



Evaluating the risk of early season grazing of waxy larkspur in central Idaho

The Situation

Poisonous plants cause significant losses for the western livestock industry. Losses from livestock death and abortion exceed \$340 million annually in the 17 western states (Ralphs, 2010). The total impact of poisonous plants is much higher when other direct and indirect costs are considered (illness, medical costs, additional labor for herding, fencing, reduced gains, and loss of opportunities to use forage on infested rangelands and pastures). Larkspurs (*Delphinium* spp.) in Idaho are abundant native plants on foothill and mountain rangelands. These long-lived native plants are widely distributed perennial plants that typically grow in spring under snow banks and continue rapid spring growth when snow banks recede. Larkspurs are often divided into several classes depending on the plant height: tall, low, and plains larkspur. Tall larkspurs include 4 species: *D. barbeyi* (subalpine larkspur), *D. occidentale* (duncecap larkspur), *D. glaucum* (sierra larkspur), and *D. glaucescens* (waxy larkspur, sometimes referred to as smooth larkspur). Tall larkspurs typically contain numerous toxic alkaloids which often cause substantial death losses when grazed by cattle. The alkaloid concentrations are highest in the early growth and decline gradually in the plants during the growing season, with the exception of the seed pods which accumulate relatively high concentrations of alkaloids in the mature seeds. Larkspurs are often heavily grazed by cattle during the summer on higher elevation rangelands, and depending on the amount of plant consumed, the rate of consumption, and the concentration of toxic alkaloids present in the plants, cattle may be fatally poisoned. Many years of research on tall larkspurs concluded that cattle consume little or no tall larkspur before the plants elongate flowering racemes (Pfister, 1997). Consumption by cattle typi-

cally begins at flowering and increases as the larkspur plants mature, with cattle consumption peaking when larkspur is in the pod stage of growth in late summer. However, ranchers in Central Idaho had observed just the opposite occurring; cattle were consuming larkspur during spring when the larkspur plants were vegetative or in the bud stage of growth. Consumption of tall larkspur in the early season had proven fatal in many cases. These observations ran counter to previous research on the timing of larkspur consumption by cattle. No information on cattle grazing waxy larkspur was available.

Our Response

In response, University of Idaho Extension contacted scientists from the USDA/ARS Poisonous Plant Research Lab in Logan, Utah. Meetings with ranchers were set up and field trips were taken to the grazing allotments to showcase what observations the ranchers had been witnessing.

To begin to answer the questions about when and how much waxy larkspur was being eaten by cattle during the spring in Central Idaho, a grazing study was conducted in the Morgan Creek drainage near Challis, Idaho. A 3-acre pasture was fenced with electric fence in an area with patches of waxy larkspur was in the vegetative and bud stage of growth. The area was grazed with 6 Hereford steers that were native to larkspur. Cattle diets were quantified using bite counts during all active grazing periods each day. Steers were placed in a corral at night and released to graze at 6:30 am each morning. The vegetation was clipped to determine forage availability at the start of the study and the clipped material was saved for nutritional analysis. Waxy larkspur plants were collected periodically for alkaloid and nutritional analysis. All of the forage at the study site was ac-

tively growing during the study and the spring forage was relatively abundant and had excellent nutritional characteristics (crude protein measured 15% in the grasses). Waxy larkspur was also an excellent source of nutrition, but was also very toxic (toxic alkaloid concentrations measured above 2%; larkspurs containing more than 0.6% toxic alkaloids are considered to be highly toxic).

Program Outcomes

During the first few days on the study site, the steers ate very little larkspur. However, on day 3, one steer ate sufficient larkspur (10% of his total forage bites) and he showed visible signs of poisoning throughout the entire following day. Similarly on days 5 and 6, several steers ate sufficient larkspur that they were visibly poisoned on that day and the following day. Progression of the clinical signs followed the classical pattern of minor muscle tremors progressing to major muscle tremors and then periodic collapse for 10-20 minutes. Even though the larkspur was highly toxic, no animals were fatally poisoned, but two animals spent about 18 hours in lateral recumbency before recovering, indicating that they were very close to death.

The larkspur was not uniformly distributed throughout the pasture, and cattle appeared not to seek it out or avoid it during their grazing activity. Cattle consumption of waxy larkspur in this study was not due to a reduction in other available forage. Waxy larkspur is at least moderately palatable during spring, and cattle consumed the plant when other forages were available.

The Future

Results of this grazing study demonstrated that management recommendations for other tall larkspurs such as subalpine and duncecap larkspurs do not apply to waxy larkspur. Unlike consumption patterns by cattle on these other two larkspur species, waxy larkspur is sufficiently palatable in spring to pose a serious threat to grazing cattle and the risk of death losses is particularly high because of the very high concentrations of alkaloids in young waxy larkspur plants.

Ranchers with tall larkspurs need to be keenly aware of which larkspur species is growing in their pastures, and take precautions to limit cattle exposure to toxic larkspurs when cattle are most likely to consume the plants. Information gained from this study will be vital when assisting ranchers in making grazing management decisions to reduce livestock losses to waxy larkspur in Central Idaho.

The results of this study were published in the Society for Range Management's peer-reviewed journal "Rangelands." These results will also be shared with beef producers in Central Idaho at Winter Beef Schools, other producer education events, and published in beef industry publications. It is our

goal to help bring awareness to ranchers who graze cattle on allotments in Central Idaho in early spring in order to help reduce, and eliminate, fatal poisonings due to the consumption of waxy larkspur.

Study conducted by: USDA-ARS Poisonous Plant Research Laboratory, Logan, UT 84341. James A. Pfister, Research Rangeland Management Specialist; Daniel Cook, Research Plant Physiologist; Dale R. Gardner, Research Chemist

References:

Pfister, J.A., M.H. Ralphs, G.D. Manners, D.R. Gardner, K.W. Price, and L.F. James. 1997. *Early season grazing by cattle of tall larkspur - (Delphinium spp.) infested rangeland*. J. Range Manage. 50: 391-398.

Ralphs, M.H., B.L. Stegelmeier, L.F. James, K.E. Panter, J.A. Pfister, D.A. Gardner, and J.D. Olsen. 2010. *Poisonous Plants: Management and Control Recommendations*. Cattle Producer's Handbook, Range & Pasture Section, CL550: pgs. 550:1-5. 2nd Edition.

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