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Mitigation Strategies for Bloat (wheat pasture) in winters: A Threat

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Abstract

Pasture bloat is a common digestive disorder of cattle and other ruminants. Frothy-pasture bloat is more common and is caused by entrapment of gas produced from fermentation of rapidly digestible forages such as alfalfa, clovers or wheat. The foam in the rumen prevents the escape of fermentation gases. Pasture bloat can occur in cattle fed most forage that are low in fiber and high in protein. Some producers avoid seeding pure-stands of alfalfa because of its potential to cause bloat. Instead, they use forage stands with a low proportion of alfalfa and more bloat-resistant legumes. As animals are greedy for green pasture, excess amount is injurious to the productive animals.

Key words: Bloat; wheat pasture; ruminal acidosis; ionophores

Introduction

Bloat is defined as, when gastrointestinal (GI) tract is filled with air or gas. It is a problem arises when animal grazed huge pasture leads to bloat. Wheat pasture is one of the important lush green forage available in winter season, in which excess ingestion causing bloat (Hernandez *et al*., 2014). Wheat pastures bloat sometimes called Sudden Death Syndrome (SDS) is a fatal problem, often killing the growing calves and adult animal that consume a high amount of forage. Bloat is a form of severe indigestion marked by accumulation of gas in the rumen that the animal is unable to expel (Bach *et al*., 2006).

Cattle grazing wheat pasture have the potential to gain BW exceptionally well, but excessive nitrogen intake results in increased excretion and increased greenhouse gas (GHG) emissions. Supplemental concentrates with the addition of an ionosphere given to ruminants grazing wheat is a potential practice for producers to increase nitrogen efficiency while decreasing GHG emissions. Also, it was important to recognize that rumen acidosis also occurs in intensive grazing systems.

Rumen acidosis has been associated with increased inflammatory response and laminitis. Laminitis, not only causes pain, but also compromises milk production (Bach *et al*., 2006). Reduced rumen pH is associated with an accumulation of lipopolysaccharide in the rumen due to the lysis of Gram-negative bacteria, which will elicit an inflammatory response. Moreover, Beef cattle reared under intensive conditions are equally exposed to rumen acidosis with similar consequences on laminitis as for dairy cows. These animals are typically fed rations high in non-fiber carbohydrates to promote high daily weight gains. These problems are appearing when the animal was fed on a large amount of the concentrates as a replacement of roughage in the diets. Most of the gases are eliminated by eructation or belching but the mechanism ceased off.

Bloat can be caused by:

*A condition secondary to acidosis
* Certain protienecious fodder
* Consumption rate, amount and coarseness of the roughage
* Rate of digestion of grains as a result of processing
* Enlargement of the lymph nodes between the lungs, which can compress the oesophagus or interfere with the function of the vagus nerves
* An inherited tendency for bloat

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Wheat pasture bloat is a type of frothy bloat in which gas builds up in a foam or froth above the liquid and semi liquid fraction in the rumen content and the normal eructation is inhibited.

Types of bloat

There are two types of pasture bloat. Free-gas bloat is associated with obstruction of the esophagus and is most often encountered when cattle are pastured on root crops. Frothy-pasture bloat is more common and is caused by entrapment of gas produced from fermentation of rapidly digestible forages such as alfalfa, clovers or wheat. The foam in the rumen prevents the escape of fermentation gases.

Pasture bloat – three factors

Three factors are required for the onset of pasture bloat:

* A highly digestible high-protein forage (e.g. alfalfa, clover, non-mature wheat) that results in rapid growth of rumen bacteria and gas production.
* Presence of fine plant particles that promote the formation of gas bubbles that restrict the release of gas from the rumen.
* Conditions favorable for ruminal bacteria to produce an excessive amount of bacterial slime that stabilizes the foam, further entrapping fermentation gases. Physiological factors of the animal are also important. Steers with a slower rate of liquid passing through the rumen (12-17 hours) were more prone to bloat than those where liquid passed through the rumen more quickly.

***Visual signs of bloat in ruminants**:*

Distension of the left side of the animal as the primary sign, discomfort as indicated by stomping of feet or kicking at the belly, laboured breathing, frequent urination and defecation and collapse due to distress respiration.

Wheat is a cash crop as well as good forage. Wheat pasture is a valuable source of high quality forage, typically available in late fall winter and early spring, when other forage sources are low in quality and quantity. Wheat forage provides succulent and highly nutritious forage for ruminants. It is palatable, high in protein, rich in energy and minerals and low in fiber. Because of its high moisture content, it is sometimes difficult to meet the daily dry matter needs of animal (Erkihun, and Lingerih, 2015). Making some dry, high-quality forage or grain available often improves animal performance. The crude protein (CP) content is particularly high 20-25% (on proximate basis), and sometimes above 30%. The CP component is highly soluble and available as energy to animals.

Properly computation of ration with wheat can be an effective protein supplement for livestock simultaneously grazing or eating other lower quality feedstuffs. Stage of maturity is also influences chemical composition of wheat. The major decline in chemical composition occurs by the heading stage. Cell wall components increase with advancing maturity.

Mineral content (potassium, calcium (Ca), phosphorus, and magnesium (Mg) also declines considerably with maturity (Andersen *et al*., 1994). The Ca: P ratio is often as low as 1:1.1 compared with a desired 2:1 ratio and Mg levels can be low or inadequate for animal needs. In summary, wheat pasture is high in moisture content, crude protein and digestible nutrients prior to heading. It is palatable and digestible, and has a fast rate of passage because of its low content of cell wall constituents (fiber and lignin).

High crude protein and low fiber contents in wheat pasture are associated with bloat. Cool, moist conditions also favor bloating (Andersen *et al*., 1994). Cooler than normal temperatures (especially at night) are usually associated with bloat. This may be due to higher forage intake by animals during cool weather and that plants initially are digested more rapidly while grown at lower temperatures. Cattle also tend to bloat more frequently in the morning, possibly because their biggest meal occurs at this time (Green *et al*., 2002).

Managemental practices for wheat Pasture bloat

Nutrition:

* Grazing management can reduce bloat problems as effectively as anti bloating agents. Grazing in such a way, that gradual change in forage quality and plant species to reduce of overeating.
* Livestock graze the highest quality forage at the beginning of the grazing period and a lower quality at the end. Both rate of intake and initial rate of digestion are higher from moist plants, causing more rapid initial digestion.
* Make paddock rotations mid-day or later to help minimize moisture and increase plant carbohydrate concentration.
* Chopped and cutting of fodder, rest for few hours that reduce the level of active anti nutritional factor.
* Total mixed ration that is the combination of balanced roughage and concentrate. So the ruminal micro flora and fauna maintain in the rumen vat.
* Avoid animal to graze with grasses the herbicides/ pesticides/weedicides treated field to reduce concentration of high bloating agent plants.

Figure 1: (Anonymous, 2020)

Treatment:

* Passing a stomach tube is the best treatment for gassy bloat. Once the gas has been released, the cause of the obstruction should be looked for.
* In a few cases a trochar and cannula punched through the side into the rumen will relieve gassy bloat when a stomach tube has not worked. But such cases are rare, and as the trochar provides a tremendous opportunity for introduction of infection, it should only be used as a last resort.
* For frothy bloat, antifoaming agents that disperse the foam should be given by stomach tube. Old fashioned remedies such as linseed oil and turpentine are effective but newer treatments such as dimethicone or polaxolene are easier to give as the effective dose is much smaller.
* If an outbreak of frothy bloat occurs all cattle on that pasture should be removed immediately and put onto a high fiber diet (hay or straw), and any cows showing bloating signs treated with an anti-foaming agent. The pasture should not be grazed for at least ten days.

Clinical Signs:

* Distended left abdomen is the most obvious sign
* Usually associated with pain, discomfort and bellowing.
* Death can occur within 15 minutes after the development of bloat
* Gaseous bloat is usually seen in one or two animals. Frothy bloat can affect up to 25% of cases
* In some cases sudden death may be the first sign seen by the stockman, although in such cases it is likely that there will be other cattle with bloat that are still alive

Diagnosis:

* On the clinical signs described above
* History of access to lush pasture
* Passing a stomach tube will distinguish between gassy and frothy bloat. If it's gassy bloat a stomach tube passed into the rumen will allow the gas build up to escape through the tube. No such gas is seen in frothy bloat.

Prevention:

It is much more effective to prevent bloat than treat affected animals. Management and planning can significantly reduce the number of cases. To prevent frothy bloat (McArt, *et al*., 2011).

* If possible avoid using high-risk pastures at high-risk times. Pastures with a history of bloat problems or with a high clover content should not be used for cows soon after turnout.
* Stagger turnout with buffer feeding as this will allow the rumen to adapt to the new diet. In particular try and keep up fibre intakes at risk periods.

* If you have to use high-risk pastures, introduce the cattle to them slowly. In some cases restricting access to as little as ten minutes per day at the start may be necessary to prevent bloat.
* Avoid starting to graze high-risk pastures when they are wet.
* Administer anti-foaming agents daily if bloat is a severe problem. If this is the case and you can strip graze then spraying antifoaming oils (emulsified with water) onto the grass can significantly reduce labor costs.
* Remove high-risk animals. Some animals have recurrent bloat despite prevention and treatment

Feed additives:

Feed additives reduce risk but do not eliminate it. The efficacy of a number of feed additives at preventing bloat has been studied and included ionophores such as monensin and lasalocid as well as pluronic detergents, various mineral mixes and other popular but unproven remedies (Cruz and Camacho, 2014). Except for intraruminal doses of the plurorlic detergent, poloxalene, none of the additives completely prevented bloat under high-risk conditions. Inclusion of bloat-preventing additives in drinking water of grazing cattle ensures more consistent intake of the additive (Wang 2012).

Administration of oil by stomach tube has long been recommended as a treatment for bloat in cattle. Daily supplementation of corn oil at the rate of 7.5 and 15 g/kg of dry matter intake, significantly reduced bloat by limiting foam production and stability in the rumen of cattle grazing wheat pasture. However, corn oil supplementation was found to promote the formation of bacterial slime associated with bloat (Dijkstra, *et al*., 2012).

Management practices such as grazing legume pastures at later maturities, including condensed tannin-containing legumes in the pasture or the use of water soluble pluronic detergents can reduce or in some cases eliminate pasture bloat.

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