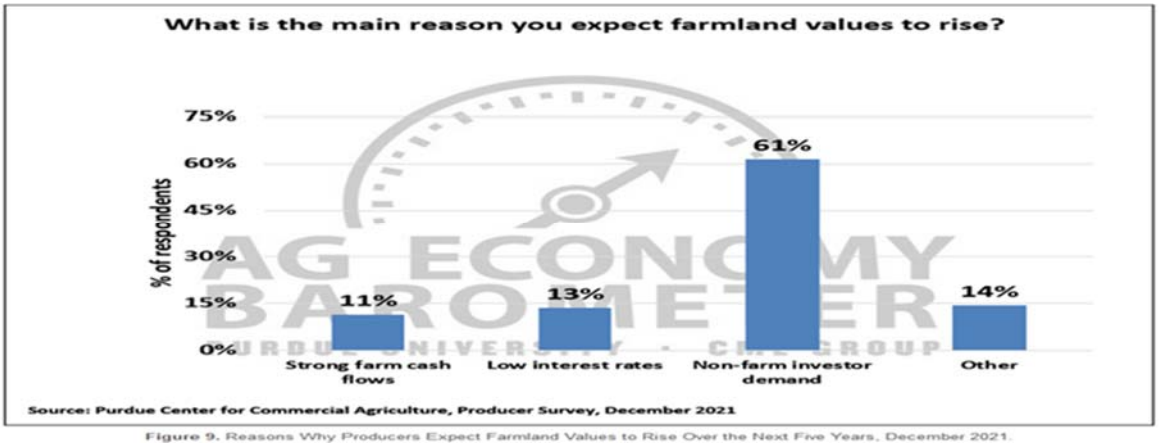

Figure 9. Reasons Why Producers Expect Farmland Values to Rise Over the Next Five Years, December 2021.

If you are interested in results from future Ag Economy Barometers, these may be found at the following link: https://ag.purdue.edu/commercialag/ageconomybarometer/

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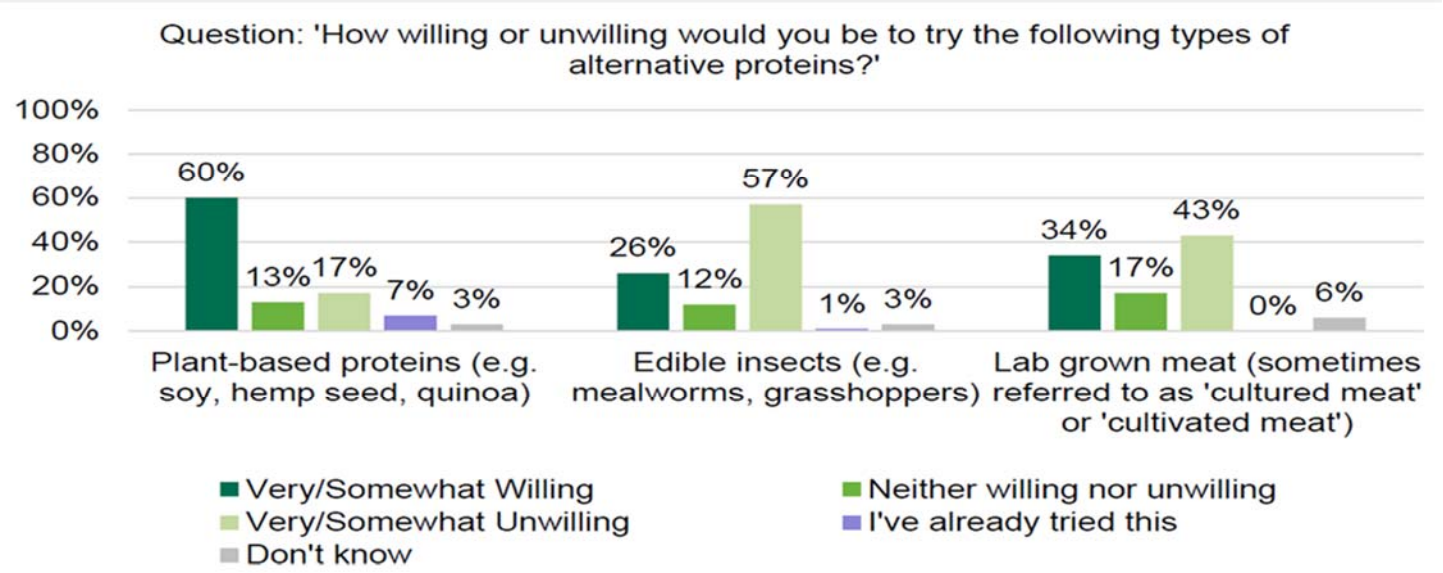
No to Lab Grown Meat and Edible Insects

Two proposed substitutes to real meat are plant-based meat substitutes and lab grown meat substitutes. Edible insects have been offered as another option. The Food Standards Agency (FSA) in the United Kingdom surveyed 1,930 consumers ranging in age from 16-75 living in England, Wales, and Northern Ireland between December 9-11. Sixty percent of consumers said they were willing to try plant-based protein products. The same could not be said for lab-grown substitutes (34%) or edible insects (26%) with many respondents citing food safety concerns.

The chief scientific adviser of the FSA commented that "This important survey highlights that, while many consumers are considering trying alternative proteins, they will quite rightly only do so if they are confident that these products are safe and properly regulated." A graphic display of the survey results are shown below:



I don't plan on trying any of them but would lean towards lab grown substitutes since I know they started from actual animal cells. Obviously, consumers in this survey did not feel the same way. Seventy-seven percent said they perceived plant-based proteins as being safe to eat while 4% said they were unsafe. The percentages for edible insects were 50% safe to eat and 20% unsafe, and for lab-grown substitutes they were 30% safe to eat and 29% unsafe.

Among those unwilling to try lab-grown meat, 49% said they found it off-putting, 37% said they did not see a reason to eat lab-grown meat, and 33% said they like to eat traditional meats. Men, at 43%, were more likely than women, at 26%, to be willing to try lab-grown meat. Younger consumers were more willing, too, with 46% of those aged 25-34 saying they would, which compared to 27% of those aged 55-75. The most common reason given for trying lab-grown meat was environmental and sustainability concerns at 40%.

Among those unwilling to try edible insects, 64% said they found it off-putting, 40% said they did not see a reason to eat edible insects, and 34% said they did not think it would taste good. Men, at 34%, were more likely than women, at 19%, to be willing to try edible insects. While 33% of those aged 25-34 said they would be willing, 22% of those 55-75 said they would be willing. The most common reason for trying edible insects was environmental and sustainability concerns at 31%.

Consumers were more likely to accept edible insects ground into food such as bread, burgers and

falafel balls for added protein as 37% said they would try the food. Nearly a third (32%) said they were willing to try insects in the form of a meal or protein replacement, 30% said they would try edible insects made into sweets or jellies, and 26% said they would try edible insects made into beverages.

Among those who said they were willing to try plant-based proteins, 44% said because they thought it was safe to eat, 39% said for health reasons, and 36% said for environmental or sustainability reasons. Among those not willing to try plant-based proteins, 36% said they preferred traditional meats, 32% said they did not see a need to eat plant-based proteins, and 30% said they did not think the food would taste good.

This survey surprised me in the acceptance of plant-based products compared to lab-grown products. It didn't surprise me in that the main concern is safety. I think the FDA and USDA will have a lot of work to do ensuring safety of these products, and edible insects, if the market share of these products continue to grow in this country.

(Food Business News was the source of this information)

Dr. Darrell D. Johnson
Executive Director

COMMERCIAL FERTILIZER VALUES FOR 2022

Commercial fertilizer values are determined and published each year. A state-wide survey was conducted in December 2021 to determine the averages for 2022. Under the provisions of Chapter 250.401 of the Kentucky Fertilizer Law, the following unit values are announced for use in determining and assessing penalties of deficient fertilizer. They represent the average of responses from throughout the state for retail value of bulk mixed fertilizers. The value of most nutrients has increased since the survey conducted last year, the current values are listed below.

A few examples of common mix values per ton are:

9-23-20	$873.92	**10-10-10**	$471.30
19-19-19	$895.47	**5-10-15 low Cl**	$517.15

Nutrient	Dollars/Unit (20 lbs)
Total Nitrogen (N)	$21.97
Available Phosphate (P_2O_5)	$11.23
Soluble Potash (K_2O)	
*Tobacco (low Cl)	$19.69
*Non-Tobacco	$13.93
Calcium (Ca)	$11.21
Magnesium (Mg)	$33.09
Sulfur (S)	$11.09
Boron (B)	$126.83
Copper (Cu)	$138.27
Iron (Fe)	$10.80
Manganese (Mn)	$45.06
Molybdenum (Mo)	$20.20
Zinc (Zn)	$63.33

Calculation Note:

(1) The *N* value for DAP & MAP was assigned from anhydrous ammonia (AA).

(2) The value of P from DAP and MAP was calculated using the assigned value of *N* from AA.

(3) The final values for *N* and P are weighted averages based on FY 2021 (distributed) tonnage for ammonium nitrate, Urea, DAP, TSP, MAP, and ammonium sulfate.

If you have any questions, please call me at (859)-257-2785; or, email: smcmurry@uky.edu

Stephen McMurry,
Director Fertilizer and Seed Programs

Service Functions of the Feed/Milk Programs

The mission statement of the Division of Regulatory Services states that we are committed to service and consumer protection of Kentucky citizens, businesses, and industries. In this article, I want to focus on the service side of our division and highlight a few of the unique services we can provide to Kentucky consumers and businesses.

Feed Analyses

Each year, we analyze 50 to 100 feed samples we classify as service. Many of these are grain mix or supplement samples from Kentucky producers interested in more information about what they are feeding to their own animals. Some samples are delivered or shipped directly by producers to our office and other samples go through a county extension office first. We typically analyze these samples for protein, fat, and fiber components and occasionally for mineral content. Though not nearly as often as with livestock feed samples, pet food samples have also arrived at our office with requests for analyses. Our lab does have the capability to use near infrared spectroscopy (NIR) for rapid estimations of protein, fat, and fiber components in nearly all animal feed and pet food.

While most of these feed and pet food samples do not involve animal sickness or death, we do get a handful of samples each year that involve complaints and are more investigative in nature. In addition to routine nutrient composition, investigative samples may be analyzed for contaminants including the common medications used in livestock feed.

We also do work for our Kentucky feed manufacturers that may request the occasional analysis on mixed feed or ingredient samples. For example, a manufacturer may ask that we analyze their retained sample after a violation on one of their products. They may also provide us with a sample of an ingredient to confirm the values they are using in their formulation system. Though not always considered strictly as service samples, our inspectors are often asked if they would sample a particular feed or pet food while visiting a firm and they will oblige.

It is important to mention that all feed samples submitted for any analyses will be coded as either official or unofficial samples. Official samples must be collected by one of our inspectors utilizing standard sampling techniques to ensure a representative sample. All other samples are considered unofficial and while useful for informational purposes, they are never used to take regulatory action.

Feed Calculator

A feed calculator program is available on our website for anyone wishing to estimate nutrient composition of a feed mix. This Excel spreadsheet contains all the common feed ingredients used by feed mills and will allow the user to determine the appropriate values for a feed label. The program must be downloaded to be used and a basic knowledge of Excel is helpful. For those who do not have access to a full-fledged feed formulation program, this Excel calculator can allow the user to mix and match ingredients and predict the final composition. I use a version of this program when working with deer mineral manufacturers. The ingredient values in the feed calculator are based on analyses of feed samples from our laboratory over the past 5 years.

Pet Treat Calculator

This program is similar to our feed calculator but is used to estimate nutrient content of pet treats. The database currently includes over 100 common ingredients used in pet treats and continues to grow as I see recipes with new ingredients. This calculator is not available on the website. Kentucky requires that pet treats be properly labeled and this calculator will provide reasonable estimates for the guaranteed analysis (protein, fat, fiber, moisture, and caloric content). Kentucky pet treat makers interested in this service can email their recipes and I will run these through the calculator and provide the label guarantees.

Milk Tank Calibration Charts

Our Milk Program has long offered a unique service to milk producers by recreating milk tank calibration charts. The majority of these are charts recreated using available data from damaged charts. If no old chart is available, we can create charts from calibration data (filling tank with known amount of water and measuring fill level). The calibration program is an Excel spreadsheet that simply interpolates to fill the gaps between known data points. The more data provided, the better the interpolated data. For Kentucky producers, a recreated calibration chart is a free service. For out of state producers, we do charge $25.

Dr. Alan Harrison
Director of Feed/Milk Programs

Inspector News

Inspection Staff: As noted under Personnel News, we have had 2 of our 8 inspectors retire in January. I want to thank John Flood and Brad Johnston for their years of service and dedication to the Division of Regulatory Services and wish them the best as they enter retirement.

We are currently in the process of interviewing candidates to fill both of these positions and hope to have new inspectors hired soon. If you have an issue that needs to be addressed while these positions are open please contact me by my email at: jim.true@uky.edu or contact me by my office phone at 859-257-7363 or my cell phone at 859-967-8057.

2021 year end summary: I would like to report that things are back to normal, but we continue to be faced with the challenges of Covid-19 and it does not look like it will be going away anytime soon. We currently have 1 inspector that has tested positive. We made it through 2021 with only 1 inspector having Covid-19. Due to the ongoing pandemic, we will continue to call to schedule the FDA contract feed mill inspections. Our inspectors are very aware of Covid-19 protocols and will follow whatever guidelines your firm has in place when they are there to do inspections or collect samples.

Here is the summary of the samples that the inspectors were able to collect during the year: The Feed Program collected 2,730 samples. These include livestock feed and ingredients, equine, deer, pet food samples and other specialty products. The Fertilizer Program collected 2,552 samples. These include bin materials, custom mixed samples, bagged products, liquid, and specialty products. The Seed Program collected 1,286 samples. These included ag crops, lawn and garden and other specialty products.

Spring 2022: During the next couple of months the inspectors will be conducting the remainder of the FDA contract inspections.

If you have carryover seed from last year that needs to be retested for germination due to expired test dates, you will need to submit a sample to the seed lab for germination so you can relabel the seed for sale. You can contact the Division of Regulatory Services seed department for samples bags to submit these samples. The inspectors will be conducting seed inspections during their next visits to look at your seed inventory for expired test date violations. If you need anything from the inspection staff please let your inspector know or contact me. We are here to assist you in obtaining compliance for the seed, feed and fertilizer programs.

Have a safe and successful spring season.

Jim True
Inspector Coordinator

Quality Reference Materials

How do you know that your lab is performing an analytical method correctly? Each laboratory should have an active quality program in place. This should include personnel that are adequately trained and competent, traceability of materials and instruments, and participation in a proficiency testing program, to name a few. There should be a paper trail

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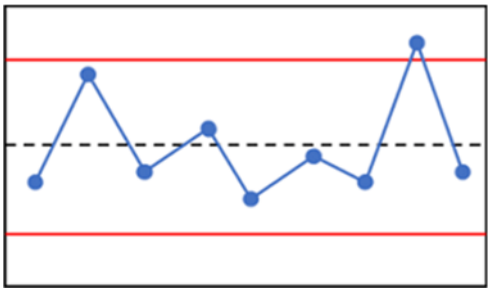
demonstrating that the instruments used are calibrated and performing as they should by using reference materials. Each analytical method that is used in the laboratory should have a quality reference material (QRM) in each set and be matched to what is in the set; i.e., the concentration of the analyte of interest and the matrix are similar to the samples.

Definitions for reference materials can be found at www.nist.gov/srm/srm-definitions. First, consider the term, "Reference Material." This term is commonly used in the laboratory and refers to material for which the analyte concentration and uncertainty of the concentration is well defined. Wherever relevant and available, Certified Reference Materials (CRMs) should be used to calibrate instruments and testing processes. A CRM is a material that has an analyte concentration certified to be within a specific range of uncertainty. It may also be used to do one or more of the following: calibrate analytical instruments; qualify a secondary reference material; verify calibration in instrumental analyses where a non-ISO Guide 34 certified reference material is used to generate a calibration curve. A Certificate of Analysis (COA) from the CRM supplier will specify the analyte concentration and range of uncertainty for the concentration. Ideally, the supplier should be accredited to ISO Guide 34 or ISO 17034:2016. Reference materials should be stored according to the manufacturer recommendations and not used beyond the expiration date. So, what is a QRM? A QRM is used to check instrument performance, review laboratory techniques and calculations, and monitor analyst performance. It is a material characterized by collaborative studies, third party testing, proficiency testing programs, or analyzing the sample multiple times and is matched to the sample matrix being tested. QRMs should be monitored using control charts.

Including QRMs in each set of data will provide reliable and defensible analytical results. It will provide a measure of the precision and accuracy of the analytical method. Using a QRM with known statistics allows for monitoring the accuracy and precision of the analyst. It may assist in identifying problematic methods and identifying training needs within the laboratory. Using a QRM with known statistics over time will provide a permanent record of instrument performance when validating data, projecting instrument repair or replacement needs. QRMs may be used not only to verify the uses above but can also be used to monitor accuracy. They may also be used to monitor batch to batch or day to day variance. It also documents the effectiveness of laboratory performance and the quality assurance program.



The data obtained from each QRM should be put into a control chart. This graphical representation of the data over time is very useful in visualizing trends. Control charts of all the QRMs should be maintained and be the basis for corrective and preventable actions when they indicate potential problems with methods. The control chart should be used once the analysis is complete. Control charts may be constructed by hand, statistical software, or even a spreadsheet program. There are several types of control charts that can be employed and will be discussed in a future newsletter.

The Magruder proficiency program should become an important part of a fertilizer laboratory quality assurance program. Comprehensive statistical reports are prepared based on ISO 13528:2015. Reports for each sample are available on the web for participating laboratories to evaluate their performance in testing the various analytes. Once the report for the sample is on the web, the sample is available for purchase. Go to magruderchecksample.org and choose "Purchase Samples" under the lab portal on the left side of the screen. You can review the available QRMs by clicking on links to the excel files. It lists Magruder sample numbers, the portions available for purchase, analyte concentrations, and certificate of analyses. Once you have chosen the QRM you would like to incorporate into your laboratory's quality program, click on "QRM Request Form.pdf". Complete this form and email it to the address provided on the form. Upon receipt, the sample will be removed from the inventory. An

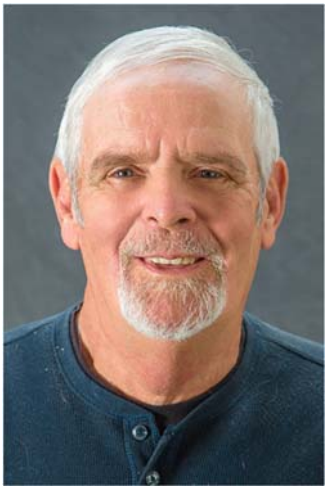
invoice is then emailed to you with instructions on how to proceed with payment. Once payment is received, the QRM will be shipped to you. Please make sure you complete all the forms with correct information.

The samples are reasonably priced at $50 each. Magruder is an international program with over 150 active participants. If you have not used Magruder QRMs in the past, I encourage you to do so now.

Dr. Sharon F. Webb
Director of Quality Program

Personnel News

John Flood retired as an inspector with the UK Division of Regulatory Services on January 4, 2022. He started with the Division on March 17, 1986, so had been with us for over 35 years. John has B.S. and M.S. degrees in Agriculture from Murray State University and spent time working at Hopkinsville Elevator Company before coming to work with Regulatory Services. His territory included the following twelve counties: Ballard, Calloway, Carlisle, Christian, Fulton, Graves, Hickman, Livingston, Lyon, Marshall, McCracken, and Trigg. This is an area heavy on row crops and lighter in livestock than other areas of the state. John spent many days climbing fertilizer trucks which have only gotten taller over the years. We appreciate his many years of dedicated service to the farmers and consumers of Kentucky and wish him well in retirement.



Brad Johnston retired as an inspector with the UK Division of Regulatory Services on January 11, 2022. He started with our Division on December 10, 1993, so had been with our Division for over 28 years. Brad has B.S. and M.S. degrees in Agriculture from Western Kentucky University and lives on an active farm in Cub Run, KY. His territory included the following eleven counties: Barren, Edmonson, Grayson, Green, Hardin, Hart, Larue, Meade, Metcalfe, Monroe, and Nelson. These counties are well balanced in both row crops and livestock so Brad has stayed busy in feed, fertilizer and seed work over his years of service. In addition, this territory contains the largest number of lime quarries of any of our territories. We appreciate Brad's many years of dedicated service and hope he has more time to enjoy his farm.

Lydia Howlett started with our Division on January 18, 2022 as a Staff Support Associate. Her primary duties will be with the milk program but she will also be assisting with the feed program and as a support person for the inspection program. Lydia is a 2020 graduate of Western Kentucky University with a degree in Agriculture (Animal Science emphasis). She lives in Lexington with her cat. In her spare time she enjoys reading and watching movies.

We are glad to have Lydia join our Regulatory Services team.

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