

UW College of Agriculture and Natural Resources
Global Perspectives Grant Program
Project Report Instructions

A brief written report must be submitted electronically to the AES office **within one month of returning from your trip**. Photographs supplementing the report are encouraged and are appreciated by the donor. Failure to submit a report may jeopardize future funding from AES.

In addition to forwarding these reports to our benefactor, reports will also be published on the AES website. Reports must be written in a style **understandable by the lay person** and may be edited for readability before being published to the AES website and in the University of Wyoming Foundation report.

Format: Use 12 point type, single line spacing, and one inch margins. Submit your report to aes@uwyo.edu as a PDF file.

Include the following information:

1. COVER PAGE

Award Period (e.g. Spring 2012): Spring 2019 (travel in spring 2019; full project period was 12 months until spring 2020)

Principle Investigator(s) Dr. Berit Bangoura **Department:** Veterinary Sciences
Email: bbangour@uwyo.edu

Project Title from Application: Epidemiology and relevance of sheep parasites

Amount spent: \$6,000

Non-technical summary (max 1500 characters plus spaces): Provide a one paragraph non-technical summary that most people can understand.

The project was designed to investigate the gastrointestinal parasite fauna in domestic sheep occurring in two different regions of the world, Azerbaijan and Wyoming. Both regions share a similar climate and feature wild sheep populations (Bighorn sheep in Wyoming, mouflon in Azerbaijan), the habitat of which overlaps with domestic sheep operations' pastures. Therefore, Dr. Turkan Gurbanova, a scientist from Azerbaijan's National Academy of Sciences, Baku, AZ, was invited as our major research partner in Azerbaijan. She visited the Department of Veterinary Sciences in Spring 2019 to learn about diagnostic methods to identify different parasite stages in fecal samples of sheep, and to participate in parasite screening of samples from Wyoming sheep operations. In collaboration with Dr. Whit Stewart (Department of Animal Science), we collected and analyzed sheep samples from Wyoming sheep flocks. Data on parasite occurrence was documented. After her 3-week visit at UW, Dr. Gurbanova returned home to collect and analyze sheep sample with a similar methodology as agreed upon during her visit; while our working group proceeded to collect samples from Wyoming sheep operations. The comparison of the field data from both regions allows for an estimate of parasite burdens under different husbandry conditions that may influence the extensity and

intensity of parasite infections in domestic sheep. The obtained data will serve as crucial basis for follow-up studies (see below) and further targeted antiparasitic management of sheep flocks in order to maintain their economic value, and will serve as basis for further joint projects with our research partner Dr. Gurbanova.

2. REPORT: Maximum of two pages of text; please also include **photos**. Must be written in a style understandable by the lay person.

Include:

1. Main results of activities planned in the proposal.
 2. Describe any future plans
 3. Outline potential impacts to a) the College of Agriculture and Natural Resources, b) the University of Wyoming, and c) the State of Wyoming
 4. Photos—be sure you have necessary permissions to be posted to the AES website.
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QUESTIONS? Contact Joanne Newcomb in the Agricultural Experiment Station office at aes@uwyo.edu or (307) 766-3667.

Project report

A. Main results

1. International collaboration

The project was conducted to compare parasite populations in both countries. The generated data is not a comprehensive prevalence data set, but intentionally we collected preliminary data that can serve as basis for acquisition of additional future funding for large scale observations.

For this project, Dr. Turkan Gurbanova spent 3 weeks at our College, with major focus on the Department of Veterinary Sciences / Wyoming State Veterinary Laboratory, but also in the Department of Animal Sciences. Dr. Gurbanova was trained in several parasitological methods from sample collection routine to microscopical and molecular analysis as well as cell culture systems (please see Fig. 1). Her visit was also a great opportunity for our College to learn about the Azerbaijani culture and the life science focuses pursued in Azerbaijan.



Fig. 1: Guest researcher Dr. Turkan Gurbanova experiences sheep sample collection at the sheep unit at the LREC (left) and lab work training at the WSVL (right)

2. Sheep parasite screening on Wyoming and Azerbaijani operations

In Wyoming, 17 sheep operations were sampled and internal parasite occurrence was evaluated throughout the study. The location of the sampling sites is indicated in the map (please see Fig. 2).

Parasites were categorized as gastrointestinal roundworms versus coccidia, which are a type of protozoa, i.e. unicellular enteric pathogens. On all of these 17 operations, internal gastrointestinal parasites were detected based on the submitted fecal samples. Both roundworms and coccidia are highly prevalent in different parts of the state. While there are farm-specific differences, on all operations coccidia that are highly pathogenic were detected over less relevant coccidia types. Moreover, one group of roundworms (trichostrongylid worms, a group that includes e.g., the barberpole worm) were most commonly detected in different parts of Wyoming.

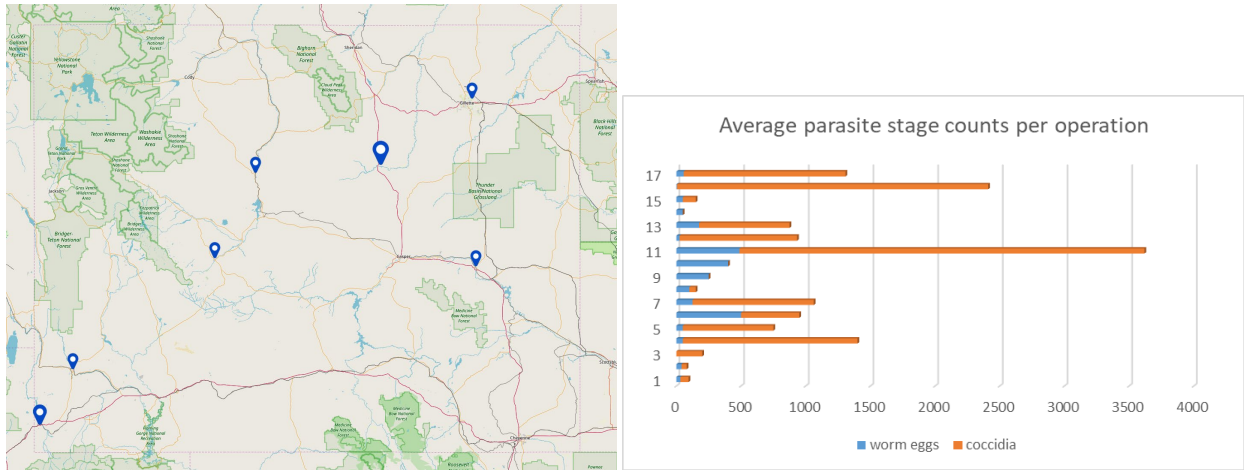


Fig. 2: Left: locations of 17 sheep operations participating the project. Each pin indicates a sampling site, with larger pins indicating higher numbers of operations located in one region. Right: Parasite stages in varying numbers were detected in all 17 locations, both roundworm eggs and coccidia for most operations.

In Azerbaijan, 8 sheep operations were sampled in different parts of the country. Interestingly, identical coccidia species and worm species occurrence patterns were detected in Wyoming and Azerbaijan, indicating that similar regions in different parts of the world may potentially share husbandry or climate related risk factors that outweigh the differences in actual geographic location.

B. Future plans

Future studies shall investigate further which factors are of highest relevance when preventing or reducing parasite infections in sheep. Therefore, more metadata on sampled operations will be collected, including husbandry and treatment protocols. We will apply for international funding in collaboration with Dr. Turkan Gurbanova.

C. Potential impacts to the College of Agriculture and Natural Resources, the University of Wyoming, and the State of Wyoming

The study was crucial in establishing a research partnership with the National Academy of Sciences in Azerbaijan, with focus on parasites in sheep production, a highly relevant economic issue in our state. Based on this study, we will be able to pursue further research into factors that drive parasite infections and how to control them. The goal is to reduce the economic burden on sheep producers linked with gastrointestinal parasite infections. Our College has direct access to the working group of Dr. Gurbanova, and like the university as such is set to benefit from this valuable partnership by future joint research projects that can drive and inform improvements in livestock production.