From: Vicki L. Hamende
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Subject: WSVL diagnosticians help link lichen as cause of elk die-off

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WSVL DIAGNOSTICIANS HELP LINK LICHEN AS CAUSE OF ELK DIE-OFF

While a lichen called *Xanthoparmelia chlorochroa* has been implicated as the probable cause of close to 300 mysterious elk deaths southwest of Rawlins, College of Agriculture investigators say much more work needs to be done in the coming months to define how and why it may have triggered the largest recorded die-off of free-ranging elk in Wyoming.

Toxocologist Merl Raisbeck of the Wyoming State Veterinary Laboratory (WSVL) and the UW Department of Veterinary Sciences first proposed that lichen might be responsible based on the presence of lichen in the area of the felled elk and his familiarity with an obscure 1953 publication which suggested that it caused a similar syndrome in cattle and sheep.

Extensive research and laboratory testing at the WSVL has eliminated scores of other more common potential causes.

Within a week of being fed a diet of lichen by Wyoming Game and Fish Department veterinarians, two of three healthy elk developed signs of weakness and passed discolored urine similar what was seen in the original episode.

Both of the experimentally affected elk were examined post-mortem at the

Wyoming State Veterinary Laboratory (WSVL), and College of Agriculture diagnosticians there will test tissues from animals on the lichen diet to identify the basis for clinical illness.

Xanthoparmelia cholrochroa grows in bare soils in much of Wyoming. Lichen is a symbiont composed of a fungus and an alga. Until now it has not been considered dangerous for elk, and some wildlife biologists point to it as valuable winter feed. However, under some conditions the lichen may be associated with muscle damage, according to Walt Cook, a veterinarian with the game and fish department.

Raisbeck said the afflicted elk migrated from the Atlantic Rim where they were eating grasses and that their rumens were probably not adapted to degrading toxins in the lichen. “For some reason they came north really late in the year,” Raisbeck noted. He also said drought stress could have caused the lichen to change its chemical composition.

Raisbeck is now working with the game and fish department on an experimental study using elk to define the toxic principle that is involved and why it makes animals ill.

The toxicologist said reindeer live on lichen but that “bugs” in their rumen degrade its toxins. Domestic animals, he said, do not like lichen although antelope will eat it.

The downed elk, he added, were producing red urine. Other animals in the area of the die-off did not become ill or exhibit any such unusual symptoms. Raisbeck and his colleagues are testing the urine to establish whether it contains breakdown products of damaged muscle.

Elk on the experimental lichen diet were examined by UW veterinary pathologists

Professor Beth Williams and Assistant Professor Todd Cornish of the WSVL. Some of the changes found in the carcasses were consistent with what was seen in the original die-off. “So far, so good,” said Williams, “but we still need to do a lot more work to lock this in.”

Raisbeck commented that given the scale of the die-off and limited knowledge about lichen poisoning, conducting further research would be an excellent project for a graduate student interested in toxicology. He plans to work with game and fish biologists and UW students to collect large quantities of lichen from the affected area in southeastern Wyoming.

The professor said it is always important to show that a suspect agent was present in the field and in an animal’s body. “We also need more samples from the experimental animals to be able to close the circle and re-create what we have seen in the field.”

Scientists in the game and fish department tapped a wide range of professionals in Wyoming, including investigators at UW, to help identify the cause of the massive number of elk deaths. Those consulted represented the USDA Arthropod-Borne Animal Disease Research Laboratory (ABADRL), the state veterinarian’s office, Wyoming veterinarians and physicians, the UW Department of Animal Science, the Wyoming Department of Health, the U.S. Department of Agriculture’s Animal and Plant Health Inspection Service, the Department of Homeland Security, and wildlife veterinarians and biologists across the country.

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