Project Information:

Project Title: Effects of choline supplementation on reproductive outcomes in ewe lambs and growth performance and carcass characteristics of their progeny

Recipient Organization Name: University of Wyoming

Recipient's Project Contact

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Project Report

Annual Report Type: As of October 1, 2023

Reporting Period Start Date: October 2, 2022 End Date: October 1, 2023

Performance Narrative:

Over the past year, study work on this project has been initiated and is ongoing. Specifically, the animal portion of Objective 1 has been completed for the spring breeding group and ewes in the fall breeding group have completed treatment and breeding (expected lambing March 2024). Work related to Objective 2 will commence beginning November 2023 when lambs from the spring breeding group are born. At present is anticipated that all animal work, sample collection and processing, and data analysis for Objectives 1 and 2 will be completed by June 30, 2024.

Activities Performed

Work related to testing the effects of supplemental feeding of rumen-protected choline (RPC) on reproductive outcomes in ewe lambs in the spring vs. fall breeding seasons was initiated. This work was completed for ewe lambs (n = 72) in the spring breeding group and was initiated and is ongoing for ewe lambs (n = 52) in the fall breeding season. In both seasons, ewe lambs were randomized to one of two treatments, control or supplemental RPC, and submitted to an estrous synchronization regimen. Rams were turned out with ewes on the last day of the synchronization protocol and the next day ewes began their respective treatment regimens (Day 0). Ewes assigned to RPC treatment were individually fed 5 g of RPC, contained within a gelatin capsule, daily for 12 days, while ewe lambs in the control group were fed an empty gelatin capsule daily for the same period. Blood samples from a subset of ewes within each breeding season (12 hd/trt) were collected at 0, 2, 4, and 6 h following RPC treatment on Days 0, 6 and

12 of RPC feeding. In both seasons, blood samples were collected at Day 20, 40±3, and Day 70±3 for determination of serum concentrations of pregnancy-associated glycoproteins as well as the determination of pregnancy.

Accomplishments

During the past year, investigators have completed animal-related and sample collection and processing activities for ewe lambs assigned to the spring breeding season group. Synchronization, treatment and initial blood sample collection and processing have also been completed for ewe lambs assigned to the fall breeding group.

Estimate the Total Percentage (%) of work Completed on the Project: 60%

#	Accomplishment/Activity	Relevance to Objective
1	Completion of animal-related activities and sample collection and processing for ewe lambs in the spring breeding groups.	Objective 1: To determine the effects of supplemental choline feeding around the time of mating on reproductive outcomes in ewe lambs during the fall and spring breeding seasons.
2	Initiation of animal-related activities and sample collection and processing for ewe lambs in the fall breeding season.	Objective 1: To determine the effects of supplemental choline feeding around the time of mating on reproductive outcomes in ewe lambs during the fall and spring breeding seasons

Challenges and Developments

#	Challenge or Development	Corrective Action or Project Change
	No challenges have been encountered over the past year.	

Outcome and Indicator Results to Date

#	Outcome/Indicator	Quantifiable Results
1	Conception rate (spring breeding group) – Day 40±3	Control – 15/37 = 40.5% RPC – 18/39 = 48.7%

2	Conception rate (spring breeding group) – Day 70±3	Control – 14/37 = 37.8% RPC – 18/40 = 45.0%

Upcoming Activities

#	Activities	Anticipated Completion
1	Analyze blood sample collected from ewes during each breeding season for serum concentrations of choline, progesterone and pregnancy-associated glycoproteins	April 2024
2	Collect lamb number, birth weight, and weaning weight for lambs born from spring and fall breeding seasons	May 2024
3	Perform feed efficiency study using lambs born from spring and fall breeding seasons, respectively	June 2024

Project Expenditures to Date

#	Cost	Amount approved	Federal Expenditures
1			
2			
3			