College of Agriculture, Food and Environment
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# Considerations for using Game Cameras for On-Farm Behavior of Beef Cattle

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## Abstract

On-farm studies provide an opportunity to build relationships with clientele while answering applied science questions. Further, game trail cameras are a low-cost technology that may be an alternative to visually observing livestock for behavior data. An on-farm study involving eight county Extension agents and producers investigated game cameras to capture cattle visitation to mineral feeders. Three different models of Browning game trail cameras (Prometheus Group LLC, Birmingham, AL) each with time-lapse feature were utilized. A three-page document provided background and methodology for the study. Details for placement of the trail camera were provided to provide consistency across farms. Cameras were pre-programmed to settings for image capture. A video for camera setup was also provided in the event that cameras reset to default settings due to battery failure. Time-lapse feature was utilized providing image capture from sunrise to sunset at 2 min intervals. Several observations were noted to improve data capture in the future. Differences existed in battery utilization between camera models with one model only capturing images for approximately 2 of the 7 d periods while others had more than 80% battery life remaining after 7 d. Cameras were to be oriented facing south to avoid sun glare. Sun glare occurred at sunrise on most cameras and was particularly bad when dew was present on the camera lens. Mineral feeders need to be secured in place as livestock may move feeders out of the frame of the images captured. Still photos are insufficient in assessing behavior and short video clips are expected to improve interpretation especially when multiple animals visit the feeder at the same time. Utilization of human observation was not useful unless observation was performed at sunrise. Game trail cameras have the potential to be a cost effective tool in capturing on-farm data of cattle behavior.
Keywords: behavior, camera, cattle

## Objective

Evaluate on-farm the use of game cameras for cattle behavior research while engaging county agents in livestock demonstrations

## Introduction

- Agents previously reported conducting an average of 6 on-farm demonstrations annually (Norman et al., 1997)
- Demonstrations were found to be the second most preferred method of learning by farmers (Franz et al., 2010)
- Continue to see high turnover of agents with replacements facing budget challenges limiting program / demonstration support
- Agent turnover is expected to stress Extension value from producer perspective until they meet and work with new agent


Figure 1. Example of image captured from game camera and easy to decipher as 1 cow standing.

## Materials & Methods

- 8 county agents (4 with > 5yrs and 4 with < 5 yr in position) agreed to participate and coordinate the efforts with a local producer
- 8 mineral feeders and hanging scales were provided
- 3 models of Browning™ game cameras were utilized
- Time-lapse feature allowed for image capture from sunrise to sunset
- Image capture interval was set to 2 minutes
- HME Products t-post trail camera mounts were used to fix camera to steel posts located approximately 3 meters from mineral feeders
- Periods consisted of 5-7 d adaptation, 5-7 d treatment a, 5-7 d treatment b
- Treatments were rubber lid “on” and lid “off”
- Visual observation occurred for 1 hour in the early morning 1 d of each treatment period

Figure 2. Example of image captured from game camera recorded which is difficult to assign with 100% confidence. Five animals are in the image, interpreted as 5 mature animals. 2 standing, 1 eating, and 2 are uncertain. Would evaluate other images near this point, but would assign to either eating or standing based on angle of neck.

## Project Preparation Approach

- A camera was tested for angle, distance from feeder
- 3 page document was developed describing project, approach
- Web-based overview session held with county agents
- In-person discussions with agents/producers when delivering equipment
- Video developed on programming camera & shared with agents
- Data collection sheets were provided

## Outcomes

- Agent & Producer interest was high
- On-farm demonstrations did increase agent visitation to farms
- Game cameras don’t use a light sensor to determine sunrise/sunset, based on time. Must have date/time set correctly
- Not all trail cameras have the same battery efficiency
- Agents & Producers must be shown EXACTLY how to exchange SD cards, record information
- Even with camera oriented South facing, still have sun glare issues
- Dew/moisture in mornings on lens magnify sun glare issues
- Mineral feeders need to be staked or cattle are out of the image frame
- Do not place cameras on t-post in fence line with shade trees
- Weighing of mineral must be thoroughly explained/discussed
- Never show an example if you don’t want the example followed
- Still images are difficult to use to categorize behavior
- At most farms, cattle visitation to feeders was best observed ~ 20 minutes prior to sunrise to 30 minutes after sunrise

## Conclusions

- Game trail cameras show promise to evaluate cattle behavior
- Time-lapse feature is not sufficient to evaluate behavior
- Extremely thorough training is required for successful data collection with on-farm research
- On-farm demonstrations continue to be a great tool with new agents to increase engagement with producers

## Literature Cited

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