L-5506
09-08

AgriLIFE EXTENSION
Texas A&M System

Biosecurity for Beef Cattle Operations

By Jason Cleere, Assistant Professor and Extension Beef Cattle Specialist
Ron Gill, Professor and Extension Livestock Specialist
Angela Dement, Extension Assistant, Veterinary Medicine
The Texas A&M System

For beef cattle, biosecurity involves a system of management practices that prevent diseases from infecting a herd. Although biosecurity is often associated with foreign animal diseases, the term also applies to common diseases that affect herds, such as blackleg and bovine viral diarrhea. Vaccines can help prevent disease, but other management practices can be even more important. By developing biosecurity protocols that protect cattle from the common diseases, producers are establishing a safety net against a possible outbreak of a foreign animal disease in the United States.

How Disease Is Spread

Disease spreads directly—from an infected animal to a susceptible animal—or indirectly, from an infected animal to an object or equipment, and then to a susceptible animal. For example, feeding a calf with a bottle that has not been properly sterilized can be a way of indirect transmission.

Disease is transmitted in seven primary ways:

- Aerosol: Disease pathogens are carried in the air on moisture droplets from sneezing or coughing.
- Direct contact: Disease pathogen contacts an open wound, saliva, blood or mucous membranes, or is passed from nose to nose, by rubbing and biting.
- Oral: Susceptible animals consume disease-causing

pathogens in contaminated feed and water or lick or chew contaminated objects.
- Reproductive: Disease pathogens are spread during mating or gestation.
- Vehicles: Contaminated objects, such as needles, trailers, trucks or clothing, transfer the disease-causing pathogen from an infected animal to a susceptible animal.
- Vector-borne: A living insect, animal or human carries the disease from an infected animal to a susceptible animal.
- Fomites: Diseases are transmitted through contaminated soil, water and food.

Immunity

Immunity allows the animal to resist a disease by preventing the pathogen's development or by counteracting the effects of its toxins. Immune animals have antibodies, which destroy a specific pathogen before it causes an illness. Immunity is natural, active or passive.

Natural immunity is provided by the body's natural defenses, such as the skin and nasal passages, which help keep disease pathogens out of the body. Some cells in the body also attack disease-causing foreign particles. Fetuses can acquire antibodies *in utero* through placental transfer.

Passive immunity comes through the transfer of antibodies from one animal to another, such as through colostrum in the mother's milk shortly after birth. Newborns must receive about 10 percent of their body weight in colostrum within the first 24 hours after birth to ensure some protection against diseases.

Active immunity is provided by protective vaccinations or by the body's fight against an infection. Both modified-live and killed vaccines cause the body to produce antibodies without actually acquiring the disease. Booster vaccinations may be necessary to maintain immunity.

Vaccinations

Total disease prevention is not possible; therefore, any ranch biosecurity plan requires a sound vaccination program that targets diseases the cattle may be exposed to.

Vaccines are only as effective as the animal's immune response; injecting cattle with vaccine does not guarantee the herd's immunity. Factors such as nutritional, shipping, social and weather stress can decrease the level of immune response. Minimizing animal stress will improve the disease protection within the herd. Handling and administering vaccines according to the manufacturer's label is important in maintaining the integrity of vaccine and providing protection against the targeted disease.

When handling and working with vaccines:
- Read the label and/or medication insert before vaccinating animals.
- Observe the expiration date and storage information.
- Keep refrigerators at the proper temperature to maintain vaccine effectiveness, usually between 36 degrees F and 46 degrees F.
- Protect vaccines from sunlight.
- Give the right vaccine to the right species. If the label indicates it is for use in swine, do not use it in cattle. This extra-label use is illegal unless done under the supervision and recommendation of a veterinarian.
- Give the proper dose in the appropriate area on the animal, using the recommended technique.
- Do not insert a used needle back into an open bottle. Always use a sterile needle.
- Use a transfer needle or a sterile needle to reconstitute modified-live vaccines.
- Use boiling water, not chemical sterilants, to disinfect syringes.
- Mix only the quantity of modified-live vaccine that will be used within 1 hour.
- Dispose of the remaining opened vaccine properly after completing the day's inoculations because the vaccine does not keep well once the bottle seal has been punctured.
- Give booster vaccinations when the label requires it.
- Keep a record of all vaccinations and treatments.
- Follow withdrawal periods.

Consult a veterinarian to ensure proper timing and implementation of a vaccination schedule. Even under ideal conditions, vaccinations are not 100 percent effective. Take extra care in handling and administering vaccines to achieve the highest possible level of immunity.

Evaluate the cost-benefit ratio of any biosecurity management practices. Do the benefits outweigh the costs? For example, if a weaned calf is worth about $550, the loss of that calf can cost the ranch $550 in lost revenue. If a vaccination routine that costs $1.50 per animal, including new needles for each, is implemented on a 40-cow herd, the total cost for this biosecurity practice may be as low as $60. If the result is one more calf, the net benefit is $490.

Procedures for Handling Incoming Cattle

Almost every ranch eventually must add new breeding animals to the operation. Some stocker or feedlot operations continuously add new cattle. These new cattle can bring disease to the ranch. Minimize this risk by:

- Defining the level of disease risk for the new cattle. For example, yearling virgin bulls from a purebred breeder with a strict health protocol may be low risk, while cows from an unknown source may be high risk.
- Isolating new animals from the rest of the herd for at least 3 weeks, and possibly at a location off the ranch
- Watching the isolated animals closely for symptoms of illness, such as elevated temperature and abnormal behavior
- Consulting a local veterinarian to determine which diseases to test quarantined animals for
- Vaccinating cattle according to ranch protocols

Limiting Unauthorized Access to Pastures and Cattle

Unauthorized visitors may introduce diseases to the ranch, increase the risk of theft and cause liability issues. To help prevent this:

- Keep doors and gates locked at all times.
- Post "No Trespassing" signs.
- Conduct random security checks and look for signs of unauthorized activity or entry.
- Maintain good perimeter fences.
- Know your neighbors and set up a crime watch program.
- Secure pesticides, fertilizers, feed and nutrients.
- Secure water sources and identify alternative sources.

General Biosecurity Practices

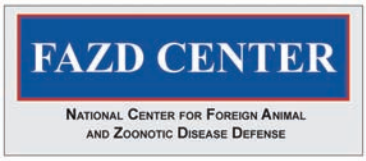
Consider these additional general management tips:

- Disinfect reusable equipment, including tattooers, implant guns, ear notchers, dehorners and castration knives, between animals. Sterilize equipment that has been used off the ranch before it is brought back to the ranch.
- Identify cattle and maintain current records.
- Watch cattle for adverse health symptoms or behavior; sudden and unexplained deaths; large numbers of sick animals; unusual ticks or maggots; blisters around an animal's nose, teats, mouth or hooves; difficulty rising and walking; a drop in milk production; and a large number of dead insects, rodents or wildlife. Contact a veterinarian immediately if these symptoms occur.
- Keep cattle away from exotic wildlife that may harbor disease.

- Develop a carcass disposal plan.
- Remove animals that are "reservoirs" for certain diseases such as Johne's, trichomoniasis or bovine viral diarrhea. These animals continue to shed the pathogen and infect other animals.
- Avoid fecal and urine contamination of feed and water sources.
- Control pest populations and limit access to feedstuffs.
- Create an emergency contact list of resource people within the community. Post copies near telephones and on bulletin boards. Have employees enter these numbers into their cell phones.

Summary

Protecting cattle from disease is cost-effective. Ranch biosecurity hinges on preventing the introduction of disease into the operation and developing adequate immunity in the herd.



Produced by AgriLife Communications, The Texas A&M System

Extension publications can be found on the Web at: http://AgriLifebookstore.org.

Visit the Texas AgriLife Extension Service at http://AgriLifeExtension.tamu.edu.

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Edward G. Smith, Director, Texas AgriLife Extension Service, The Texas A&M System.
17.5M, New