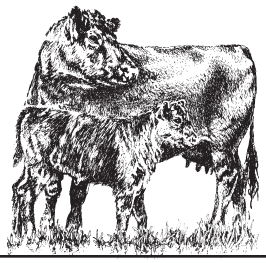

Western Beef Resource Committee *Fourth Edition*

Cattle Producer's Handbook

Range and Pasture Section 596

Pasture Management and Problems While Grazing

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Forage crops provide 54 percent of the feed consumed by livestock in the United States. Pastures furnish 36 percent, harvested forages contribute 18 percent, and the balance of livestock feed is obtained from concentrate feed including grain and protein supplements.

As expected, the importance of each kind of feed varies with the type of livestock. Sheep and goats obtain greater than 80 percent of their nutrition from forage, while 73 percent of beef cattle nutrition is from forages. Forages make up the majority of a horses' diet. Lengthening the grazing season by using practices such as stockpiling forage or planting forage annuals to expand the grazing season can greatly reduce production costs for a wide variety of livestock species. To be profitable, producers have an increased dependency on forages, grazing, and pastures.

Pastures can be a useful source of forage on property that is unsuitable for other crops. The amount of pasture needed depends on pasture quality, animal size and type, season, and species of forage in the pasture. Early spring growth from half of 1 acre may be adequate to feed young heifers, dry cows, low milk producers, or beef stockers. July and August heat may depress forage growth to a level where 50 percent more acreage is needed to feed the same animal.

The ideal rotational grazing system consists of 1 to 2 days of grazing with 20 to 30 days of rest for each field or paddock. This requires 16 to 20 paddocks and will provide high-quality pasture needed by growing animals and dairy cows. Ideally, intensive grazing closely resembles the harvesting of hay and is close to ideal for forage plant physiology.

A less intensive grazing system consists of 5 to 10 days of grazing with the same 20- to 30-day rest period for the paddock. This less intensive system will not maximize paddock production but will lower the management level and provide adequate quality forage for beef cows, dry cows, and stocker cattle.

It is recommended to not graze below the 3-inch level at any time during the growing season. It should be noted that the plant physiology calendar year starts in the fall (September in the Pacific Northwest). Any stress or overgrazing that occurs at this time of year will be detrimental to the following year's production. It is recommended for phosphorus and sulfur levels to be checked via soil sampling in August and fertilizing, if needed, to be accomplished in early September.

The second critical time in plant physiology to be considered during grazing management is when the average high air temperature (subtract the 24-hour minimum from the 24-hour maximum) becomes 43°F each spring. At approximately 43°F the grasses and other forages activate or wake up from winter dormancy. From this point until the forage population or sward reaches and exceeds approximately 10 inches in height, grazing should be either prohibited or at least limited.

When managing grazing, care must be taken to not overgraze. A forage plant grows logarithmically, or doubles in height every 2 weeks. Physiologically, it takes a forage plant an equal number of rest days to grow from 2 inches to 4 inches in height as it does for the same plant to grow from 4 inches to 8 inches in height.

Belated removal of animals from a paddock in an intensively managed grazing system is a major obstacle and will cause the system to fail. Animal removal at a 4- to 6-inch forage height speeds paddock rest rotation, decreases animal parasite load, increases forage quantity, and greatly increases quality.

Problems Encountered When Grazing

One major difficulty with pasture grazing of animals is inconsistency of forage quality and quantity. Early spring growth is much lower in dry matter content. This can prevent high producing animals from consuming enough nutrients for maximum production. Variation in pasture dry matter, fiber, nutrients, and palatability throughout the growing season contributes to lower animal gains or milk production when compared to concentrate ration-fed animals. Many of the inconsistencies can be minimized by managed grazing systems. Allowing forages to achieve slightly greater maturity in the spring before grazing helps eliminate forage quality inconsistencies as does the use of a rotational grazing system. The net cost of gains and milk production is less when grazing is included as an integral part of the management plan.

Poisonous weeds or other plants that can cause metabolic disturbances or death in animals are also major concerns with grazing (see fact sheets 542 and 550). Some plants such as wild onion, penny cress, bitterweed, and cocklebur can change the flavor of milk produced by dairy animals. Following are some of the most common disorders that can happen when grazing pasture forage plants.

Endophyte Toxins

Endophyte toxins are produced by a fungus that lives inside the grass plant. The relationship between grass and endophyte is symbiotic, that is, they both benefit. Although endophyte-producing fungi do not harm grass, they produce toxins that are harmful to livestock. Since endophyte does not affect the appearance of the grass plant, its presence can only be detected by laboratory analysis.

Some grass varieties grown for turf seed have high levels of endophyte toxin. With endophyte present a grass plant may have increased growth, increased drought tolerance, and some insect resistance.

Endophyte-infected plants are only produced through endophyte-infected seed. Seed transmits endophyte fungus, and its entire life cycle takes place inside plant tissues. A plant does not infect neighbor plants. A stand of non-infected grass plants will remain non-infected unless overseeded with infected seed. If overseeded with infected seed only the new plants will be infected. A stand of infected grass cannot be cured with applications of fungicide.

The species of endophyte that infect tall fescue and perennial ryegrass are different. They produce different toxins. *Acremonium coenophialum* produces the toxin ergovaline and primarily infects tall fescue grass. *Acremonium lolii* produces the toxin lolitrem B and primarily infects perennial ryegrass. Until recently, it was thought that the toxin ergovaline was present only in endophyte-infected tall fescue. Studies have shown that ergovaline can be present in perennial ryegrass populations.

Ryegrass Staggers

Ryegrass staggers is caused by the toxin lolitrem B, produced by endophyte *Acremomium lolii*. This disorder usually occurs in grazing animals in the late summer when the predominant ryegrass pastures are mature. Hazards increase with plant maturity and are greater in late summer and fall and when infected pastures are closely grazed. The danger of ryegrass staggers is diminished with increased plant height or growth.

Ryegrass staggers is caused by an endophytic fungus and is associated with rainy and humid weather. The condition occurs most frequently in sheep with some occasional cases in cattle and horses. Most affected animals will show no signs unless disturbed or in some way excited.

Symptoms of ryegrass staggers vary from mild tremors when animals are at rest to severe incoordination and falling when animals are moved or excited. Death from ryegrass staggers is rare; however, affected animals may injure themselves by falling or become unable to rise or stay standing and may starve as a result. Removal of the animals from the pasture and/or changing the feed will allow recovery.

Fescue Toxicity

This condition is commonly called "summer slump." It is more frequent and is more severe during hot weather. Fescue toxicity in animals is caused by ingestion of the toxin ergovaline produced by the fungal endophyte *Acremonium coenophialum*. This endophyte can grow in several species of grass but primarily in tall fescue. This toxicity is characterized by reduced gains, reduced conception rates, intolerance to heat, rough hair coat, fever, rapid breathing, and nervousness.

A forage legume such as birdsfoot trefoil, or red or white clover, seeded with tall fescue, will substantially reduce the adverse effects of this disease by diluting the intake level.

The method of transmitting the endophyte is through infected seed. Certified endophyte free seed and less susceptible varieties are now available and should be used anytime pasture is being seeded.

Fescue Foot

Fescue foot is another condition occasionally seen in cattle grazing tall fescue pastures and is more apparent in cool or cold seasons. Elevated levels of the toxin ergovaline produced by the endophyte *Acremonium coenophialum* cause this condition when ingested. Early signs, which occur 5 to 15 days after turning animals into a new pasture, include rough hair coat, soreness in one or both hind limbs, arching of the back, and mild to severe diarrhea.

In acute cases reddening and swelling of the hooves will occur and can lead to dry gangrene and damage

severe enough that the foot will slough. Severely affected animals appear thin and may go off feed. Removal of affected animals from the pasture will usually allow complete recovery unless hoof damage has become too severe.

There is no treatment for fescue foot so prevention must be the goal. Preventative measures include mixing forage populations in pastures of fescue and legumes, rotational grazing (keeping the grass in a vegetative stage), avoiding excessive nitrogen applications, and providing sources of nutrition in addition to fescue in affected pastures.

Another preventative measure that has been successful includes clipping the pasture once or twice during the season and grazing fall regrowth before excessively cold weather sets in. Care to plant only certified clean seed when establishing pastures is also an effective prevention method.

Ergotism

This is a condition caused by the growth of a mold that produces a toxin. The ergot mold primarily infects rye and some other small grain crops. Some forage grass species including bromegrass, bluegrass, and ryegrass can also be infected with the same mold. Seeds form a distinctive dark purple to black mass when infected with this mold. If ergot is suspected to be a problem, the feed should be evaluated to determine if it is present (see fact sheet 632).

Two separate syndromes have been identified. Gangrenous ergotism, the most common form, is a chronic condition affecting cattle and occasionally swine. Signs of this form of ergotism can be analogous to those of fescue toxicity. It is characterized by lameness, swelling around the fetlocks, pain, and eventual loss of hooves caused by dry gangrene. If severe, ears and tails can also be lost to dry gangrene.

The nervous form of ergotism, although relatively rare, usually begins with diarrhea followed by convulsions, aggressiveness, stupor, and eventually paralysis of the respiratory center. There is no effective treatment except animal removal from the offending feed source. Prevention can be best accomplished by clipping potential problem pastures to prevent development of seed heads. The mold primarily affects the seed heads.

Grass Tetany (Hypomagnesemia)

This condition is also commonly known as grass staggers, wheat pasture poisoning, or lactation tetany and can be seen in lactating dairy animals, beef cattle, stockers, dry cows, and ewes being fed on lush, rapidly growing pastures. Also it may be seen during grain regrowth while grazing small grain stubble or anytime lush, rapid-growth pasture conditions exist. Under some circumstances it may also be seen while feeding grass hay. The causative factor in grass tetany is a deficiency of magnesium in the diet (see fact sheet 627).

Animals that may already be slightly magnesium-deficient because of lactation are the most susceptible. Rapidly growing grasses tend to be deficient in magnesium. Forage legumes like alfalfa and clovers tend to have higher magnesium content and can help prevent this deficiency if they make up a percentage of the forage population.

Affected animals become restless, separate themselves from the herd or flock, stop grazing, may suddenly run for no apparent reason, have third eyelid flickers, and may become abnormally aggressive. Walking is characterized by a high-stepping gait in the forelimbs. The legs may become stiff and the animal may fall when moved or excited. The chronic form of grass tetany is characterized by abundant salivation, mild to severe tremors, flinching or jerking of the head and neck, and more aggressive behavior than normal.

Death loss can approach 100 percent if treatment is not received. The condition follows a rapid course, with 2 to 6 hours between onset and death. Treatment with magnesium salts and calcium salts provides short-term recovery. Additional magnesium and calcium treatments along with magnesium trace mineral supplementation or forages high in magnesium will likely be necessary to ensure permanent recovery of the affected animals.

Prevention may be easily obtained with trace mineral supplementation containing high levels of magnesium. Supplements, especially granulated, containing higher levels of magnesium can significantly reduce or eliminate this problem if used whenever a rapidly growing grass grazing situation occurs. Supplementation of magnesium by addition to livestock drinking water can be effective, however, this form of supplementation has been known to decrease water consumption due to palatability problems with magnesium.

Nitrate Poisoning

This condition occurs in animals grazing or consuming hays, pasture grasses, or weeds that have accumulated high levels of nitrates during growth. Nitrates accumulate in plants when excessive rates of nitrogen fertilizers or effluents have been applied, or when plants have been under environmental stress, such as drought. Nitrate levels tend to be higher in the lower one-third of plants, and to increase or accumulate levels at night and on cloudy overcast days.

Ruminants such as cattle, sheep, and goats are most susceptible with horses rarely being affected. Bacteria in the rumen of cattle and sheep, and the cecum of the horse, convert consumed nitrate into nitrite, which in turn causes the toxicity. For this reason nitrate poisoning rarely bothers pigs and poultry.

Some species of plants are known nitrate accumulators. Johnson grass, sorghum, sudangrass, Russian thistle, puncture vine pigweed, sweetclover, bromegrass,

orchardgrass, lambsquarters, oat hay, turnips, rape, barley, triticale, wheat, and corn are some of the more common nitrate accumulators. The ensiling of forages suspected to have elevated nitrate levels reduces the chance for problems. It must be remembered, however, that stored high nitrate hay continues to be dangerous, as the nitrates do not reduce over time.

Low levels of elevated nitrates may cause abortions without any other symptoms. Severely affected animals develop muscle tremors, lose coordination, and become weak. Moving these animals will initiate difficulty breathing, which is commonly followed by collapse and death.

Nitrate poisoning can be confused with prussic acid poisoning but is distinguished by a marked difference in blood color of affected animals. Animals with nitrate poisoning will have a chocolate brown blood color. In prussic acid poisoning, the blood color is bright red. Treatment by your veterinarian can be effective if initiated early.

Routine forage testing is considered the best management tool in nitrate poisoning prevention. Mixing affected forages with normal forages will dilute nitrate levels. Other preventions to this problem are raising the cutting bar 10 inches to avoid the lower part of the forage plant while making hay and not cutting drought-stressed forages for several days after a rain. Also, nitrates may be present at high levels in water (see fact sheet 355).

Prussic Acid Poisoning

Prussic acid poisoning is caused by hydracyanide that is naturally produced in several species of plants under certain environmental and growing conditions. All species of farm animals can be affected with this acute poisoning. The plants most commonly associated with prussic acid poisoning include Johnson grass, sudangrass, common sorghum, arrowgrass, black cherry, choke cherry, pin cherry, and flax. Johnson grass is the most toxic of the sorghums and commonly causes poisonings when frosted or when under drought conditions. Frost damage can cause prussic acid poisoning while grazing many of these plant species.

Very young, rapidly growing plants have a higher likelihood of causing prussic acid poisoning. Feeding or grazing of these forages should be delayed until they have matured. Feeding forages after heavy nitrogen fertilization, plant injury by trampling, or stunting of plant growth due to adverse weather should be avoided.

If large amounts of forage containing prussic acid are consumed, death may occur within a few minutes. Excessive salivation, difficulty breathing, muscle tremors, and a rapid heart rate all signal the onset of prussic acid poisoning. Shortly after these symptoms are seen the animals may go down and death will likely occur due to respiratory paralysis. Animals that live 1 to 2 hours after the onset of these signs will usually recover.

Prussic acid is water based, volatile, and disappears quickly with drying so little danger is presented by feeding well-cured hay. Forage with prussic acid issues should be allowed to completely freeze and dry cure in the field before animals are allowed to do any grazing. Ensiling affected forages will not make the feed safe because prussic acid dissipates by drying through volatility. The following prevention measures will best control the problem

- Do not graze pastures that are less than 18 to 24 inches tall or green chop plants over 18 inches tall for at least 3 days after a killing frost.
- Do not green chop plants less than 18 inches tall for 3 weeks after a killing frost.
- Feed grain before allowing animals to graze fields that may be high in prussic acid.
- Do not feed tree trimmings.

Pasture Bloat

This condition is most often associated with consumption of young growing legumes in the pre-bloom stage of development. Alfalfa or clover pasture is commonly involved. Animals in early stages of bloat will show signs of abdominal pain that includes restlessness and kicking at the belly. The left side of the animal will usually appear distended and swollen.

In advanced cases severe distension of the abdominal cavity will be seen. Animals with severe bloat will often exhibit difficult open-mouth breathing and in many cases will go down. The first indication of an existing problem can often be the discovery of one or more dead animals in the pasture.

There are several different types of bloat. Pasture bloat is most often a frothy type and cannot be relieved by the passage of a stomach tube alone. Bland oils (such as mineral oil), detergents, and/or special chemicals such as poloxalene are usually required to free the gas from the rumen.

Prevention of pasture bloat includes pre-feeding hay or other dry feed before turning animals into legume pasture. Pre-filling cattle and then limiting grazing time by moving animals into the pasture in late afternoon or evening usually works well. Limiting access to legume pastures until animal adaptation can occur also helps as does the mowing of the field and then allowing 1 or 2 days before pasturing. Using oils, detergents, or poloxalene (Bloatguard® or Therabloat®) for prevention is effective, but only if given the same day that the problem forage is eaten.

It is recommended that an adaptation period of about 7 days be used when feeding these products before grazing the questionable pastures. In high intensity grazing systems, pre-mowing the paddock 12 hours before grazing has shown to be highly effective in late summer where grasses have slowed and clovers often dominate some pastures. It is not clear if reducing the

moisture content is to be credited, or there is less selection of feed eaten because the grasses and clovers are mixed in the windrow.

Alfalfa and other legumes make some of the most productive pastures. Use of alfalfa as a grazed forage has been popular for many years in other areas of the world but has been limited here in America. The principle limiting factor is the worry about pasture bloat. Anti-bloat supplement materials in trace mineral mixes or water works well for bloat prevention. Alfalfa grazing takes careful management but is growing in popularity (see fact sheet 625).

Sweet Clover Poisoning

This poisoning occurs as a result of molds that grow in poorly managed sweet clover silage or in sweet clover hays that were put into the bale at too high moisture (above 15 to 18 percent) content. These molds cause the chemical dicoumarol to be formed. This blocks normal blood coagulation or clotting.

The signs of sweet clover poisoning include abnormal bleeding. The first signs may be bloody noses and black tarry manure. Swelling of joints, lameness, and difficult breathing can occur if heavy doses of this toxin are consumed.

Treatment consists of removal of the feed source and administration of vitamin K to restore normal blood clotting. Prevention includes avoidance of moldy feeds, specifically silage and hays containing sweet clover. Other molds can cause liver damage and problems unrelated to dicoumarol.

Acute Bovine Pulmonary Edema and Emphysema (ABPE)
Pulmonary Emphysema (Fog Fever)

This pulmonary disease, associated with the movement of adult cattle to lush green pasture, is historically referred to as "fog fever" because of the English term "foggage" (i.e., post-harvest regrowth or aftermath of hay or silage production). The disease occurs when cattle are moved from dry summer pastures or range onto lush pastures in the fall. It may also occur in the spring, when cattle are moved from dry winter ranges to lush irrigated or valley pastures. The lush pasture may be of any variety grass, alfalfa, rape, kale, and turnip tops. When seen it is frequently associated with annual forage cropping methods designed to extend grazing in the fall.

The composition of the rumen microflora is important in the development of pulmonary emphysema. A low plane of nutrition is believed to alter the rumen microflora to one that is favorable to abnormal growth of clostridial organisms. These organisms readily overproduce tryptophan and help convert it to 3-methyl-indole (3-MI) when lush pasture is encountered. When large quantities of 3-MI are absorbed into the blood stream pulmonary emphysema may result.

Symptoms include difficulty breathing, reluctance to move, and extreme weakness. Death may occur within a few hours after onset of the disease. A gradual transition from summer range to lush pasture or the continuation of hay feeding while cattle acclimate or adjust to lush pasture is advised.

Polioencephalomalacia (Polio)

Polioencephalomalacia (polio) occurs sporadically in cattle, sheep, and goats. It is characterized by the sudden onset of blindness, incoordination, excitability, and head-pressing. The cause of the disease is not completely understood, but thiamine inadequacy is associated. Favorable response to thiamine administration is diagnostic for this disease.

The reasons why thiamine deficiency should exist is not well understood, because thiamine intake or microbial thiamine conversion appears to be more than adequate in all cases. A theory that high concentrations of thiaminase enzymes from unusual plants or microflora destroy the vitamin before it can be absorbed has not been fully studied.

The treatment consists of thiamine injection for several days. Response to thiamine is varied, but if treatment is to be of benefit it must be prompt. Some animals will recover completely, but a percentage will not recover due to permanent cerebellar damage. Concentrate feeding should be decreased and high quality roughage supplied for a period of 5 days before gradual return of higher concentrate rations.

The ability to graze and change forage into a high quality protein is an outstanding natural asset of cattle. It is of benefit to the cattle as well as the environment and the producer to manage grazing.

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