

SheepSense:

an applied research brief

Tracking Toxic Plants: Using Fecal DNA to Manage Sheep Grazing on Western Rangelands

The Challenge

Toxic plants in extensive landscapes negatively impact grazing management, animal behavior, and economic returns to ranching operations. Detecting, managing, and quantifying toxic plants in sheep diets, especially in western North American rangelands is difficult because landscapes are highly variable, with different toxic species occupying niches from low riparian areas to high alpine meadows.

Analysis

Sheep diets vary across seasons and geographical areas and are influenced by environmental factors. Sheep express flexibility in their diets according to the plant species that are available, and they are readily able to adapt from majority-grass or majority-forb diets when conditions allow. Similarly, sheep increase their dietary shrub intake during the winter months when herbaceous species are inaccessible under snow.

Use of fecal DNA metabarcoding (fDNA) technology enables approximation of plant species in sheep diets to provide efficient and detailed insights without a need for surgical or other invasive means. Researchers at the University of Wyoming are refining the use of the technology to estimate dietary plant species composition from fecal samples.



The Response

The first step in managing toxic plants on a landscape scale is to correctly identify the species present. Potentially toxic plants in the west include Short's milkvetch and other locoweeds, larkspur, chokecherry, selenium-accumulating species of the Asteraceae family, and deathcamas. All of these and more can be found in the University of Wyoming Extension (UWE) Bulletin 1265, Rangeland Plants: Wyoming Tough or online at <https://bit.ly/WY-range-plants>. UWE personnel are available to assist with proper identification of plant species on Wyoming rangelands.

The goal is that someday, data from fDNA analysis will inform adaptive grazing management strategies that maximize utilization of nutritious range plant species while reducing risk from toxic plant species. Long term, this technology might be used in real time to provide awareness of toxicosis in range sheep before clinical signs occur.

For more information, check out the peer-reviewed Technical Note at <https://www.sciencedirect.com/science/article/abs/pii/S187114131930798X>

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bit.ly/4brsdsC

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Sources:

Burke, J. M., Chenchen, W., Garnick, S., Ndagurwa, H. G. T., Provenza, F. D., Scasta, J. D., Valentini, A., Bailey, E. M., Burritt, E. A., Cook, W. E., Cook, D., & Craine, J. M. (2020, March 9). Technical note: Toxic plants in sheep diets grazing extensive landscapes: Insights from fecal DNA metabarcoding. *Livestock Science*. <https://www.sciencedirect.com/science/article/abs/pii/S187114131930798X>