Ingrid Wood interviews
Lora R. Ballweber, DVM

War on Worms

Dr. Lora Ballweber

The Alpaca Research Foundation (ARF), in conjunction with 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 the third in a series of interviews with the researchers carrying on this important work.

In *Worms 101,* Wes Laraway, a llama breeder from Middleburg, New York, candidly reports the heartbreaking deaths several of his animals suffered as the result of a "parasite overload."

Laraway believes that the problem started with the introduction of a severely infested rescue animal to his herd. This unfortunate female llama was the first to die. Both Laraways are obviously caring owners. They left no stone unturned and spared no expense to pinpoint and correct the problem on their farm. Like many camelid owners, they discovered the hard way that parasite prevention and treatment are not all that simple.

Not surprisingly, a *Survey of Disease Issue Concerns on Alpaca and Llama Farms* listed parasites as the main concern among camelid owners. The authors, Stephanie J. Mitro and Dr. David E. Anderson, report that the survey yielded seventy-eight responses, including several owners and veterinarians abroad.

The Alpaca Research Foundation, sensitive to the needs of the alpaca community, approved a Grant Proposal Request submitted by Dr. Lora R. Ballweber (Mississippi State University) to research camelid parasitic issues. In collaboration with Dr. David G. Pugh and Dr. Christine Navarre (both of Auburn University), Ballweber's study is entitled "Determination of a Periparturient Rise in the Excretion of Giardia Cysts and Nematode Eggs in South American Camelids."

A Problem for Dams and Crias

Breeders of other species have long known that right around birthing, the dam experiences a temporary loss of acquired immunity to intestinal parasites. As the result of this loss, large numbers of larvae reach maturity. For example, the *Merck Veterinary Manual* talks about marked increases in strongyle eggs in sows during that time. The phenomenon is well known in sheep, where lactating ewes lose their immune response to larvae. Likewise, many puppies become infected with roundworms during the fetal stage or in the whelping box.

Larvae develop through various stages. The first two are "free living," meaning larvae can survive outside of a host. The third stage larvae are "infective when eaten by a llama or alpaca, they are the stage that ultimately develops into reproducing adults" (Ballweber).

Dr. Ballweber's research is important to breeders who wish to utilize anthelmintics at times when they're most effective. If her work establishes that a periparturient rise in parasite eggs occurs in camelids, breeders can judiciously target this specific parasitic population with appropriate treatments at the most advantageous times.

During a phone interview, Dr. Ballweber further defined the temporary loss of immunity as a "relaxation of immune response" caused by hormonal changes in the dam's system.

"Why would the mother's body create a harmful environment for the baby?" I questioned.

Dr. Ballweber's response: "The fetus obtains its genetic material from both the mother and father. Because the material from the father is different from the mother, the mother would normally make an immune response against it. If that were to happen, the pregnancy would not go to completion. To avoid this problem, several mechanisms exist that allow the fetus to escape the mother's immune response. One of these mechanisms is suppression of the mother's overall immunity in late pregnancy. This suppression helps allow the

pregnancy to go to term; however, a side effect of this suppression is that normal immune responses against other organisms are also suppressed."

Camelid gastrointestinal parasites, by the way, are not ingested through mother's milk. They are picked up by crias grazing on contaminated pasture.

Prevention

While research is ongoing, Dr. Ballweber offers pertinent and practical advice to camelid breeders. She stressed that daily pick-up and disposal of fecal matter on pastures and in the barn remains the easiest and most effective prevention strategy.

"It's not a bad idea", Ballweber added, "to treat the dam with an anthelmintic the day after she gives birth, when warranted." Parasites thrive in a lush, moist environment. Pastures, especially the grass around community dung piles, must be clipped short enough for sunlight to penetrate.

A routine checking of fresh fecal samples is helpful. Ballweber pointed out that sample results can be presented in two different ways:

1. A qualitative count simply verifies the presence or absence of parasites.
2. A quantitative count includes the count of eggs per gram of feces (a gram is roughly the weight of a paper clip).

Unfortunately, parasites can develop resistance to treatment. Both underdosing as well as too frequent dosing can result in "survival of the fittest" – worms, that is! Although it takes time for the resistant population to numerically surpass the non-resistant parasites, this phenomenon should nevertheless be of concern to all breeders. Resistance in camelids has not been documented at the present time. Breeders also need to be aware that individual animals differ in their response to parasitic infestation. When asked about tapeworm in camelids, Ballweber quickly pointed out that the tapeworm found in llamas and alpacas is not the same as the flea-transmitted parasite found in canines. The former is transmitted by mites living in pastures.

As indicated earlier, Ballweber's research also addresses the extent of a "Periparturient Rise in the Excretion of Giardia Cysts in South American Camelids."


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According to information found in Ballweber's Grant Proposal Request, this "protozoan parasite is transmitted by the fecal-oral route primarily through contaminated feed and/or water." Signs of giardia infection are diarrhea, ill thrift, and retarded growth, although Ballweber points out that some infected animals show no "detrimental effect."

People and Parasites

The bad news is that people can also become infected by this parasite, suffering from similar symptoms as their animals. There is presently no approved treatment for the parasite in camelids, although some anthelmintics do have an effect. The good news is that the giardia cysts cannot survive long on dry ground. Good management practices such as preventing contact with contaminated water (pond, stream, or water trough) and feed aid in controlling the spread of giardia. Ballweber pointed out that, in affected populations, high numbers of crias and high turnover of animals contributes to spreading the infection.

The presence of giardia cysts is hard to diagnose. Experts recommend three fecal tests within a 10-day period. As with other parasitic infestations, fecal samples may give false negative results. The take-home message for camelid owners here is not to rule out parasites if a sample comes back negative. Be aware that the very young, old, or debilitated animals are always more compromised by a parasite problem.

Ballweber's research population consists of two llama herds (approximately 130 animals) and 30 alpacas. A sheep flock serves as a control group.

Lora R. Ballweber, who was born and raised in Wyoming, brings two Masters Degrees (Parasitology and Veterinary Science/Epidemiology) and a Doctorate from the Oregon Veterinary School to her project. She teaches classes in parasitology and wildlife diseases in addition to taking on consulting work. After working with wild turkeys in Florida, a chance meeting with Oregon llama owners peaked her curiosity about camelids. Dr. Ballweber and her husband, Jeff, enjoy hiking, camping, photography, and the company of two middle-aged "ladies" – their cats, Pumpkin and Puds. She can be contacted at ballweber@cvm.msstate.edu or (662) 325-1345.

Ingrid Wood lives with her husband, Dave, and a small herd of huacaya alpacas on Stormwind Farm in Burlington County, New Jersey. Ingrid can be reached at (609) 261-0696 or alpacas@uscom.com.