

Dr. Clayton L. Kelling

■ Controlling the Spread of BVDV

Project Title: **Bovine Viral Diarrhea Virus (BVDV) in North American Alpaca Herds: Determination of Prevalence and Implementation of Control Strategies**



Dr. Clayton Kelling

The principal investigator for this project is Dr. Clayton L. Kelling. He and his team of co-investigators conducted their research over a span of fourteen months from May 2006 to July 2007. The study took place at the University of Nebraska-Lincoln under the Department of Veterinary and Biomedical Sciences. Results were published in the November 2008 *Journal of the American Veterinary Association*.

Bovine viral diarrhea virus (BVDV) is classified in the genus Pestivirus in the family Flaviviridae. It is distributed worldwide and affects cattle and most even-toed ungulates. Acute disease can manifest itself ranging from no or only mild symptoms to high fever, respiratory infection, oral ulcerations, diarrhea, and abortions, with severe cases resulting in death.

In pregnant animals, the virus may cross the placental barrier and infect the fetus. Depending on the time of fetal development, the fetus may not recognize the virus as such and fails to mount an immune response. If it is not aborted, an alpaca cria infected in utero will be born persistently infected (also known as "PI") and shed the virus over its entire, usually short, life span. Specific tests exist

to differentiate between acute infection, antibodies developed by alpacas that successfully cleared the virus, or alpacas with PI status.

Dr. Kelling's grant proposal to the Alpaca Research Foundation (ARF) projected: "We anticipate that the proportion of BVDV-infected alpaca herds in North America will be low. The prediction is based on the prevalence of 4% of U.S. beef cattle herds and 15% of dairy herds with PI cattle. Since BVDV has been indigenous in the U.S. cattle population for decades, BVDV prevalence in alpacas is expected to be less than in cattle."

Dr. Kelling and his team identified 562 eligible herds for their research. Eligibility was determined by herds including 12 or more adult females. From these 562 eligible herds, 250 were chosen randomly to participate in the study.

Although great efforts were made to encourage full participation, eventually only 63 farms from 26 states elected to take part. Each farm submitted five samples per herd from crias less than six months of age for a total of 315 crias.

Regarding this disappointingly low level of farm participation, Dr. Kelling pragmatically remarked: "Although we did not reach our goal of full participation, I feel with a high degree of confidence that our results provide an accurate indication of the prevalence of BVDV in the U.S. alpaca population during the time period of our study."

Testing methods were chosen to diagnose alpacas



Kenneth Adams

with antibody titers as well as acutely infected and persistently infected crias. The initial study found only one herd with PI crias. However, antibody tests showed that 16 of the 63 herds had crias with antibodies to the BVD virus, for an infection rate of 25.4%. That's a rate much higher than what Dr. Kelling had predicted going into the study.

"We decided at that point to conduct additional testing," Dr. Kelling explained. "We went back to the 16 herds and tested their entire population. We interviewed the owners and evaluated each herd's history." After extensively scrutinizing lab results and herd histories, it was determined that 3 of the 16 herds had previously had PI crias. The final analysis showed that 6.5% of tested alpaca herds had active BVD infection.

It became clear during the interview that Dr. Kelling, while maintaining an appropriate scientific emotional detachment, nevertheless felt deep compassion for the predicament of the affected alpaca farmers. "The biggest problems these people faced were abortions, births of weak crias, the cost of diagnostic testing, and the quarantine they had to

endure until their herds could be cleared." He added, "And of course, there's the loss of sales to deal with in such a situation." Dr. Kelling succinctly summed up his research: "Our study shows that there was a high prevalence of BVDV in alpacas comparable to cattle."

The ARF study on BVDV was conducted in strict confidentiality. Dr. Kelling will never disclose the names of the participants. As breeders, we can only thank the anonymous farm owners for their courage and sacrifice.

Breeders who, after reading the results of Dr. Kelling's study, are still not convinced that the BVD virus poses a real threat to alpaca herds, may want to ponder the following data.

Alan Rosenbloom, president of the Alpaca Research Foundation, began to solicit and to record incidents of PI crias in U.S. herds over the span of one year. By the end of 2006, he had recorded 61 documented cases. "Let's be clear that these cases presented just the tip of the iceberg. These numbers do not include the PI crias that died without diagnosis, nor those that were quietly buried and not



The Alpaca Research Foundation (ARF), in conjunction with Morris Animal Foundation (MAF) and other groups in the llama and alpaca communities, provides funding grants to veterinarians and scientists engaged in research that has the potential to improve the health and well-being of our animals. *Alpacas Magazine* is pleased to bring you another in a series of interviews with the researchers carrying on this important work.



reported by their breeders. BVD causes hundreds of million dollars of losses in the beef cattle and dairy industries. In real dollars, our losses are not as high, but you have to look at the numbers in terms of percentages.”

The alarming number of PI crias reported by breeders to Dr. Rosenbloom had given urgency to ARF’s mission to fund a scientific, peer-reviewed research study and led directly to the acceptance of Dr. Kelling’s research grant proposal request.

There are solutions to the spread of BVDV and other infectious diseases. For starters, we must bury the myth that alpacas are not subject to many of the diseases suffered by other farm animals. We can then extrapolate from other livestock species’ proven methods to protect and treat alpacas. Finally, with the help of professional scientists and veterinarians working in the field, we can develop alpaca-specific, protective protocols and treatments.

It will be helpful for breeders to review the implementation of control strategies addressed in my interview with Dr. Kelling. Testing for infected animals is one strategy available to breeders. The PI cria obviously is of greatest concern to alpaca farmers because it represents the source of infection for herds and no treatment is available to help it clear the virus. Laboratories use the Reverse transcription polymerase chain reaction assay to diagnose PI status. It is commonly referred to as the PCR test. A positive PCR test result indicates the

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presence of active BVDV infection at the time the blood sample was taken. “How accurate is this test? Do we have to worry about false negatives?” I asked. “Test results are very reliable,” Dr. Kelling responded. “It’s important that breeders do not make the mistake of assuming that all PI crias will be sick. Some look and act healthy and can live for a year or even longer.” “Should we vaccinate?” I inquired. “I do not recommend vaccination. It clouds the picture when trying to determine a herd’s BVD status,” Dr. Kelling cautioned.

In other species, vaccinations have not proven to be totally successful in protecting animals against the virus. Vaccinating therefore gives breeders a false sense of security. “Of course, natural protection occurs when a previously acutely infected mother passes on antibodies to her cria in her colostrum. That’s not bad!” Dr. Kelling clarified.

“Please identify some management practices that put herds at risk,” I asked. “Feeding bovine and goat colostrums to alpaca crias presents a risk factor,” Dr. Kelling answered without hesitation. Infected colostrum passes the virus to a cria. BVD antibodies in cow or goat colostrum fed to crias can complicate matters. Antibodies may interfere with the blood serum test and give a false negative. Crias less than three months of age should therefore be tested by using whole blood and using the buffy coat PCR test. In any case, the testing protocol for the BVD virus is complex. Most breeders will need

the advice and guidance of a competent veterinarian to steer them safely through the BVDV testing maze. In addition, a good practice would be to know the status of your herd’s source of colostrum and get a professional opinion on its use.

Further, animal movement between farms and commingling at events such as shows and auctions add to the virus being passed from one farm to the next.” He advised, “Breeders should determine the BVD status of an alpaca before bringing it to their farm.”

Of course, sending a female to another farm to be bred also calls for close scrutiny of bio-security practices. Unfortunately, too many alpaca breeders presently only have a nebulous idea of a true quarantine protocol. Also, and this can’t be stressed enough, a quarantine area only protects the home farm. It does not protect visiting females arriving from multiple locations. Where a steady stream of incoming alpacas exists, true quarantine conditions are impossible to enforce.



ARF Investigator Profile

Breeders of other livestock species often elect to keep a “closed” herd. Once the herd is “closed,” no new animals can be brought in for any reason. Owners of closed herds do not show, do not offer stud services, cannot offer repeat breedings, and do not purchase additional stock.

Should alpaca breeders elect to close their herds? That’s for each individual breeder to decide. Every farm has to develop its own policies when it comes to farm bio-security.

What we all can and must do to protect our animals is to thoroughly understand the rather complex issues of BVDV.

“I am not the scientific type. This is too complicated for me” just doesn’t cut it when our herds’ health and our profits are at stake. Under certain circumstances, even a negative test result is no assurance that a new arrival to a farm will not introduce the BVD virus to the herd. For example, if a blood sample is taken from a pregnant female on a Monday, it is conceivable that an infected alpaca arriving on that farm the following day infects her and her fetus. The female is shipped one week later to her new destination... with a negative BVD test result but an infected cria in utero waiting to be born. Quarantining this female for a month upon arrival will do nothing to defuse the ticking BVDV time bomb.

Knowing the scientific facts pertaining to this virus helps a breeder to assess all possible risks and implement appropriate strategies to reduce or eliminate disease. It may not be possible to clear the BVD virus completely from the entire North American alpaca population, but we should all stay on guard and work toward that goal.

Breeders who tested for and cleared the virus from their premises are to be commended. Purchasing alpacas from their farms is completely safe as far as the BVD virus is concerned. It is by far safer than buying alpacas from farms where owners are afraid of tainting the image of a “stress-free alpaca lifestyle” and pretend the problem will go away if we all just take a deep breath and relax.

Let’s be grateful that the financial generosity of the study’s participating farm owners, generous contributions to ARF by the Mid Atlantic Alpaca Association (MAPACA), and Dr. Kelling’s expertise make it possible for alpaca herds to escape this dreaded virus.

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