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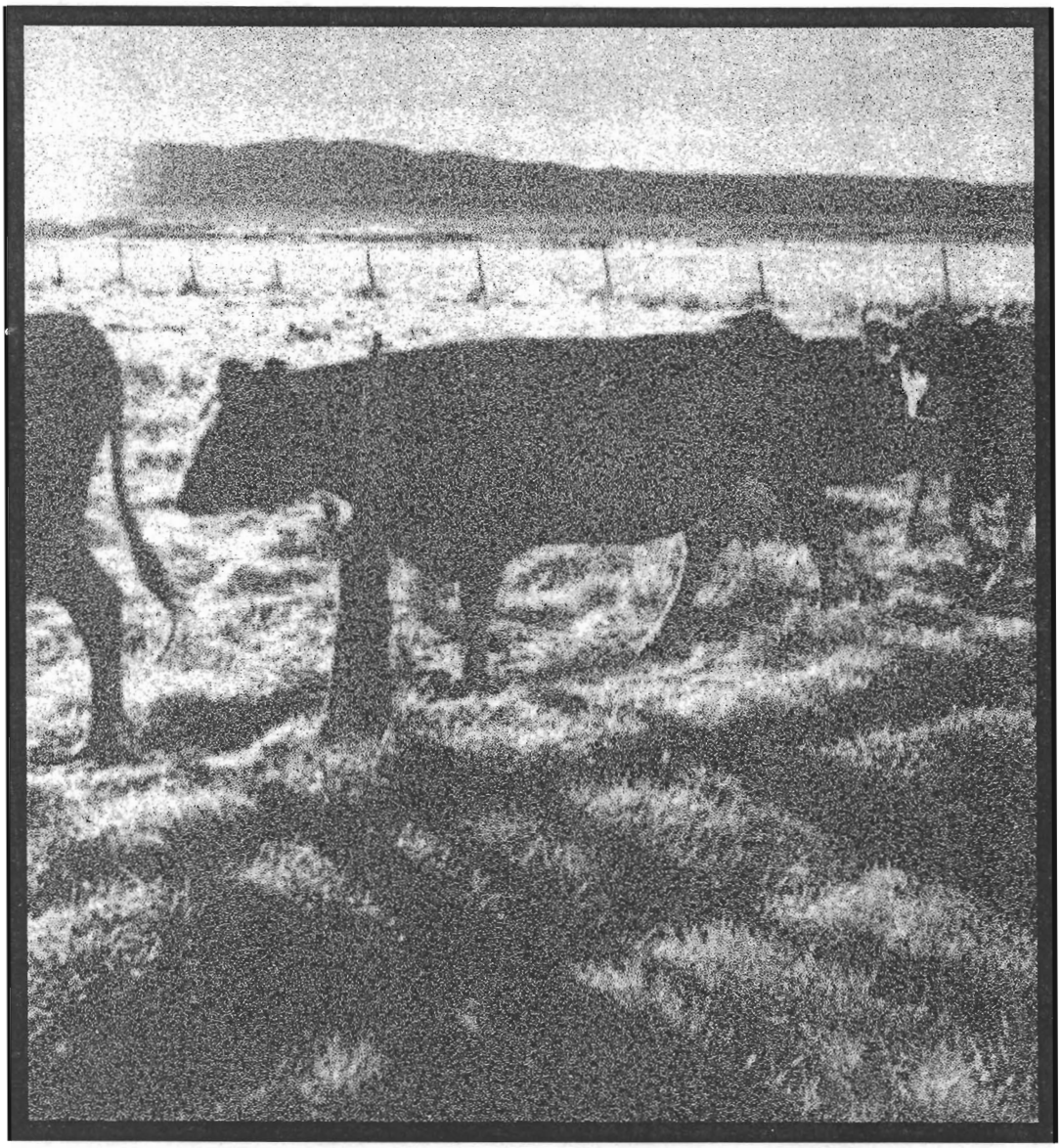

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Livestock Droppings Aid Rangeland Biodiversity

Some see just a cow pat. Others view it as evidence of a mobile range revegetation system.

Seeds in the droppings of domestic livestock are used to revegetate rangelands in many regions of the world, and they can serve the same purpose in the Intermountain West, according to USU range scientist Chris Call.

"We usually worry about domestic livestock spreading weeds, but there's no reason they can't spread seeds of desirable plants," Call says. Revegetation through livestock droppings is a "less intrusive method of revegetation" than chemical and mechanical treatments, establishing small "satellite" areas that increase rangeland biodiversity.

The method is widely studied on rangelands in Australia. Here, however, critics of grazing often view cattle as sources of damage, not as depositors of desirable grasses and forbs.

Call's research focuses on the spread of cool-season perennial grasses.

Moderate Chewing Leaves Seeds Intact

Cattle are the best domestic livestock for revegetation via droppings. They chew a moderate amount and food passes quickly through the digestive tract, leaving many seeds intact. "Nearly everything passes through in 24 to 48 hours," Call says. In one study, nearly 20 percent of the seeds of Hycrest, a variety of crested wheatgrass, passed through the digestive system intact, of which nearly half germinated.

The "system" can be managed to enhance germination rates.

"If a seed is sensitive to conditions in the digestive tract, increasing the quality of the diet might increase the rate of passage, and improve germination. On the other hand, feeding a lower quality diet could slow the rate of passage and weaken tough seed coats to improve germination," Call says.

Bison droppings are similar to those of cattle, and the tactic might help the bison herd on Antelope Island improve rangelands.

Droppings Favor Germination

Once through the digestive system, the "microenvironment" of dung offers favorable conditions for seed germination, according to Call, who has studied the changes in moisture content, temperature and nutrients in cow pats.

"Cattle dung is a more favorable environment for seed germination, and allows germination over a longer period of time than does soil," Call says. Although crusts form on pats, they usually don't significantly impede the emergence of seedlings.

The attrition of seedlings is high, but those that do survive tend to persist and set seed. "Seventy seedlings might emerge over a 6-week period, but only three or five plants survive on the periphery of the dung. Those that do survive are usually larger and more productive than those drilled in soil."

The "suppressive ability" of cow dung is also an attribute. Although it can smother cheatgrass long enough for crested wheatgrass seeds to germinate, cheatgrass roots subsequently extracted most of the

moisture under the pat. However, cow pats suppressed squirreltail, a perennial plant often found on degraded rangelands, thus aiding the establishment of crested wheatgrass.

Another question is the number and types of seeds to provide per feeding.

About 60,000 Hycrest seeds seems to be about right for cattle, which isn't a huge amount since there are about 200,000 seeds per pound. Common yarrow, a forb, contains almost 3 million seeds per pound. Bitterbrush seeds contained a secondary compound that upset cows' digestive systems.

Introduce Forbs and Shrubs

"In the longer term, this method can change the composition of rangelands, perhaps by introducing forbs and shrubs in areas dominated by grasses," Call says. The revegetation method is likely to be particularly useful in pastoral economies. Most of Call's studies have involved a few animals, but he plans to work on pasture-scale studies.

Although sheep can utilize (and revegetate) rough terrain, their chewing tends to harm larger grass seeds. Moreover, their droppings dry out too quickly and aren't large enough to suppress competing vegetation. They can successfully disperse annual legumes, whose hard seed coats can survive chewing and digestion, and are often used for this purpose in the Middle East.

Horses also tend to chew food too thoroughly, thereby reducing the viability of seeds of cool-season perennials. Still, it might be possible to establish feeding stations so feral horses can ingest and disperse other types of seed.

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MORE INFO

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