AN120

UF UNIVERSITY of FLORIDA IFAS Extension

Florida Cow-Calf Management, 2nd Edition - Maintaining a Healthy Herd[1]

Owen Rae and Allen Tyree[2]

A healthy, disease-free herd is the goal of every beef producer. A cow-calf herd health program succeeds best when producer and veterinarian work together and customize it to the needs of the herd. Local veterinarians are knowledgeable about diseases in your area and should be able to recommend some cost-effective strategies that will prevent disease and improve productivity. Your veterinarian can do more than just treat problems; together you can plan a herd health program that prevents problems.

The following requirements are essential to the success of any herd health program:

- Controlled breeding season
- Adequate handling facilities
- Adequate nutrition
- Good working relationship between producer and veterinarian
- Willingness to follow a preventive health care program once it is initiated
- Management practices that reduce stress in cattle

Contagious Diseases

Several contagious diseases can cause problems in Florida beef herds. If you have an understanding of these diseases, you will be better equipped to prevent any that might affect your herd.

Blackleg and Malignant Edema. Similar in manifestation, both diseases are part of the clostridium disease complex. The clostridial organisms that cause these diseases live in the soil and can enter a calf through wounds, ingestion, or the exposed navel cord. Clostridial bacteria are not spread directly from animal to animal; they are spread through the soil. Once these organisms enter an animal's body, the toxins they produce are rapidly fatal. Signs prior to death include depression, rapid breathing, lameness (in one or more legs) with hot, painful swelling localized in the upper leg. ***Blackleg*** usually occurs in cattle that are 6 months to 2 years of age; ***malignant edema*** can occur at an older age. The vaccine against clostridial disease is inexpensive and effective. All calves should be vaccinated at about 4

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2. Owen Rae, Associate Professor in Large Animal Clinical Sciences and Allen Tyree, County Extension Director and Agent in Hamilton County, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

months of age. Calves receiving the vaccine at less than 3 months of age should be revaccinated.

Bovine Respiratory Disease Complex. This is a clinical syndrome characterized by depression, fever, inappetence, cough, nasal discharge, labored breathing, and bronchopneumonia or fibrinous pneumonia; it is caused by a complex interaction of viruses, bacteria, and physical, psychological and environmental stress factors. Viruses associated with the condition are infectious bovine rhinotracheitis (IBR), parainfluenza type 3 (PI_3), bovine virus diarrhea (BVD), and bovine respiratory syncytial virus (BRSV). Bacteria associated with the condition include *Pasteurella hemolytica*, *Pasteurella multocida*, *Hemophilus somnus*, and several others. Stresses include weaning, commingling, shipping, heat or cold, wind, rain or snow. Some of the component viruses and bacteria of bovine respiratory disease are further discussed in the paragraphs that follow.

Infectious Bovine Rhinotracheitis (IBR). This disease is sometimes called “rednose.” The IBR virus can cause respiratory infection, abortion in cows exposed during pregnancy, and eye inflammation similar to pinkeye. All forms of IBR are preventable by vaccine, and different products offer a choice between intranasal or intramuscular administration. Modified live virus vaccines (in combination with BVD and PI_3) for intramuscular injection are the most effective, but they can cause abortion in pregnant animals. Calves should be vaccinated at least 30 days prior to weaning. Replacement heifers should be vaccinated at least 30 days prior to breeding.

Parainfluenza Type 3 (Pl_3). The PI_3 virus causes respiratory disease in cattle, and is considered a secondary factor in many shipping fever outbreaks. Vaccines are available in combination with IBR for use in immunization programs.

Bovine Virus Diarrhea (BVD). The BVD virus affects cattle by causing abortion, diarrhea, weak calves at birth, and chronic digestive disturbances. There is no effective treatment for cattle with BVD. Vaccines available are killed or modified live-virus products. Use these vaccines only after discussing them with your veterinarian.

Pasteurella Hemolytica. Often a secondary invader of the upper airway following respiratory infection caused by IBR, PI_3 or BVD viruses, this *Pasteurella* bacterium invades when an animal's defenses are weakened, causing bronchopneumonia—and potentially death. Signs include depression, inappetence, fever, cough, nasal discharge, and labored breathing. Prompt treatment is required to avoid severe outcomes.

Hemophilus Somnus. This bacterium causes an infectious disease of the central nervous system, and is also associated with bovine respiratory disease (especially in feedlot cattle). Clinical signs are similar to those observed with *Pasteurella* bronchopneumonia, except that systemic septicemia can occur as well. Veterinarians in Florida recognize that *H. somnus* can also affect reproduction. Vaccines are available; they require two doses initially and then annual boosters.

Brucellosis (Bang's disease). This disease primarily affects cattle by causing reproductive loss, such as abortion. Not all sick cows abort, however; other signs that occur more frequently include retained placenta, lowered fertility, and reduced milk production. Cows with brucellosis shed large numbers of infectious organisms at calving. Calves receiving milk from infected cows shed live organisms in their feces. The critical sources of human and animal infection are post-calving discharge, vaginal discharge, milk from infected cows, and feces from calves that consume infected milk.

There is no cure for brucellosis. Efforts are, therefore, directed at control and prevention. To test and slaughter infected animals is the only method of control available. Florida is making rapid progress toward eradication of brucellosis. Purchased breeding animals should be retested for brucellosis after 60 to 120 days of ownership. Keep these animals separated from the herd until after the retest.

Prevention is best accomplished through calfhood vaccination of heifers. Although it is permissible to vaccinate calves between the ages of 4 and 12 months, it is preferable to vaccinate between the ages of 4 and 8 months. Heifer calves must be vaccinated by an accredited veterinarian. Upon

vaccinating a calf, the veterinarian places an official tattoo and calfhood vaccination tag in its right ear and records its vaccination with the state veterinarian. Work with your veterinarian to certify your herd "brucellosis-free."

Leptospirosis (Lepto). A bacterial disease that causes abortion, stillbirth, weak calves, and death in nursing calves; two strains of lepto, *Leptospira hardjo* and *L. pomona,* are of primary concern. There are, however, at least six strains known to cause disease in cattle. Kidneys are the site of infection, and urine the main infective material. Ponds and standing bodies of water become sources of infection once they are contaminated with urine. Lepto is also spread by sexual contact. Every animal over 4 months of age should be vaccinated for all strains of lepto currently identified as harmful to cattle. Booster doses should be administered at least once a year, sometimes more frequently.

Vibriosis (Vibrio or Campylobacteriosis). A sexually transmitted disease, vibrio causes temporary infertility in the cow and, to a lesser extent, abortion of the fetus. Treatment is difficult; reinfection rates are high. Prevention is accomplished by vaccinating 30 to 90 days before the start of breeding. Once cattle are vaccinated, continue to protect your herd; take measures to prevent introduction of vibrio-infected breeding stock.

Trichomoniasis (Trich). Like vibrio, this sexually transmitted disease causes infertility, early death of the embryo, and (occasionally) abortion. Once a bull is infected, he remains infected. But cows can rid themselves of the disease through sexual rest. A vaccine is available to reduce the severity and duration of the infection in cows, but your primary tool of control is ultimately management. Avoid the introduction of infected bulls into your herd. Purchase young bulls, and test for the disease upon arrival. Annual testing of breeding bulls is advised.

Anaplasmosis. Caused by a microscopic parasite that destroys red blood cells, anaplasmosis is spread by bloodsucking animals, chiefly horse flies, mosquitoes, and ticks (referred to as *vectors* of the disease). Since it is readily transmitted through infected blood, outbreaks can be triggered by such routine herd management procedures as bleeding, dehorning, castrating, ear tagging, and vaccinating. Equipment should be cleaned and disinfected in order to minimize spread of the disease.

Signs of anaplasmosis include anemia, pale mucous membranes, dehydration, and constipation. Most cases occur in late summer or early fall, when disease vectors are abundant. The most severe cases occur in older cattle (2 to 3 years old, at least).

Oxytetracycline is the drug of choice for treating anaplasmosis. Treatment to clear the carrier animals (which can *transmit* the disease, yet exhibit no clinical signs) requires injections of oxytetracycline for 10 days, or feeding chlortetracycline daily for 60 days. As a preventive measure, you can feed low levels of chlortetracycline (.5 mg/lb body weight, daily) during the insect vector season.

A vaccine is available to control anaplasmosis. Discuss a vaccination program with your veterinarian, since special precautions might be necessary. The vaccine can protect cattle against acute attacks of anaplasmosis, but cannot eradicate the condition in carrier animals.

Johne's Disease (Paratuberculosis). This chronic infectious disease of cattle is caused by the bacterium *Mycobacterium paratuberculosis* and is transmitted through infected feces (intrauterine transmission is rare). Due to long incubation periods and very gradual deterioration, the signs of Johne's disease are usually observed only in adult animals and only in a few at a time. Observable signs are chronic, watery diarrhea, and gradual but significant weight loss. Animals become unthrifty and eventually die. Treatment is usually not attempted. Control and eradication of the disease includes culling affected animals and avoiding infection of young animals.

Pinkeye. A bacterial infection in cattle, pinkeye is characterized by inflammation and watering of the eye, painful sensitivity to light, and varying degrees of corneal damage. The common cause of pinkeye is the bacterium *Moraxella bovis.* These bacteria are generally transmitted by face flies, and often remain dormant until irritation of the eye occurs. During summer months, dust and pollen can cause trauma to the eye, increasing the risk of penetration by *M. bovis.*

It is suspected that viral agents such as IBR may also trigger outbreaks of pinkeye.

Usually, the first indication of the disease is watering of the eye. The animal might try to stay in the shade, stand with the affected side away from sunlight, repeatedly blink, or keep the eye closed. As the disease progresses, redness intensifies and a whitish opaque spot sometimes appears in the center of the eye. Left untreated, the white area will enlarge; it can rupture and ulcerate.

Pinkeye should be treated as early as possible. The early cases usually respond to a variety of antibiotic preparations, administered topically or as subconjunctival injections. It is important to place the topical medications in the eye; repeated applications are necessary. Affected eyes should be protected from irritants, which can be accomplished by cementing a patch over the eye. The patch needs to stay on for a week or two. Also, keep affected animals in a shaded area.

Intramuscular injection of the long-acting antibiotic oxytetracycline is effective against pinkeye, as well. Calves treated intramuscularly with oxytetracycline should stop shedding *M. bovis*, but antibiotic treatment is not indicated for protection against pinkeye caused by other agents (e.g., the IBR virus).

To Control Pinkeye:

- Develop a program to control face flies.
- Reduce eye irritation: Keep cattle out of dusty lots, and provide plenty of shade.
- Consult with your veterinarian to develop a treatment or control plan. All cattle herds should be vaccinated routinely for IBR; vaccinate optionally for pinkeye if the problem is persistent.
- Observe herds regularly to assure early detection; ***treat problems as they arise***.
- It is an expensive option but, if an outbreak occurs, treating all animals with antibiotics could prove necessary to clear the *M. bovis* infection, since recovered animals often become carriers.

Your ***herd health management plan*** (including a vaccination program to prevent contagious diseases) should be developed in collaboration with your veterinarian to suit the needs of your particular herd. Factors such as what time of year you work your cattle, and how often you work them, will influence the plan you develop. Figure 1 and Figure 2 illustrate two phases of a preventive health program designed for a 2,500-head commercial cow-calf operation in south Florida. (Phases shown are for adult cows, and for calves through weaning; keep in mind that breeding bulls and replacement heifers would have different schedules.)

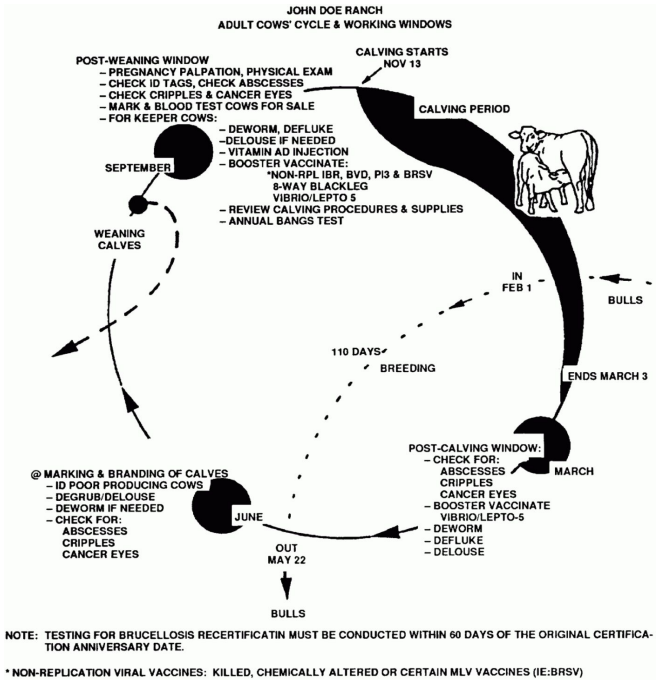


Figure 1. Example of a herd health program for adult cattle on a 2,500-head commercial cow-calf operation in south Florida. Credits: Richey, E.J. 1998. Keeping a Record of Administering Animal Health Products to Beef Cattle. University of Florida, Gainesville.

Forage-Related Disorders

Grass Tetany. An abnormally low level of magnesium in an animal's blood causes tetany. And even though beef cattle producers in Florida have generally been successful in reducing the incidence of tetany, this disorder can still be a problem in some situations.

Grass tetany occurs most often in lactating cows grazing small grains and cool season perennials such as ryegrass. It is most common in heavy-milking

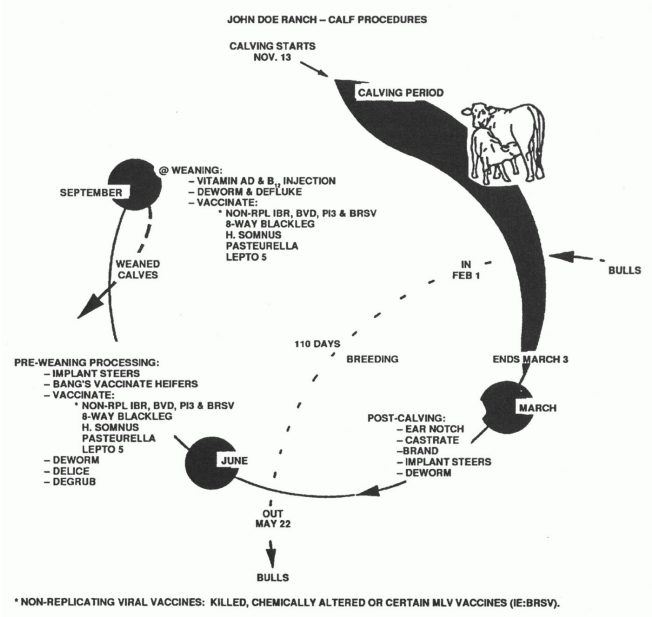


Figure 2. Example of a herd health program for calves on a 2,500-head commercial cow-calf operation in south Florida. Credits: Richey, E.J. 1992. Keep Herd Health Simple and Make It Fit the Beef Cattle Operation! Florida Cooperative Extension Service, Circular 1038. pp 14-15. University of Florida, Gainesville.

cows that have had several calves. Several factors combine to increase susceptibility to tetany. The magnesium requirement of a cow doubles from late gestation to early lactation. This rapid rise in the cow's magnesium requirement, in conjunction with seasonally low concentrations of magnesium in these particular forage plants, and aggravated by elements that inhibit absorption of magnesium (e.g., high accumulations of nitrogen and potassium, whether occurring naturally or due to application of fertilizer), are factors that can combine to trigger incidence of tetany.

Weather might also have an effect: susceptibility to tetany is highest when temperatures are between 40° and 60° F, particularly when foggy or overcast conditions exist. Conversely, if temperatures remain in excess of 60° F for a week or so, incidence of tetany decreases markedly.

Cattle affected with grass tetany often isolate themselves from the herd, and often stagger when they walk. As the disease progresses, cattle can exhibit extreme nervousness, rapid breathing, and muscle tremors. Animals might also become aggressive and charge. At the most severe stage, an animal will collapse to the ground with muscular spasms. Treatment must then be given rapidly: death can occur within an hour after the onset of convulsions.

Treatment entails intravenous injection of a solution containing magnesium, calcium, and glucose (combinations and proportions can vary). This must be done quickly and correctly! To prevent relapse, recovered animals should be removed from pasture and fed hay and/or a concentrate mixture, supplemented with magnesium oxide, for at least a week.

Cows grazing winter pasture should be fed a magnesium supplement, or a mineral mixture containing magnesium. Commercial mixtures to prevent tetany are available in a variety of forms. However, before you make a purchase, determine whether the mineral product is going to provide adequate magnesium. In most situations, consumption of .5 oz magnesium per head per day prevents grass tetany. As an example, beef cows would need to consume 5 oz per head per day of a product containing 10% magnesium in order to take in .5 oz magnesium daily.

Nitrate Toxicity. This can affect cattle that consume forages containing excessive amounts of nitrate. It can also develop in animals that have access to nitrate fertilizer (especially those hungry for salt). Cattle normally consume nitrate at low levels; they convert the nitrate to ammonia, and convert ammonia to protein. But when intake is too high, nitrate interferes with the red blood cells' ability to carry oxygen. An animal with nitrate poisoning can die from lack of oxygen to its body tissues (hypoxia).

Forage crops most prone to high nitrate accumulations are warm season annual grasses such as sorghum, sorghum-sudan hybrids, sudangrass, corn, and Johnsongrass. Avoid grazing these warm season grasses (especially those fertilized with high amounts of nitrogen) when growth ceases due to drought or cold damage. Suspect forage should be tested for nitrate level. Consult your county extension agent or veterinarian for information about taking samples and sending the samples to a diagnostic lab.

Signs of nitrate toxicity in cattle can include labored breathing, frothing at the mouth, diarrhea, frequent voiding of colorless urine, staggering, convulsions, and brown color of the mucous membranes. Animals showing signs of toxicity should be removed from their feed or pasture, and fed a high-concentrate diet. Call your veterinarian immediately; a solution of methylene blue can be administered intravenously to help restore oxygen-carrying ability to the red blood cells.

Grasses and small grains that test high in nitrate content should not be baled; the nitrate content of dry forage is stable. Corn fodder and sorghum-type plants also contain about the same levels of nitrate when fed as when they were baled. Properly fermented silage, on the other hand, *loses* about half its nitrate content during fermentation.

Hay that tests high in nitrate can be diluted with low-nitrate feeds. Feeding a supplement with high grain content not only dilutes high-nitrate forage, but the grain promotes metabolism of nitrates, which further helps to prevent toxicity.

Prussic Acid Poisoning. Animals that consume plants containing cyanide-yielding compounds can develop prussic acid (hydrocyanic acid) poisoning. Potential for poisoning varies with the species and variety of plant, with soil fertility, and weather. Plants of the sorghum family and leaves of wild cherry trees have the potential to cause prussic acid poisoning. But some of the sudangrasses are actually low in prussic acid, and pearl millet is not toxic.

A dead animal is often the first sign of trouble. Cattle poisoned with smaller amounts of prussic acid might show signs that include labored breathing, frothing at the mouth, and staggering.

You can lower the risk of prussic acid poisoning by following these management practices:

- Don't graze sorghum or sorghum-cross plants until they are at least 15" tall.
- Don't graze these plants when they are wilted.
- Don't graze these plants during or shortly after drought periods, when growth is retarded.
- Don't graze for 2 weeks after a non-killing frost.
- Don't graze for approximately 48 hours after a killing frost (wait until plant material is dry).
- Don't graze at night when frost is forecast.
- Don't allow cattle access to wild cherry leaves.
- After storms, check pastures for fallen wild cherry trees or limbs.

Bloat. Caused by excessive levels of gas trapped in the rumen, bloat results when an animal cannot "belch off" the gases it produces during ruminal fermentation. Pasture bloat usually occurs in cattle grazing legumes such as Ladino, crimson, arrowleaf, and red clovers. The danger of pasture bloat (frothy bloat) is greatest when pasture plants are young, lush, and high in soluble proteins. There is a change in normal plant composition, which causes formation of a stable foam in the rumen; this foam prevents gas bubbles from dissipating as free gas, effectively trapping gas so it cannot be belched off. This disorder is triggered by foaming properties of soluble leaf proteins, which are more concentrated in lush pasture legumes.

Because a cow is unable to expel the gas it produces, pressure begins to build up in the rumen. As pressure increases, the rumen becomes distended; as severity of bloat increases, breathing becomes impaired. Once a cow is no longer able to stand, death follows within several minutes.

Toxic Plants. Even though toxic plants infest most of Florida's pastures and fields, cattle that are provided an adequate quantity of quality forages will generally not consume toxic plants. Poisoning most often occurs in cattle that are exposed to the following conditions:

- High stocking rates
- Forage not readily available (such as in winter, or when cattle are corralled)
- Cattle introduced into a new habitat

Toxic plants of common concern in Florida are listed as follows, along with major signs of their toxicity in cattle:

Crotalaria - Leafy annual herb that commonly causes bloody diarrhea, jaundice, rough hair coat, unthriftiness, and weakness.

Black Cherry - Medium-sized tree with dark, smooth bark; causes difficulty breathing, bloat, moaning, staggering, convulsions, and death.

Pokeweed - Perennial herb with green-to-purple stems and a large, fleshy root stock; causes gastroenteritis with cramping, diarrhea, and convulsions.

Lantana - An erect or spreading shrub with multicolored flowers that causes gastroenteritis, diarrhea, jaundice, photosensitivity, ulcers at the nose and mouth, peeling skin and, potentially, death.

Bladder Pod, Rattlebox, Sesbania - Tall woody annual herbs; these cause gastroenteritis, bloody diarrhea, shock, and death.

Sickle Pod, Coffee Senna (coffee weed) - These coarse annual herbs with sickle-shaped seed pods cause diarrhea, tremors, muscle degeneration, coffee-colored urine, “downer” syndrome, and death.

Redroot Pigweed - A large, coarse annual herb with thorns, redroot pigweed causes weakness and trembling; it can also be a source of nitrate poisoning.

Chinaberry (or umbrella tree) - A tall, leafy tree with yellow-orange fruit, chinaberry causes gastric irritation; affected animals exhibit initial excitement followed by depression, diarrhea, paralysis, convulsions, and death.

Prevention of poisoning by toxic plants includes providing an adequate quantity of quality forages; avoiding situations of overstocking; and implementing good pasture management practices to eliminate toxic plants and situations leading to toxic plant poisoning.

Parasites

Internal Parasites

Internal parasites persist in nearly all Florida beef herds. Infestation is often subclinical, which results in hidden losses: apparently healthy cattle demonstrate reduced gain and feed efficiency. However, animals with *heavy* infestations of internal parasites exhibit many of the following signs:

- Anemia
- Rough hair coat
- “Bottle jaw” (edema underneath the mandible)
- Progressive weight loss
- Persistent diarrhea
- Unthriftiness

The life cycles of most internal parasites follow a typical pattern. Mature female worms living in an animal's gut produce large numbers of eggs, which pass out of the animal via manure. The moisture and warmth of the manure pad provides a favorable environment for eggs to hatch and develop into larvae. Once they reach their infective stage, the larvae of most species crawl onto adjacent forage to be ingested by cattle. Once inside an animal, they grow to maturity, and the cycle begins again.

The behavior of the medium brown stomach worm *(Ostertagia ostertagia*) is different in that its larvae enter digestive glands in the stomach lining and can then become “inhibited” (i.e., they hibernate) for as long as four months. This period of inactivity generally occurs during Florida's hot summer months. The hibernation is a method of survival for the worms; eggs produced at this time would be deposited on hot, dry summer pasture and would quickly die. So when weather favorable for the development of worms on pasture resumes, the larvae resume activity in the stomach lining. They develop into adult worms and break out of the cow's digestive glands, damaging the glands as they leave. They can emerge gradually or can emerge very suddenly, causing severe damage to the stomach lining.

Several products are available to help control worms in cattle and are available in many different forms: pastes, gels, boluses, crumbles, drenches, injectables, or feed additives. Such wide selection practically guarantees you a product to fit your program at reasonable cost. The latest generation of dewormers (containing ivermectin, albendazole, oxfendazole, or fenbendazole) is effective against inhibited larvae of the brown stomach worm. These dewormers are especially effective on inhibited larvae if used during July, before larvae develop into worms.

Cattle are typically dewormed in spring when pasture growth begins. However, a different time of year might be more appropriate for your particular operation. Discuss a worm-control program with your veterinarian to help determine which products you need, and what time of year you need to use them.

Chemical control of internal parasites should be accompanied by other measures, such as elimination of overstocked pastures, pasture rotation, feedbunk sanitation, and adequate nutrition. You can harrow pastures on which cattle have been concentrated, using a chain-link harrow to expose eggs and larvae to the effects of drying, and heat or cold.

External Parasites

External parasites such as flies, lice, and cattle grubs cause losses to beef producers by lowering weight gains, reducing milk production, and transmitting diseases. Animals severely infested with parasites are also more *susceptible* to disease.

Lice

Infestation of lice occurs primarily during winter months, when cattle have longer hair coats and their skin is less oily. Two types of lice infest cattle in Florida: biting lice and sucking lice.

Biting Lice (little red lice)—These do not suck blood; biting lice have *chewing* mouthparts, which they use to feed on dead skin, hair, and skin secretions. Biting lice are highly active, causing irritation by their movement and feeding. Infestations are usually found around the tailhead and top of the shoulder.

Sucking Lice—Characterized by *piercing* mouthparts, which they use to feed on blood, sucking lice are bluish or slate grey in color. Infestations are often manifested as colonies of lice, which look like patches of dirt or manure against a light-colored hide.

Signs of lice infestation include animals licking their hair (to sooth irritation), rubbing, and scratching. Severely infested cattle will often rub off patches of hair. Cattle that rub constantly can cause injury to themselves, and damage to fences.

Lice are easily controlled in winter with a pour-on or spot-on insecticide (either those used to control cattle grubs, or those designed specifically for lice control). Lice can then be kept in check by using backrubbers or dustbags throughout the year. Some forms of injectable dewormers (avermectins, moxidectin, doramectin) will kill sucking lice, as well as cattle grubs.

Effective treatment for lice requires that you treat *all* herd animals in order to prevent reinfestation via untreated cattle. Eradication of lice requires a second insecticide treatment, 14 to 21 days after the first, to kill lice that have hatched from the unkilled eggs.

Flies

Flies are pests of beef cattle that primarily cause problems during warmer months. Most flies have either sponging or piercing-sucking mouthparts. Face flies have sponging mouthparts; horn flies, stable flies, and horse flies have piercing-sucking mouthparts.

Face Flies - Usually feeding on mucus secreted from the eyes of cattle, face flies spread the bacterium *Moraxella bovis* which causes pinkeye in cattle.

Horn Flies - These blood-sucking pests remain on their host continuously, relocating only when disturbed or when moving to fresh manure to deposit their eggs. They are usually found on the shoulders and backs of cattle. Horn flies are easy to control due to their tendency to remain on the host.

Horse Flies - Severe, blood-sucking pests, horse flies are usually a problem for cattle during late

summer. Horse flies feed on cattle, causing extreme irritation; they can also spread anaplasmosis. Control is very difficult because horse flies spend little time on their hosts.

Face flies and horn flies can be controlled using insecticide sprays, backrubbing devices, dust bags, insecticide-impregnated ear tags, and feed-through insecticides. Insecticide-impregnated ear tags have been used effectively for several years. Tags can best provide fly control when (1) two tags per animal are used, (2) tags are applied in late April or early May, when the fly population begins to increase, (3) tags are used on every animal in the herd, and (4) tags are removed at the end of the fly season.

Flies will develop resistance to the chemicals used in insecticide-impregnated ear tags if the same chemicals are used over a long period. So, alternate types of insecticide and/or methods of control are necessary in order to prevent the development of insecticide-resistant fly populations.

Cattle Grubs

The immature (or larval) form of the heel fly is known as a cattle grub. Producers are usually aware of this parasite during two specific stages of its life cycle: (1) when heel flies try to deposit their eggs on cattle, causing cattle to run tails-up (sometimes called “gladding”); (2) when grubs emerge from an animal's body onto its back (having spent approximately nine months feeding on the animal's internal tissues).

Control of these insects is important; producers sustain losses due to disturbed (or “gadding”) cattle, reduced vigor of cattle (during the migration of larvae through their bodies), and damage to the loin muscle and hide (which is evident at slaughter). Control can best be accomplished while larvae are small and still migrating through the body tissues of cattle. In Florida, this phase lasts from mid-July until the end of September. Systemic insecticides are available for application as pour-ons, spot-ons, and sprays. Also, the avermectin, moxidectin, and doramectin products kill cattle grubs.

Beef Quality Assurance

Beef producers, together with their animal health care providers, are becoming more keenly aware of their own responsibility to maintain healthy, productive livestock for a consuming public that expects (demands) a wholesome, appetizing food product. Among the tools available to accomplish this goal is a wide array of animal health products (e.g., vaccines, antibiotics, medications, and nutritional supplements).

Optimum benefit from animal health products is achieved only when they are properly applied and administered. Products can persist in an animal's body following administration, resulting in unlawful drug residues. Products delivered by injection are of particular concern. And even when properly administered, these carry the potential to produce injection-site blemishes in a carcass.

The beef industry currently loses $21.36 per cwt (27% total carcass value) on every 1200 lb steer processed through the packing industry. Losses result from excess fat, poor marbling, hide defects, bruises, pathology, and injection-site blemishes. Independent of other factors, injection-site blemishes result in average losses of $1.74 per carcass, with losses as high as $40 per *individual* carcass, according to a 1990 survey. Injection-site blemishes cost the industry $35.7 million each year. Retailers and packers, asked separately to cite their top-10 quality complaints, both ranked the issues of excess fat and injection-site blemishes high on their lists. Quality complaints result in lower cattle bids, loss of consumer confidence, and loss of market share.

Even though educating producers and veterinarians has resulted in a dramatic reduction of injection-site blemishes and drug residues, these improvements have been primarily effected by changes in handling and processing at the *feedlot.* Producers in the stocker, cow-calf, and dairy beef segments of the industry have yet to respond to the call for quality assurance. Pharmaceutical companies, veterinarians, and producers must all work together to assure a solution that is favorable to everyone working within the beef industry.

Rules for Product Handling and Administration

- **Read the Label.** Administer products carefully, according to label recommendations. Pay attention to dosage, timing, route of administration, warnings or indications, withdrawal period, storage, disposal, and shelf life.

- **Select Products That Will Minimize Blemishes.** This might require some field trials for product evaluation. Use caution when handling irritating or large-volume products (i.e., oil-based vaccines, antibiotics, vitamins).

- **Don't Combine Vaccines.** Unless so instructed bythe manufacturer, *do not combine vaccines;* vaccine efficacy can be destroyed.

- **Keep Mixing.** Mix thoroughly *before* you begin using a product; periodically stop and mix again.

- **Restrain Animals Properly.** Poor restraint endangers both cattle and personnel. A proper handling facility reduces bruising and stress to cattle, and facilitates delivery of injections.

- **Choose the Best Route.** Read the label and determine the best route of administration. If given a choice for delivering injections, select a subcutaneous (under the skin) route.

- **Choose the Best Site.** This does *not* mean the fastest and easiest location but, rather, the most effective location that is least likely to damage muscle (meat). Preferred sites are the neck muscle, and in front of or behind the shoulder.

Intramuscular injections should be delivered deep and straight into the muscle. Avoid injecting excessive quantities into single sites. Remember that all parts of the carcass are valuable. (Figure 3 illustrates preferred sites for intramuscular injection.)

- **Choose the Correct Needle.** Intramuscular injections should be delivered using a 16- or 18-gauge needle, 1 to 1 1/2" long. Subcutaneous injections should be delivered using a 16- or 18-gauge needle, 1/2 to 3/4" long. Select the needle of smallest diameter that still allows easy flow of the product.

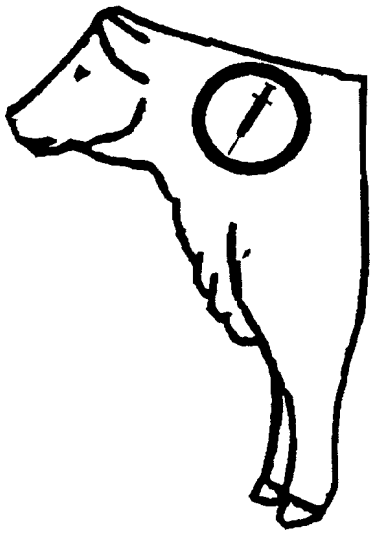


Figure 3. Preferred site for intramuscular (IM) injection. Credits: Richey, E.J. 1998. Keeping a Record of Administering Animal Health Products to Beef Cattle. University of Florida, Gainesville.

- **Use Proper Injection Technique.** For delivery of subcutaneous injections, “tent” skin and insert the needle under the skin (Figure 4). For delivery of intramuscular injections, insert the needle deep and straight into the muscle. If multiple injections are required, deliver them several inches apart. Do not administer more than 10 ml per injection site. If injections are given on multiple occasions over several days, vary the injection site from day to day.

Figure 4. Subcutaneous injections can be delivered using the "tent" method, behind the shoulder or in the neck region.

Antibiotics (penicillin or oxytetracycline), vitamins, and clostridial vaccines seem especially prone to irritate tissues; use these products carefully. Recent studies suggest that clostridial

vaccines (1) ***should not*** be given late in the feeding period, and (2) ***should*** be delivered subcutaneously in cattle of all ages, preferably in front of the shoulder.

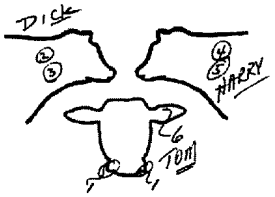
- **Sanitation Is Essential.** Only clean needles should enter the vaccine and/or medicine bottle. Change needles frequently: every 10 to 20 uses, or after one syringeful of the vaccine has been dispensed. If a needle is dull, burred or contaminated, change it; dirty and/or damaged needles can increase trauma, reaction, and product leakage.

Sharp needles and clean equipment do make a difference! For killed vaccines, an alcohol sponge can be used to clean needles between injections; however, this is not an option when administering modified live vaccines. Inject only into clean areas of the hide; avoid mud, manure, etc. Thoroughly clean and disinfect equipment between uses. Maintaining clean working facilities—from the work table surface to the holding chute—is also important.

- **Maintain Treatment Records.** Identify treated animals; know what products have been given, where, and how they were administered (Figure 5 shows an example processing map and record). Know and observe slaughter withdrawal time periods for all products used. Keep these records accessible.

- **Implement Employee/Family Awareness.** Teach proper drug use, and review your quality assurance plan annually.

Steer *Processing Map*



Date of Processing: 1-7-98

Animal of Herd ID: P-STEERS

Dairy & Barn/Ranch: 3-Doe Ranch

Site No.	Product & Manufacturer	Lot/Serial Number & Used for	Dose Size	Admin Route	Date Used	Withdraw Days
1	Intranasal	100123	1 & 1	IN	1-7	21
	VAC/AVC	IBR/PI3				
2	Viral-4VAC	200234	5 ml	IM	1-7	21
	(BVD-K)/	IBR, PI3				
	AVC	BVD & BRSV				
3	7-Way Isomnus	1230045	5 ml	SQ	1-7	28
	VAC	C. Chauvoel				
		C. Septicum				
		C. Noyvi				
	AVC	C. Perf. C&D				
		H. Somnus				
4	Pasteurella	200345	2 ml	IM	1-7	21
	VAC/AVC	Pasteurella				
5	Kill All/AVC	00134-Worms	5 ml	SQ	1-7	49
6	S-Implant/AVC	00987-Implant	1	EAR	1-7	0

EJR2-98

Earliest date that animals are available for slaughter 3-26-98
(Last date of administration + longest withdrawal days +1)

Figure 5. Processing records are an important part of a ranch quality assistance program. Credits: Richey, E.J. 1998. Keeping a Record of Administering Animal Health Products to Beef Cattle. University of Florida, Gainesville.