

Project Information:

Project Title: Developing a high-throughput walk-over-weighing system for extensive sheep production systems

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Project Report

Annual Report Type: End of year report
Reporting Period Start Date: January 1, 2022 End Date: October 1, 2022

Performance Narrative:

The parts for two complete Tru-Test weighing systems were purchased between April and June. As a solution for power, Goal Zero Yeti Portable Power Stations were used. These have the advantage of having multiple options for power ports and can be recharged using solar panels. Two alleyways were designed with a spacer between them to help with the flow of the animals. A gated system was explored for controlling the flow of the animals while they were moving through the system. However, concerns that this might result in animals getting stuck or lambs being separated from their dams led us to consider alternatives. Standard procedure for data collection (e.g., weights) at GBREC uses a wooden rod as a barrier that the animal must step over to control flow. Similarly, we used PVC pipe as a barrier to control animal movement.

The system was well received by the sheep at MSFL, with sheep typically adjusting to changes within a couple of days. Unfortunately, delays due to unforeseen complications resulted in not being able to get weights to compare between the walk-over-weigh system and the standard weight collection method for sheep. However, standardized weights were tested that spanned the range of weights expected for our sheep flock, which showed the scales were accurate within a half a kilogram for our system. Therefore, we deployed the system GBREC.

The walk-over-weigh system we have currently developed is sufficiently portable for movement every few weeks, or longer. The pack-down at MSFL took 2 people less than an hour, and set-up at GBREC took 5 people approximately an hour and a half,

including setting up the alleyways. These times are expected to decrease with experience. The system was able to be relocated using one vehicle (a flatbed truck with a small trailer).

In addition to the walk-over-weigh system, we explored strategies to make weight collection more portable. To this end, we developed a baited system, which entices the animals onto the scale using a bait such as a salt or molasses lick to collect weights. Because this system would be more compact than an alleyway-based system, the hope is that such a system can be used where there is insufficient space to set up a night pen/alleyway for walk-over-weigh data collection.

Upon exploration of the system and talking with the herders, we decided that the alleyway system was not the most desirable path forward for development of this passive data collection system. The herders mentioned that animals would walk over at variable speeds, and some animals would stop on the scale for extended periods of time, causing them to bunch up. This was evident when looking at the data collected from this system, whereby multiple IDs were scanned and the data collected was highly variable. Furthermore, the alleyway system requires creating a pinch point. In this case, we used a night pen, which would limit where and when the system can be used. The baited system is a more portable system because it is more stripped down, and the data collected was improved over the alleyway system, but it was evident that further optimization was needed for this system to consistently and reliably collect data that would be necessary for trait development related to performance in a rangeland environment. To this end, we are currently testing designs for the baited system on a small group of animals at MSFL, where we will have more control over how to optimize the system

We estimate that the total percentage of work completed on this project is 70% complete.

#	Accomplishment/Activity	Relevance to Objective
1	A high-throughput walk-over-weighing system for extensive rangeland systems was successfully developed	Completion of Objective 1: Develop a high-throughput walk-over-weighing system for extensive rangeland systems
2	Successfully completed a one-month trial to assess the system as a management tool in a rangeland environment	Completion of Objective 2: Carry out a one-month trial to assess the system as a management tool in a rangeland environment
3	WOW data from the one-month trial was copied off the machines and checked for completeness. Variations of the original system are being tested on a smaller set of individuals.	Data processing to enable traits to be developed for Objective 3: Develop novel traits for individual performance in a rangeland setting.

Challenges and Developments

#	Challenge or Development	Corrective Action or Project Change
3	Data was not very consistent/reliable because some sheep moved to quickly through the WOW system, and others stopped on the scales for too long.	A baited system, which was tested alongside the alleyway system during the one-month trial (Objective 2). The baited system shows promise, and we are currently in the process of testing variations on a smaller set of sheep. This will be coupled with cameras to gain a better understanding of what is contributing to inaccuracies in data capture.

Outcome and Indicator Results to Date

#	Outcome/Indicator	Quantifiable Results
1	A WOW alleyway system was developed that is portable and can be used in a rangeland environment. This was further adapted to a baited system, which will extend the portability of the system and enable it to be used in a wider range of environments.	A system was developed.
2	Our portable WOW alleyway system and the baited system were successfully tested in a rangeland environment for one month.	The system successfully collected data for the full month, meaning that the battery packs maintained a charge and all systems were communicating and recording data for the duration of the trial.
3	Although the system was recording data for the whole month, initial data summaries indicate that the data is very variable, which has encumbered development of traits. Further development of the baited system holds the most promise moving forward.	

Upcoming Activities

#	Activities	Anticipated Completion
3	Further optimization of the baited WOW system in a small group of animals.	April 2023
3	Development of traits.	June 2023

