Acute Emphysema of Cattle
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Acute Bovine Pulmonary Emphysema (ABPE) occurs in most regions of the West and causes extensive economic loss on some ranches. Although losses may occur in any month of the year, the greatest incidence is from July through October, a period associated with an abrupt dietary change. ABPE may occur when cattle are moved from winter to spring pasture. More commonly it is seen when cattle are moved from scabrous, dry range conditions to meadow pastures in the months of August and September, often occurring from 4 to 12 days after the change of pastures. Mature, lactating cows are most frequently involved. Bulls, yearlings, and calves also die as a result of this disease.

Signs of the Disease
A typical case might develop something like this: The cows have been grazing a meadow pasture for 5 days. If the cows have not been differentiating observed twice a day, a dead cow may be the first indication of a problem. Careful observation of the herd may reveal from 4 to 20 animals that are breathing with some difficulty. Moderate exercise, which can occur in the process of driving sick individuals to the corral, can precipitate severe respiratory distress. These individuals will extend their necks, breathe with their mouth open, and have a rather typical grunt on expiration. For this reason, many cattlemen call this condition a "grunts" or "asthma."

Cattle afflicted with ABPE should be moved very slowly and cautiously. Exercise or excitement increases the oxygen demand, and these cattle are really hurting for lack of oxygen. Since the disease occurs following a change in diet, the character of the forage consumed or digestive processes peculiar to cattle have been the target of most investigations. Enterotoxemia, protein allergy, mold growth, noxious gases, and fermentation products from the rumen and feed have been investigated by various researchers. Current research indicates that the amino acid tryptophan and indole acetic acid precursors found in plants produce 3-methylindole, which causes lung damage and emphysema.

During lush feed conditions, large quantities of forage are consumed and the rumen becomes more acid. This mild acidosis in the rumen causes more 3-methylindole production and increases the chance for lung damage.

When cattle are fed buffering agents under research conditions, there is less rumen acidosis, less 3-methylindole is produced, and little or no lung damage occurs. Buffering compounds used orally have prevented lung damage and deaths due to ABPE when lethal doses of tryptophan were fed. Rumen buffers used include sodium bicarbonate and magnesium oxide. Research has shown that sodium mononitrate also has a beneficial effect in reducing the incidence of ABPE.

Feeding 2% of cows 6 ounces of sodium bicarbonate each day has been proposed to reduce the risk to emphysema. A question arises as to how to add this amount of baking soda into the cows each day. One scheme probably would require this treatment for 5 days after entering a lush pasture area. Sodium buffers could be mixed with palatable feed such as grain or molasses and fed to cattle daily. This would incur additional feed and labor costs, but might be practical under some ranch conditions.

Increased Incidence
Several factors appear to contribute to increased losses in the western states. These include:

- **Genetic selection.** In an attempt to produce more beef per cow per year, we have selected heavier brood cows that raise bigger calves; as a consequence, they consume a greater volume of feed. Many investigators conclude that the larger, mature cows are most susceptible.

- **Permanent damage.** Cattle that repeat the established grazing pattern annually probably experience mild lung damage without the owner being aware of illness. The following season, when exposed to similar ABPE-inciting pasture, cows that have experienced this disease previously are more susceptible and manifest more serious disease signs.

- **Improved nutrition.** As we improve feed availability by pasture seeding, irrigation, and fencing, it appears we contribute to those factors that trigger acute disease and accentuate losses.
Prevention

The specific cause of ABPE is obscure. Consider several control measures to reduce the incidence of emphysema. Each ranch setup is a bit different, so the manager, in consultation with the local veterinarian, should consider the suggestions appropriate for each particular ranch operation.

- Use supplemental feeding to minimize the abrupt nutritional shift when moving cows to meadow pastures with abundant feed. Adapt cattle gradually to inciting pasture areas: graze them on the suspected pasture for 1 hour the first day, and supplement their diet by feeding alfalfa hay as needed. Increase time of pasture use 1 hour each day for 7 days, and then leave the cows in the meadow. Continue feeding alfalfa hay during this adjustment period.

- Nutritional change and emphysema can occur in large pastures or allotments when cattle move to moist, marshy areas and consume a different variety and volume of plants. It may be advisable to disrupt this grazing pattern by periodically herding cows away from the wet areas of the new pasture.

- Particularly dangerous is a pasture containing regrowth following a light frost, when growing plants are hidden beneath mature plants that have died back. Limit the daily use of such pastures during the first week to minimize the problem. If this is impractical, or if ABPE still occurs, mow and windrow some of the green feed. On the other hand, after a heavy frost, where most grass dies back, the incidence of emphysema is decreased.

- Electric fencing may be useful in some meadows to reduce the amount of feed consumed by hungry cows.

- Consider the use of supplemental feed containing rumen buffers. Research is now in progress on amount and type of buffer. Feeding 6 ounces of sodium bicarbonate daily appears to be helpful in reducing the incidence to ABPE.

Control

- If an outbreak of ABPE occurs, carefully remove all the cattle from that field and place the visibly affected ones in dry lot. Avoid excitement of the cattle; if excited, the affected ones may die suddenly and additional cattle may begin to show signs.

- Where affected cattle can be treated without excessive excitement, several drugs may be helpful. Antihistamines, corticosteroids, and epinephrine have been used with varying degrees of success by veterinarians. Obtain veterinary assistance in confirming the suspected disease and avoiding further losses.

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