Changes in forage measures through the course of a grazing season

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ABSTRACT
The goal of grazing is for animals to utilize the forage for their benefit, while also controlling forage growth. Grazing systems which determine when animals will graze the pastures, should be based on several objectives: 1) meet the nutritional needs of the animals, 2) maintain forage diversity and health, and 3) distribute the consumption of forage across the pasture. The objective of our research was to evaluate forage quality measures and forage mass across a grazing season while cow-calf pairs grazed rotationally. Eight pastures (1.21 hectares each) were used in a rotational pattern for 38 cow-calf pairs during the 2018 grazing season. The grazing season started on June 1st and continued until October 5th. Two pastures were utilized every week and each pasture was grazed for 7 days and then given a 14 day rest period, allowing regrowth and recovery. Mixed grass pastures containing tall fescue were utilized. Forage was collected at the beginning and end of the grazing season, along with prior to cattle entering the pasture. Forage mass was collected using a quad (1 meter by 1 meter square) that was systematically throw 8 times in each pasture. Where the quad laid, the forage above the square was harvested and placed in a paper bag. Following collection, bags were dried in a 50 degree Celsius oven for 48 hours and then weighed. The average weight was determined and entered into an equation to determine mass. Following the drying of forage samples, they were ground using a Wiley Mill using a 1 millimeter screen. Subsamples of the forage were sent to Auburn University for analysis of crude protein, dry matter, in vitro total digestibility, neutral detergent fiber, acid detergent fiber, and lignin content. For all previously stated forage measures, a pasture by day interaction was observed ($P < 0.001$). Forage mass varied by day ($P < 0.01$), however no differences were observed between pastures. Pastures contained a variety of grasses and their growth varies by day and weather. Variation in quality is expected, however, based on the data, pastures should be monitored to prevent under- or over-utilization. This research was supported by the Morehead State University Undergraduate Research Fellowship Program.

MATERIALS AND METHODS
- Project was approved by the Institutional Animal Care and Use Committee, 17-04-01R2
- Trial conducted at the Derrickson Agricultural Complex
- Grazing season started on 6/1/18 and continued until 10/5/18
- Thirty-eight angus cow-calf pairs were used
- Eight mixed grass pastures (1.21 hectares each) were used in a rotational pattern
- Pastures were grazed for 7 days and given a 14 day rest period
- Forage mass collected using a quad (1m by 1m); used 8 times per pasture per time point
- Material within quad was harvested and put in a paper bag
- Paper bags were dried in 50º Celsius oven for 48 hours and then weighed
- Following drying, samples were mixed and ground using a 1mm screen on a Wiley Mill
- Subsamples of forage were sent to Auburn University for analysis
- Statistical analysis was completed using the MIXED procedures of SAS

RESULTS
Figure 1. Changes in average forage mass across the grazing season
Day effect: $P = 0.0018$; SEM = 385.25

Figure 2. Changes in crude protein content in forages during the grazing season
Pasture by day interaction: $P < 0.0001$ SEM = 0.1

DISCUSSION
As expected, forage mass decreased as day increased. However, in crude protein content, a pasture by day interaction was observed. There was significant variation in pastures as some pastures started at a lower value and increased prior to declining again. This is likely the result of the variety of forages present within the pasture, cool season, and warm season. The season determines when the most rapid growth occurs. Therefore, pastures that saw a rise in crude protein in the later portions of the season, likely had a greater portion of cool season grasses. Our hypothesis was confirmed and cattle producers should use our findings as a suggestion to increase their ability to monitor forages throughout the grazing season.

LITERATURE CITED