Detailed Project Outline

Research Purpose

With the support of the American Association of Small Ruminant Practitioners and study participants, we will explore the use of mucus membrane color (e.g. eyelid tissue) as a field-based indicator of gastrointestinal parasite burden. This technique has been verified in domestic small ruminants, but lacks scientific validation in many exotic species. In this study, we aim to validate this method for cervids in an effort to equip producers and veterinarians with a rapid, non-invasive, easily-implementable parasite control modality.

Eligibility & Participation

Official data collection for the study will take place between August 1, 2023 and August 1, 2024. Data collected prior to these dates will also be included with permission from eligible producers. Contribution is entirely voluntary. There are no commitment requirements for frequency of scheduling or number of animals. You are free to refuse involvement or withdraw from future participation at any time. However, results collected prior to withdrawal will not be excluded from the study. A signed authorization may be required on each date, however, your signature does not constitute a contractual agreement.

Any client of Aggieland Veterinary Services (current or future) owning/managing cervids (e.g. deer species) is eligible for participation. The following criteria will be used to determine if an animal qualifies for inclusion:

1. Classification as a cervid species
   Examples include (but are not limited to):
   - *Axis deer*
   - *Barasingha*
   - *Elk*
   - *Fallow deer*
   - *Mule deer*
   - *Muntjac*
   - *Pére David's deer*
   - *Red deer*
   - *Sika deer*
   - *White-tailed deer*
2. At least 4 months of age
3. Have not been treated with antibiotics or dewormers within 30 days of sample collection
4. Be currently free of overt or confirmed disease/illness unrelated to parasites (e.g. pneumonia)
5. Have not suffered substantial blood loss within the last 180 days (6 months)
6. Have not contributed samples to this study within the last 180 days (6 months)

Participant Obligations

All samples can be collected on awake animals restrained within a mechanical chute, however, use of sedation does not exclude an animal from the study. Samples may be collected during any routine or non-routine veterinary visits (both pre-arranged or opportunistically). Alternatively, visits solely for sample collection may be scheduled on the date(s) of your choosing in conjunction with routine herd work (e.g. fawn release, AI, annual vaccination days, etc.). If able, it is preferred that samples are collected in the morning as they must be processed within 12 hours to prevent interference with results.

General background information will be requested from the producer as part of data analysis. This includes each participating animal's age, sex, general health history, pregnancy status and/or breeding date (if applicable/known), and the date of last deworming and product used (if applicable/known).

For inclusion, each individual animal must contribute the following data during the same visit:

- General health assessment by Dr. Brady or other approved veterinarian.
  - If able, a rectal temperature and photos of the eye may be taken.
- Blood sample (maximum 3ml)
- Fecal sample

Benefits of Participation

In addition to herd health information, participating facilities will receive benefits with economic value in exchange for their involvement. Funding is limited within the allotted grant stipend and benefits are subject to availability. Direct financial compensation will not be awarded.

Immediate benefits to participating clients include:

- Determining levels of parasite burden within individuals and/or herds
- Establishment of recommendations for future deworming practices
- Evaluation of success of previously performed deworming
- Indications of individual and overall herd health
- Identification of "problem animals" who may benefit from additional care or removal from the herd

Complimentary services for included animals:

- Health assessments including a physical exam, body condition score, and documentation of findings in the patient/client's medical record
- Fecal analysis via McMaster's Fecal Egg Count
- Blood screening tests for anemia
- Reports and recommendations for management of current parasite burden

➢ *Notes & Disclaimers*

- *The likelihood of inconclusive results or sample handling error is minimal but possible, thus, there are no provided guarantees that all samples collected will be viable*
- *Once samples are collected, you are entitled to results regardless of future participation. Results will be reported as they become available (within 2-21 business days) and documented in your medical record for future herd management*
- *All animals included in this study will receive their health examinations, sample collection, and diagnostic tests (detailed above) free of charge. However, any additional treatments, medications, miscellaneous laboratory tests, etc. will be charged at their regular rates*
- *Any examinations, treatments, medications, laboratory tests, or herd certification paperwork for animals not included in the study will be charged at the regular rates*

Complimentary or discounted travel & hourly fees:

**As funding is limited, producers/facilities must meet certain stipulations to qualify (provided below); however, we will make every attempt to work with clients to encourage participation.*

- Scheduled visits during routine producer herd-work days
  - For sample collection **only**
  - 15-30 animals sampled per visit
    - *Exceptions for minimum and maximum sample numbers must have prior approval*
  - No travel or hourly fees/costs associated
    - *Any supplementary veterinary services completed may be subject to charges and fees stipulated below.*

- Sample collection during routine or non-routine veterinary appointments
  - Conducted concurrently with provided veterinary services
    - *Pre-arranged as part of scheduled veterinary care and/or procedures*
    - *By opportunity during veterinary care of qualifying individual animals*
  - 1-5 animals sampled per visit
    - Not eligible for discounted travel fees
    - No charge/fee for time spent conducting study-related sampling or evaluations
  - 6-14 animals sampled per visit
    - Eligible for discounted travel dependent upon location, number or animals, and other services requested
    - No charge/fee for time spent conducting study-related sampling or evaluations
  - 15+ animals sampled per visit
    - Eligible for discounted or complimentary travel dependent upon location
    - No charge/fee for time spent conducting study-related sampling or evaluations
    - Eligible for discounted hourly rate for other services dependent upon the number of animals and requested services

➢ *Notes & Disclaimers*
  - *Regardless of travel/hourly fees, all animals included in this study will receive their health examinations, sample collection, and diagnostic tests (detailed above) free of charge*
  - *Sampling during routine or non-routine visits may be prearranged or occur opportunistically. If sampling is arranged in conjunction with veterinary care, eligible discounts will be discussed in advance.*
  - *Travel fees will apply for sampling scheduled in conjunction with annual CWD biopsy/testing, but will be provided at a 15-35% discount based on location and number of samples collected.*

Supplemental Details

For a species to be represented in this study, a minimum of 10 animal samples must be available. There are no limits to the number of animals from a certain species or facility; however, increased diversity may provide better support for practice methodology. Ideal various age groups and sexes be also represented in our data collection to provide the best scientific support. As the study progresses, available funds may become limited. As such, the Principle Investigator (Dr. Lauren Brady) reserves the right to decline sampling of animals from specific facilities, species, age groups, or sexes to maintain study integrity.

Ethics & Confidentiality

Animal welfare is a top priority, and animals will not be forced to participate if severely stressed or it is deemed unsafe to do so. All sampling methods are considered minimally-invasive with negligible risk of complications or unnecessary stress.

Animal ID's are required in the data collection phase for organization and documentation in the client's medical records. However, all animal identities will be kept **confidential**, and specific identifiers such as ownership, tag numbers, unique ID's, or other markers **will not** be included in any published study. Recognition of a client or facility's participation in the "acknowledgement section" of the finalized study is at the discretion of the client and will only be included with direct written permission.

Reporting Results

The findings of the study will be submitted for publication in a scientific journal. The published paper and its discoveries will be made available for industry researchers and professionals as deemed appropriate by the publisher. The publication journal will be announced at a later date, and the author(s) may also elect to

allow open-access when able. In addition, results will be presented at the annual Association of Small Ruminant Practitioners conference. Regardless, a summary of the final outcomes will be available to study participants directly.

Scheduling

As detailed above, there are various ways you can elect to partake in the study, and we hope you will keep us in mind as you plan your fall or spring herd-work dates! As mentioned, it is preferred for sample collection to occur within the morning especially if collection from multiple animals is anticipated.

If you are open to arranging a date for sample collection (without veterinary services) please contact our Client Liaison directly via the information provided at the bottom of this document. We also may reach out directly to request your participation during your annual veterinary visit(s). Ideally, participation will be addressed when appointments are requested, but may also occur during the visit itself based on circumstance. In addition, we may periodically send additional requests to specific facilities housing species or age groups where current data is lacking.

If you completed an Intent to Participate during the grant request phase of this project, you are not obligated to participate. However, we hope that you will elect to continue as a contributor to our research. If you contributed samples to this study prior to acceptance by the AASRP, you may still be asked to complete a consent form if an Intent to Participate was not submitted.

Final Remarks

After you have read the information provided, our team is happy to answer any questions you may have. Any additional information specifically applicable to your facility will be provided at the time of scheduling or sooner upon request. In addition, we encourage you to refer other cervid producers to us for inclusion in this study as well!

We understand and respect your busy schedule, and will make every effort to facilitate your needs in conjunction with this research! We are hopeful that this study is the first of many, and will provide both cervid veterinarians and producers with strategies for improved herd health!

Contact Us

For scheduling and questions please contact our client liaison via one of the modalities listed below.

Client Liaison: Magda Harden
Phone: 979-595-7296
Email: info@aggielandvetservices.com