Bighorn Domestic Sheep Working Group (BHDSWG)

Science Symposium – June 10, 2019

Post-Meeting Q&A Sent Via Email to Speakers

Over the last 25 years, some members of the wild sheep community have repeatedly included llamas with sheep and goats for separation from wild sheep. This happens in spite of the fact that llamas have undergone pen studies with wild sheep that show them not to carry M. ovi and other pathogens associated with polymicrobial pneumonia, the major cause of mortality in wild sheep populations. Llamas have no endemic diseases and as Tylopoda/camelids have a wide taxonomic separation from Ruminantia/bovids, including sheep, goats, & cattle. Yet the diseases endemic to these bovid species are cited as reason to consider separating llamas from wild sheep despite no documented occurrence in llamas. At the same time cattle are not recommended for separation and are even considered as replacement species for domestic sheep and goats. Can you explain this reasoning?

Bob Garrott: Thanks for your question but I am afraid I cannot provide any insight. While the WSF has supported our bighorn research efforts in both the GYA and in Montana I do not play any advisory role to their advocacy positions/policies and am not privy to their rationale for recommending llamas be included with domestic sheep and goats in bighorn separation policies.

Helen Schwantje: This issue has been raised and examined with more than a decade gap to add new published material on risk of transmission of infectious diseases/pathogens, including non-respiratory pathogens from camelids. Almost none of the material was from camelid health researchers. We did not have an agenda to persecute the species but had these RAs performed by a third party using standard methods. BC does have the responsibility to protect species that we believe are naïve to livestock diseases, including those carried by camelids. As BC has global responsibility to protect Stone's sheep - a thinhorn sheep, we took the step of repeating the RA. We also had anecdotal information that one disease that can be carried by llamas was introduced to an area where mountain goats declined with that disease (Contagious Ecthyma) and llamas were used for packing. We could find no other reason for that disease introduction. There are pathogens that can be carried by camelids as hosts (with or without major impacts) but I wish we knew more about their carriage of pathogens as temporary hosts. Is it possible? We have little evidence but as you all know, lack of evidence is not proof. These risk assessments were simply circulated, and they are available as resources to take or leave. British Columbia did use them to support one proactive regulation controlling camelids (and other small ruminants) so that they may not be used for packing for the purposes of hunting in the northern regions of BC. That is the only action taken to date that I know of. The workshop that was held on June 10 was around domestic sheep, not these other issues.

Maggie Highland:

To answer this question specifically, I cannot explain that reasoning. This would be better addressed to someone who believes cattle are OK among bighorn sheep and llamas are not. Perhaps someone from the WSF can explain this, since I believe they are one entity that push the idea that sheep and goats should go and cattle can be in bighorn habitat. Percentage-based data that is published reveals that a higher percentage of bighorn sheep die when forced to co-mingle in captivity with cattle than the percentage that have died from being co-mingled with goats (even though there are more bighorn-goat co-mingling studies that have been performed than bighorn-cattle commingling studies).

Tom Besser: I agree that the wider phylogenetic separation of llamas from sheep lessens the likelihood of them carrying pathogens that could be transmitted to and cause disease in bighorn sheep. However, it does not preclude the presence of such pathogens, and some pathogens can transmit across hosts separated by a very wide phylogenetic distance. Too few pen studies have been done to date with llamas and bighorn sheep to provide a solid understanding of the degree of risk to wild sheep that contact with llamas might bring. In fact, I am only aware of one pen study involving a total of 3 llamas.

In the case of cattle, hundreds of years of their presence in and near bighorn sheep ranges without an association with pneumonia outbreaks in wild sheep provides strong evidence of their lack of a role in wild sheep pneumonia. (Yes, *M.ovi* detection was reported – although not confirmed with sequence information – from cattle sympatric with bighorn sheep undergoing a pneumonia outbreak, but we have found that during a bighorn sheep pneumonia outbreak *M. ovi* can be detected in pretty much everything in the vicinity, including water, air, dirt, flies, etc., so this outbreak really does not support cattle as the source of the pathogens even though the authors considered this possibility.)

A relevant principle is that of an abundance of caution: keep everything away from bighorn sheep that does not have a strong evidence base showing it is not hazardous to bighorn sheep. Pack animals potentially could gain very close proximity to bighorn sheep, increasing the risk posed by any pathogens they may carry. So, I think it is reasonable to try to maintain separation between llamas and bighorn sheep, at least until additional research provides stronger reassurance of the lack of risk.