



# Don't Poison Your Cattle

► **Above:** The delphinium may be an innocuous flowering perennial in the family garden, but on the range as larkspur, it is one deadly customer.

**Grazing your cattle on untried pasture might be an opportunity to cut production costs, but before releasing your animals on unfamiliar ground, it is a good idea to look at what they will be ingesting.**

*by Ed Haag*

In the garden the delphinium is an innocuous flowering perennial, but on the range as larkspur, it is one deadly customer. Consider the following: A beef producer leases a pasture in southern Idaho and, ignorant of the consequences of grazing larkspur, he releases more than 200 animals onto the site.

"In four days he lost 54 head, including several bulls," says James Pfister, U.S. Department of Agriculture (USDA) research rangeland management specialist and an authority on toxic plants that kill livestock.

Pfister adds that the beef producer was not neophyte to the cattle business, but he was new to the area and had no knowledge of the dangers of cattle consuming larkspur. His ignorance of the plant and its effects on livestock only exacerbated the problem, Pfister recalls.

"One of the characteristics of larkspur poisoning is that it is a neuromuscular toxin that causes paralysis in the cattle," he says. "They go down, and they can't breathe. If you get them excited and move them around, you are going to make it worse."

Upon losing 20-some animals, the owner hurried to remove them from the area, Pfister continues. "They took them out of there on the run, and they killed almost 30 head more."

Unfortunately, such a misadventure is not uncommon in the western states, Pfister says. Larkspur poisoning sporadically kills from 5% to 15% of the cattle on North American mountain rangelands.

Karen Launchbaugh, associate professor of grazing management and animal behavior at the University of Idaho, believes that larkspur's toxicity in relation to livestock cannot be overemphasized.

"For cattle, tall larkspur [is the] most dangerous plant in all of North America," she says. "It kills more range animals than anything else."

Canadian livestock research shows those animals that consume as little as 0.7% of their body weight in larkspur during a one-hour period will die from the effects of methyllycaconitine, a diterpenoid alkaloid that is a powerful neuromuscular blocking agent.

Launchbaugh adds that larkspur's deceptively inviting appearance does little to discourage cattle from indulging in this deadly feast. "It is very green and leafy and has a lot of good forage value," she says. "But it has this alkaloid that is really toxic at fairly low levels."

Her work with another alkaloid-containing plant indicates that cattle are particularly susceptible in drought years when they are more likely to have low body condition scores (BCS).

"Our studies show that animals in low body condition tend to eat those poisonous plants sooner and eat more of them than those in higher condition," says Launchbaugh, adding that this presents a double hazard because cattle in low body condition have immune systems that are less equipped to respond to the toxins than cattle in higher body condition.

### Know your nemesis

Both Pfister and Launchbaugh agree that while there are numerous native plants that contain lower levels of the same alkaloid compound — lupine and vetch are only two of the more common — tall larkspur and low larkspur are by far the leading cattle killers in the western United States. These are two plants every beef producer in the West should be intimately aware of, Pfister says, noting that while they are very closely related, each one requires its own management strategy and should be viewed as separate from the other.

Tall larkspur is found growing in the Rocky Mountains, in moist draws or coulees, at snow accumulation sites and on hillsides at higher elevations. It needs some shade and a well-drained, fertile soil. The common habitat of the plant is aspen forests. Larkspur may be found in recently cleared land that has been left unbroken. At its maximum height, the hardy perennial can reach a dramatic 6 feet (ft.), sporting long stalks of deep blue flowers and the characteristic spurs of the delphinium flower group.

"Typically it is going to grow at 7,000 to 12,000 feet," Pfister says, noting that these elevations encompass a significant portion of the West's traditional summer cattle range.

## Safeguarding Animal Health



► USDA research technician Gus Warr assesses a larkspur stand.

Range researchers such as Pfister and Launchbaugh have focused much of their attention on determining at what stages the two types of larkspur are of highest risk to cattle. Pfister breaks the annual growth cycle of the tall larkspur into three stages:

- ▶ the vegetative stage, when it is producing leaf mass;
- ▶ the flowering stage, when it blooms; and
- ▶ the pod stage, when it produces the pea-like seedpods.

While toxicity is high in the vegetative stage, the danger to cattle is diminished by the fact that they seem more interested in grazing on plants other than the young larkspur.

"Even though it is toxic early on, there is usually a four- to six-week period, if other forages are available, [during which] a rancher has an opportunity to graze on tall larkspur ranges and not run into too many problems," Pfister says. As the plant matures the alkaloids concentrate in the flowers and the pods.

Once the plant enters the blooming stage, that grazing opportunity ends. "Typically, if the cattle are going to eat the plant it is going to be in the flower and pod stages," Pfister says. "We call it the toxic window because it is a four- to six-

week period when the plant is relatively toxic and the cattle will eat a lot of it."

At a 9,500-ft. elevation, tall larkspurs begin flowering about July 15-25, and finish flowering about three weeks later.

Pfister notes that the duration of the toxic window is not always the same every year. Cooler, wet weather extends that period; while hot, dry weather shortens it. The high-risk period ends when the pods mature and shatter. In mature plants, only the seeds are considered poisonous.

"Once the pod shatters, larkspur can be grazed with impunity," Pfister says.

Low larkspur, unlike its taller cousin, takes considerably less time to develop and reach maturity. It emerges in the early spring and has a tendency to bolt with the advent of warm weather. Canadian range scientists point out that the reason they consider low larkspur a danger to cattle in the spring is because it reaches a grazable height before most grasses do. The low larkspur that is found in pastures can kill livestock if the pasture is grazed too early.

Pfister notes that while the threat from low larkspur is real, it is short-lived.

"The growth cycle of low larkspur — from the time it emerges until the time the pods shatter — is about six weeks," Pfister says, adding that by July low larkspur in most locations is no longer a threat to cattle.

He notes that low larkspur, with a

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maximum height of 18 inches (in.), produces a lot less biomass than tall larkspur. "Physically there is just a lot less there for a cow to get poisoned on," Pfister says.

When assessing the risk of low larkspur poisoning, he recommends marking out a yard square in an area where the largest concentration of larkspur plants is located. "If you see five plants within that square, that is considered high density. But if you walk five or six paces before locating a single plant, that would be considered low density," Pfister says. "Typically a cow has to eat 1,000 to 2,000 low larkspur plants to be killed. If the plant density is low, then the risk is low."

### Larkspur strategies

In the research paper "Mitigating Financial and Non-financial Livestock Losses Due to Larkspur," available at [www.behave.net/ecosystem/Money/Larkspur120905.pdf](http://www.behave.net/ecosystem/Money/Larkspur120905.pdf), Pfister and his colleagues at Utah State University (USU) evaluated several strategies to control

the effects of larkspur on a cattle operation. These ranged from not changing the grazing management strategy to hiring a rider to prevent cattle from grazing on larkspur-infested areas.

In the study, the authors point out that the response to the presence of larkspur will depend directly on the effect the plant is having on a particular operation. They add that in scenarios where losses are infrequent and all alternatives involve a substantial outlay in time or money, the practical approach might be to not change practices.

For Pfister, one of the most practical approaches dealing with larkspur is to heed the growth cycle of the larkspur and graze cattle in known larkspur areas before and after the toxic window. He notes this might involve a task as simple as changing the grazing schedule to reduce the likelihood of cattle coming in contact with larkspur when the risk is greatest.

When developing a grazing schedule

around the toxic window, remember that tall and low larkspur flower at different times of the year and as a result have totally different periods of high risk. The toxic window for low larkspur is around the last two weeks of May through the first two weeks of June. With tall larkspur, it is usually from the last two weeks in July through August.

One of the more interesting strategies to prevent cattle from eating larkspur is the use of aversive conditioning. Developed by Mike Ralphs, USDA rangeland scientist, it involves feeding a cow up to 20 bites of fresh larkspur then dosing it with lithium chloride (LiCl; 200 mg/kg body weight; 3.1 oz. for a 1,000-lb. cow) through a stomach tube. It has been found that the cow associates the taste of the larkspur with the illness induced by LiCl. This has proved to be an effective deterrent provided that the animal is not reintroduced to larkspur consumption by animals that have not received the aversion treatment.

To Pfister, how larkspur is distributed will often dictate the measures used to control it. "Sometimes it is found in dense clumps, which usually make it easier to manage," he says. "If it isn't widely distributed, herbicide might prove cost-effective."

Even in government forest allotments, where spraying native plants with herbicide is sometimes discouraged, the option of using riders to separate the cattle from the larkspur can be a practical option when the plants are concentrated into well-defined areas, Pfister says.

### Responding to larkspur poisoning

As Launchbaugh points out, the toxic alkaloids in larkspur affect cattle by inhibiting nerve impulses at the junction of the nerves and muscles, causing muscle paralysis.

Some of the symptoms of larkspur poisoning are constipation, bloating, muscle weakness, staggering and inability to stand. Later stages include respiratory failure and death. An affected animal should be kept quiet, with its head elevated, and it should not be moved because stress will exacerbate the situation. A veterinarian should be called immediately.

Ranchers grazing their cattle in isolated areas that are known to have larkspur should consult with their herd veterinarian and establish a treatment contingency plan.

Pfister notes that animals that are poisoned and recover have no residual toxins after a couple of days and are safe to send to harvest.



► Tall larkspur kills more cattle than any other North American plant.

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