Drought: Herd Management and Vaccination Considerations

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Drought Decisions

• Weaning calves or strip and ship?
  • Calf Management

• Culling Cows?
  • Cow Management

• Don’t forget, management for next year
Calf Considerations
Bovine Respiratory Disease

• Remains the largest challenge facing the beef industry.
• Cost is $500 million+ annually
• Fresh weaned, naïve calves are the most susceptible.
Bovine Respiratory Disease
BRDC

• Viral
  • Bovine Respiratory Syncytial Virus
  • Parainfluenza 3 (PI3)
  • Adenovirus
  • BVDV
  • Infectious Bovine Rhinotracheitis (IBR)

• Bacterial
  • Pasturella multocida
  • M. Haemolytica
  • Histophilus somni
  • Mycoplasma bovis

  • Blackleg = Clostridials
How Do We Protect Calves?

Figure 1. Components of the immune system. Based on Abbas and Lichtman (2007).
WHERE ARE WE TODAY?
Branding Vaccination?

• Yes but just blackleg = No
• Colostrum antibodies have largely worn off
• Blackleg does not protect against BRD
• Vaccination program must be approached as an initial vaccine
Initial Vaccination Near Weaning

• Remember, the initial antibody response takes about 14 days to peak.
• The antibody level helps provide protection.
• Vaccinating on the day of weaning will not provide full protection until 14 days later.
• When will those calves break?
Drought: Initial Vaccination

- Immune response is not free.
- 10%-13% increase in energy requirement for every 1 degree increase in body temperature.
Drought Scenario Vaccination at Weaning

• Calves are stressed
• Calves have been nutrient restricted
• You administer a vaccine. How effective?

- Peak can be reduced
- Less pathogen challenge required to initiate more severe infections
Initial Vaccination: Type of Vaccination

Classification of vaccines

**VACCINE**
* Suspension of microorganisms that induces antibody production to protect against disease. *
* Induces immunity. *

Types of Vaccine

Whole-Agent vaccine
- whole, nonvirulent microorganism

- Inactivated (killed)
  - microorganism killed using formalin and present no risk of getting the disease.
  - e.g. rabies vaccine

- Attenuated (weakened)
  - DNA mutations have accumulated during long-term cell culture but there is a risk of getting the disease.
  - no booster shot required.
  - e.g. MMR vaccine

Subunit vaccine
- part or product of microorganism

- use adjuvants that increase effectiveness of the vaccine.
  - adjuvants are not part of the pathogen (e.g. detergent or dead non-pathogenic bacteria).
- safer than attenuated vaccines; no risk of getting the disease.
  - e.g. hepatitis B vaccine
How Do We Protect Calves?

**Figure 1.** Components of the immune system. Based on Abbas and Lichtman (2007).
Initial Vaccine

• Modified live or chemically altered is best especially in the drought condition.

• Killed products will have less of a response at first injection (requires a 2\textsuperscript{nd} injection approximately 21 days later)

• Recommend: MLV or Chemically altered for BRD pathogens + 7-, 8-, or 9-way + deworm.

• If possible, vaccinate 2 weeks prior to weaning.

• Same recommendations for calves that were vaccinated at branding; except 2 weeks prior.
Vaccination Success in Drought

Goal is to immunize!
If possible, decent feed around the time of vaccination.
Don’t forget water!

Mucosal immunity
Cow Considerations
If You are Forced to De-stock

• Middle-aged cows are typically the most “durable” through drought conditions.

• Watch the cull markets and call ahead; COVID continues to disrupt aspects of marketing.

• Good time to start preg checking.
  • Staging pregnancies can help culling decisions
  • Cows that bred up early and maintained a pregnancy are good candidates to keep
  • Gives you an idea of what to expect next year
What is fetal programming?

• ENVIRONMENTAL conditions during embryonic and fetal development which impact postnatal development and long-term health, growth, and production.
  • Environmental conditions are often conditions that we have some level of control over.
    • Nutrition
    • Shelter
    • Health
Dutch Famine: 1944

- Pregnant women received only 400-800 calories/day
- Resulted in nutrient restriction at various stages of pregnancy
- Depending on which stage of pregnancy:
  - Cardiovascular disease
  - Metabolic disorders
  - Cognitive health decline with age
Example of Fetal Programming: Uterine Capacity

(A) a Tb-in-P ‘restricted’ yearling colt with a Tb-in-Tb control colt. (B) a ‘restricted’ Tb-in-P filly (left) with a larger Tb-in-Tb control filly.

(C) A P-in-Tb ‘luxurious’ yearling (left) compared with a P-in-P control. (D) a larger ‘luxurious’ P-in-Tb filly (right) with a smaller P-in-P control filly (left).

Fetal Programming: Health

- Increased morbidity and mortality in calves born to energy restricted heifers vs. heifers on full feed (Corah et al. 1975)

- Calves from cows that were protein supplemented had reduced cases of respiratory disease in the feedlot (Mulliniks et al., 2008; Larson et al., 2009)

- Some work indicates calves born may have impaired ability to absorb colostrum (antibodies)
Inadequate Colostral Immunity

- Preweaning
  - Risk of death
  - Risk of sickness
  - ADG

- Feedlot
  - Risk of sickness
  - Risk of respiratory disease
  - ADG

Managing Drought for Next Year

• Cull to a level that allows you to keep cows in decent shape.

• If you don’t have a cow vaccine program, discuss options with your local veterinarian.

• Unfortunately, no studies relative to drought and the subsequent year’s calves, but the stage is set for challenges with colostrum production or antibody absorption in the calf.

• If you were able to get them bred this year, don’t forget you are trying to do the same next year—don’t dig a big hole.
Cows and Bulls

- Long-acting viral vaccine that includes at least IBR and BVD, and may include parainfluenza-3 virus (PI3) and bovine respiratory syncytial virus (BRSV)
- Long-acting campylobacter fetus (vibrio)/leptospirosis (lepto) vaccine
- Dewormer
- 7-way clostridial booster (optional)
- Other vaccines if necessary in your area

**NOTE:** In the fall, bred replacement heifers should be vaccinated using the same protocol as the mature cows.

Replacement Heifers (pre-breeding)

- Modified-live IBR, BVD, PI3, BRSV (initial at 2 to 3 months of age, plus booster around weaning)
- Vibrio and 5-way leptospirosis (initial and booster around weaning)
- Dewormer
- 7-way clostridial booster (optional)
- Brucellosis (optional; if administered it must be given by an accredited veterinarian and before 1 year of age)
- Other vaccines if necessary for your area
Questions?

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