# TECHNICAL NOTES

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## GRAZING HABITS OF LIVESTOCK

Livestock graze cafeteria style. They select the best smelling and tastiest forage, season by season. That fact accounts for a great deal of their behavior.

A thorough knowledge of the grazing habits of animals is essential if the ranchman is to set up a successful forage management program. And the right kind of range management is a necessity if our national livestock appetite is to be satisfied permanently. We need to learn everything we can about animals' harvesting and digestive apparatus.

Fortunately, grazing animals are not as frivolous in selecting their diet as civilized man; they haven't developed a craving for faddish foods. Nor have they gone in for bon-bon or delicatessen styles in eating. When they can get it, they prefer palatable, nourishing forage that provides a balanced diet of proteins, carbohydrates, and minerals. Green grasses, cereal grains and legumes -- the most desirable forage plants -- make up the greater part of livestock diet when available. The key to continuous growth and good fleshing of animals is keeping before them an adequate and varied bill-of-fare of green forage, year-round, if possible. As it is, far too many of the nation's livestock are on a growing and fattening ration only four to six months of the year. The other six to eight months they are on a maintenance or starvation ration. Any

forage shortage thwarts livestock in exercising their inborn ability to roam over the range, selecting a palatable, nourishing diet. Sometime in 1950, workers at the Oklahoma Agricultural Experiment Station found out that the preference of cattle for certain areas of a pasture may be due almost entirely to the high sugar content of the grass on those areas. Subsequent experiments showed that it was the sweetness that attracted the cattle, rather than the food value of the sugar, because forage sprayed with saccharine and other non-sugar sweeteners attracted the cattle as much as did the sugar sprayed forage. These experiments show what the attractant in good forage is. They also demonstrate a technique for getting cattle to eat forages they otherwise pass up, by spraying such areas with diluted molasses. This, however, does not change the fact that cattle, when they can get it, prefer palatable, nourishing forage, and when it is there, they will select it. The quoted experiment explains why stock will select the best smelling, tastiest, and most nutritious forage as the seasons advance.

In the harvesting and masticating of forage, the lips, the bars, the teeth, and the tongue of the livestock play a role that is not only interesting, but explains some of the grazing characteristics and habits of the different classes of livestock. There are several references that contain this information. Practical Grassland Management, by B.W. Allred, is one such reference.

## SIZE AND HOLDING CAPACITY OF DIGESTIVE TRACT

The mouth of a grown cow has a cutting swath of two and one-half to three inches. She harvests from 90 to 150 pounds of green weight forage per day, depending on the lushness and availability of the forage. She usually takes 50 to 70, and occasionally up to 90, bites per minute. While grazing, the cow is working pretty hard. A cow is able to graze within one-half inch of the ground. In San Diego County, some of the men have been able to develop a breed that seems to be able to graze a half inch below the ground.

The alimentary system of livestock has a remarkable holding capacity. It averages for cows 260 quarts, horses 196 quarts, and sheep 26 quarts. According to Morrison's Feeds and Feeding, the horse may secrete around 90 pounds of saliva in a day. Saliva and other digestive juices are largely water. Water makes up a large part of the animal's body; large amounts are needed for body functions. The average daily water requirements of grazing animals are: horses, 10 to 15 gallons; cows, 10 to 15 gallons; and sheep, 1 to 2 gallons. When animals are taken off water, they shrink quickly. At Cheyenne, Oklahoma, in one experiment, yearling steers lost 40 pounds from 5:00 p.m. September 15 to 7:00 a.m. September 16. This was just 14 hours, or over night.

Horses partially chew their food as they gather a mouthful; hence, they eat only 1/3 to 1/2 as fast as cattle. Horses digest roughage almost as well as cattle. Their stomachs are small, but the blind gut of the horse substitutes admirably well for the four stomachs of the cow.

Most authorities seem to agree that under normal conditions, cattle graze about 8 hours, chew the cud about 8 hours, and rest about 8 hours. Australian authorities say: "If the grass is long and coarse, or two short, or a poor stand, the amount grazed by the cow is very much reduced, because the cow does not graze any longer than the eight hours. Cows do not graze for longer periods of sparse pasture than on good pasture. They travel farther for their feed, they eat less food, and lose condition." Down in San Diego County, the feed has been so sparse for so long that the ranchers have had to develop a breed that trots while it grazes in order to get in a productive "eight-hour day."

In an ARS experiment with individually-penned steers, it was found that the steers ate an average of 12 times, and spent four and one-half hours of the 24 at feedbunks. About 75% of the feeding was done during day-light hours. The animals ate day and night, however, for at least 10 minutes of each three-hour period. The researchers say that the feeding habits of these individually-penned steers are similar to those observed in tests with pasture animals.

The penned animals spent an average of four hours eating a grain rotation, and five hours on a high-roughage diet. They required two hours longer to eat a given amount of ground feed (five and one-half hours) than when feed was pelleted (three and one-half hours). The fact that steers like to eat around the clock helps explain why animals fed frequently usually out-gain those fed only once or twice a day. Some cattlemen recognize this by never letting feedbunks become empty.

## THE 24-HOUR COW CLOCK

Dr. Don D. Dwyer, of Oklahoma State University, made an interesting study a couple of years ago. He studied 20 randomly-selected cows in a 210 head herd of Herefords on the K. S. Adams Ranch in the Osage Hills of Oklahoma. Dr. Dwyer spent several days clocking the activities of these cows for the entire 24-hour day. Detailed information on this study is in the OSU Bulletin B-588. I want to quote some rather interesting excerpts from this study:

> "Just before the summer sun breaks over the horizon at 4:40 a.m., the long 'cow day' gets under way. On the range, mother cow gets up, stretches, chews her cud for five to ten minutes, and then grazes contentedly until her calf awakens. When the calf gets up, it nurses for about ten minutes. Then, the 15-hour cow day gets into full swing by 5:15 in the morning.
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> "After nursing, calves remain near their mothers as they graze toward water. During this three-hour stretch, hardly anything bothers the cows. The herd usually arrives at water by 8 o'clock for a brief drink. Then, they graze away from water with their calves for about 30 minutes, then rest, ruminate, and lie for an hour. Cows then resume grazing for about two hours until 11 o'clock, again in the direction of water. After a short rest near water, calves get 'dinner' at high noon for their second nursing.

"Cattle usually spend the first four to five hours of the afternoon in or near the water, keeping cool. Cows drink very little water during this time. Much of this midday rest is spent ruminating, resting, and keeping cool. Grazing time during the day is directly affected by temperature. With every increase of one degree F. in average daily temperature, cows spend 8 minutes less grazing. Cows normally graze 8.7 hours a day during cool days. They graze about two hours less on the hot days. Cows tend to graze broadside to the wind about 70 per cent of the time, so that more of their bodies are exposed to the breeze. Cattle normally arrive at water when temperature approaches 85 degrees, and leave when it drops below this point. The hotter the morning, the earlier the cows arrive at the pond, and the longer they stay during hot afternoons. When the average daily temperature is 87.5 degrees, cattle stay near water for nearly ten hours. When the temperature averages around 70 degrees, cattle stay less than one-half hour at water.

"Hot weather habits of cattle probably explain the decrease in gains or even losses in weight during July and August. On extremely hot days, cows are so occupied trying to keep comfortable, that grazing is curtailed.

"Keeping cows cool, comfortable, and undisturbed is one of the key factors in getting good range gains. When it comes to disruptions, bulls cause a lot of trouble. During the breeding season, bulls graze much less than cows and travel almost twice as far. Bulls often disrupt the herd during rest, and travel a great deal at night.

"By 4 or 5 o'clock in the afternoon, or as the day cools, cows leave water and search out their calves so they can nurse for the third time. Then, both cows and claves graze very intently toward the bedding grounds. This is the second of two intense daily grazing periods. During these morning and evening grazing periods, cows take several bites of forage between each step. During other grazing periods, cows may walk several steps between bites, and are easily disturbed.

"While grazing, cows rub on almost any protruding object. Cattle often get on their knees and rub their necks on objects that protrude as little as 18 inches. Bulls are especially destructive to gully walls as they rub.

"Calves, much like children, play together in small groups during early evening hours. As they grow older, they acquire the habits of their mothers - graze more and play less.

"Calves may stray from their mothers following the afternoon nursing, but by 6:00 or 6:30 p.m., cows try to have their calves with them. A cow without her calf continues to graze, but looks up nervously and calls frequently until the calf comes to her. Very young calves may nurse for the fourth and final time when they reach the cow. As calves grow older, they often wait to nurse until the herd arrives at the bedding grounds. When calves are four months old, they postpone this final nursing until midnight.

"If cows do not reach the bedding area by dark, they start walking in single file the remaining distance. Small groups of cattle will walk a long way to be with the herd at night. By about 9:00 p.m., most of the herd is lying down. Cows rest or alternately stand and lie until midnight when they get up to graze. Older calves nurse and also graze. This grazing period lasts about two hours, and they don't drift far from the bedding area.

"Finally, after the 'midnight snack' cows bed down again for the remainder of the cow day. During the cow day, cows travel an average of 3-3/4 miles while grazing. Most of the travel is to water or salt, from one group to another, and to the bedding grounds.

"Cows seldom go for more than 36 hours without salt, even though their average daily consumption is less than one-tenth of a pound. Normally, cows take salt when it is cool, and seldom go directly from salt to water."

## TOPOGRAPHY, SIZE, AND SHAPE OF GRAZING AREAS AND SOILS

Stock often will trail up a steep hill covered with excellent forage to graze much commoner fare on a mesa or tableland. Animals, like humans, prefer to get their food as easily as possible; it requires less effort on their part to fill their stomachs on level or gently rolling ground than on steep rocky ranges. Of course, all the level land now has been seeded to sub-divisions and shopping centers.

Livestock graze small pastures fairly evenly, but on large ranges, the problem of distribution becomes acute. Odd-shaped or triangular pastures are generally harder to manage properly than rectangular or roundish ones. On steep ranges, fences can be used to force stock to use the forage evenly.

Most domestic animals avoid wet, muddy, or boggy places, except when forced to them by feed shortages elsewhere, or driven to them to avoid insects. In wet weather they prefer sandy soils to gumbos and heavy clays. They like to graze in soil free of rocks. The feet of unshod animals are quite sensitive to rough, sharp rocks and gravel, particularly granite, chert, obsidian, quartz, quartzite, and hard and sharply fractured limestone.

It is considered good practice to run a few mature animals with young stock, because the older ones will lead the younger ones to choicer feed and provide maximum protection against predators. Older animals are less playful and steadier grazers. Young ones tend to gather in large bunches, and to roam about heedlessly. John Sarvis, of the Mandan Experiment Station, says that two-year-olds require about 30 to 40% more forage than yearlings. When animals are first put into a pasture, they may roam over the entire fenced perimeter before they settle down to grazing. It may take up to two weeks before the animals start to gain on new, that is, strange, feed, or in a strange pasture. Almost any movement of cattle brings about a loss in weight. Some animals get homesick. Corral-reared animals often will leave excellent forage to return to the home lot and starve. Animals on the open range or large pastures may homestead certain areas; they may be found within a small radius of such areas most any time. Animals that are fed supplements during the winter or critical periods tend to lounge about troughts and buildings. They will sometimes quit their grazing and trail considerable distances at the rattle of a wagon or truck.

## BREED DIFFERENCES

Herefords graze more in open formation --Angus tend to graze in groups. Polled animals tend to bunch; whereas, horned ones crowd less and maintain broken rank formation. Hindu cattle are particularly well adapted to stubtropical climates because they have far more sweat glands than English breeds. Too, their large dewlap and sheath and loose skin provide a larger body surface from which to radiate heat.

Maintenance food requirements of animals are more nearly proportional to their body surface than to live weight. This is true because animals lose most of their heat by surface radiation and conduction. Larger animals have a smaller percentage of body surface exposed than small ones. This is important because heat loss is proportional to body surface.

Thin animals graze more contentedly on good range than fat livestock. This continues true until the thin ones begin to take on flesh.

Small herds and flocks usually graze more contentedly and trail less and trample less forage than large ones.

Animals often become nocturnal grazers to avoid heat and insects. Hungry animals on short feed are apt to graze on moonlit and even dark nights. Animals worked or trailed during the day seek their forage at night, whether moonlit or dark.

Livestock fed protein supplements will eat a great deal of low quality forage such as straw and coarse grass, that otherwise would not be taken. Protein supplements are usually needed on winter ranges, dry ranges, and where grass is low in protein and phosphorus. This is a wise practice where there is plenty of grass, but care must be taken to leave enough plant residues to protect the plant and the soil. (I can't sell this concept to one of our cooperators who tells me that his father taught him that a blade of grass ungrazed is a blade wasted.)

alt, and often minerals, are essential to the diet of animals. It can be used as an aid in distributing livestock on the range. Without it and other essential minerals, animals may trail about seeking the mineral nutrients they lack. They may lose weight, and often they wear deeply rutted trails while roaming around.

## WATER

The location of water -- whether it is close by or distant -- causes livestock to select forage differently. Stock get hungry after traveling long distances to water. When this happens they show little discrimination in the forage they eat, some of which may be low grade or even poisonous. Animals tend to trail to water instead of grazing to water where supplies are too far apart.

Spacing as close as one-quarter mile apart is extremely convenient for the animals; but on many of our ranges, returns for investment will not justify such extensive water developments. Expenses vary according to needs and conditions. Some authorities claim that $5.00 per animal unit served is a reasonable expenditure. Others believe that expenses for water development are not justified on ranges where potential grazing capacity is less than five to six animal units per section year long. Each individual operator must set up his own criteria to suit his conditions.

Cattle when grazing on our brushy ranges will eat a wide variety of brush grass and forbs. Not too long ago, I spent a day riding with a cooperator. The cattle were grazing the bottom and slopes of a swale that had oak trees and grasses in the bottom, along with weeds. On the sides of the swale, there was some grass, quite a few forbs, and a lot of brush. This was in the late spring. During the morning, as the cattle were grazing toward water, they took a bit of almost every plant they passed. I watched one cow hook a century plant stalk with her horns, pull it down. She, another cow and their calves spent about an hour eating all the flowers on that stalk. They browsed on chamise, oak brush, buckwheat, several species of Ceanothus, and a lot of weeds. It is not my purpose to try to tell you that these plants are as palatable and nutritious as good grasses and legumes. I just want to point out the fact that cattle do eat some of these plants, and when a rancher claims his cows eat them, don't argue, because they probably do. If you are riding together, you can point out which plants the cows eat the most of. On some ranges, there is no grass.