

Florida Cow-Calf Management, 2nd Edition - Practicing Good Management¹

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Management techniques, which include animal identification, implanting, vaccination, castration, and dehorning, should be implemented in as timely and humane a manner as possible. This chapter concentrates on these techniques and on cattle handling.

Cattle Handling

Managing cattle properly and maintaining an adequate herd health program are impossible unless producers have the basic ability to catch and restrain their cattle; producers must possess a working knowledge of cattle behavior. Cattle respond directly to the way they have been handled. Cattle that are handled gently will be quieter and easier to work with at each gathering.

The key to handling cattle is understanding their “flight zone,” a surrounding area of personal space that cattle must maintain to feel at ease (Figure 1). An animal moves away from anything that penetrates its flight zone, in an attempt to maintain a constant margin of space between itself and the intruder.

Flight zones apply to individual animals and also to herds of animals, where each herd collectively maintains its own flight zone.

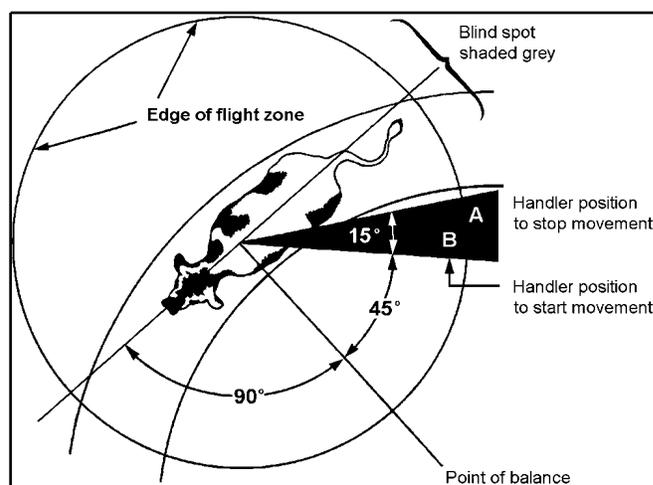


Figure 1. Cattle flight zone diagram; point of balance controls movement forward or backward; positions (A) and (B) control starting and stopping.

The size of a flight zone depends upon how wild an animal is. In range cattle, the flight zone can cover a large area. But it might extend only 5 to 20' in cattle

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accustomed to people. Extremely tame cattle can actually be difficult to drive because they have *no* flight zone. Many times, such cattle can best be moved by leading them with a feed bucket.

When a person penetrates an animal's flight zone, the animal moves away. This behavior can be used to your advantage when moving cattle. Approach cattle slowly and, as you begin to get into their flight zone, they will begin to move away from you. If you move too rapidly or try to get too close, an animal will turn back, or break and run away. You should ideally stay on the edge of the flight zone, causing the animal to move away slowly. Cattle will normally stop moving once they get a comfortable distance away. Do not crowd them or make sudden motions until you have them through the gate and in the cow pens.

Cattle have a strong herding instinct and do not like to be isolated. With beef cattle, occasionally an animal will become excited if left alone in the crowding area of the working facility after the rest of the herd has entered the single-file working chute. Try not to leave individual animals by themselves. Excitable cattle move better in a group, not by themselves.

Cattle tend to be gregarious and thrive best in groups. Separation of individual cattle from the main herd results in stress to those separated. Cattle should never be penned individually for an extended period of time. Instead, pen two or more animals together to minimize stress and maintain productivity.

When processing cattle, work carefully. If you try to set a record for speed, you could end up unduly stressing or even injuring your cattle. Cattle can be worked rapidly enough when they are handled skillfully and gently, provided the handling facility is well designed and facilitates the flow of cattle. Remember that animal health products such as vaccines and implants must be administered properly to be effective. Therefore, emphasis should be placed on proper technique rather than speed. When painful procedures are required, it is especially important to minimize excitement and handling stress. Excitement and fear due to rough handling can be even more stressful to an animal than the pain of a surgical procedure such as castration.

Building a properly constructed handling facility ("cow pen") is no more expensive or time-consuming than building one improperly. Figure 2 shows a set of cow pens designed for 20 to 40 cows. It is simple in design and should be cost-effective to construct. With this design, one man by himself can sort cattle and move them safely and quietly into the funnel, then into the single-file chute. The single-file chute should terminate in a properly designed squeeze chute and headgate. If your finances will not allow purchase of a squeeze chute, you can buy the headgate separately and attach it at the end of your single-file chute. Headgates with straight, vertical neck bars and positive-type latches that require minimum physical effort to operate are recommended for the safety of both the handler and cattle.

Cattle Identification

Proper animal identification is essential to efficient record keeping, proof of ownership, and routine observation. Methods of identification most commonly used include ear tagging, tattooing, hot branding, and freeze branding.

Regardless of method, you must first decide on a numbering scheme if your records are to be meaningful. Each animal needs a unique number. Herd size will determine how many digits are required, but each digit should have some meaning.

Using 4-digit numbers, you can employ a common scheme where the first digit denotes year of birth; the second identifies sire or breed crossed; and the last two digits indicate birth order. Or, a letter can be used to denote year of birth, using the international year/letter designations (Table 1).

For example, a tattoo reading "1 2 14" might mean:

1 = 1991 birth year

2 = Sire #2

14 = 14th calf born in 1991

Or, the tattoo could read "A214" and have the same meaning.

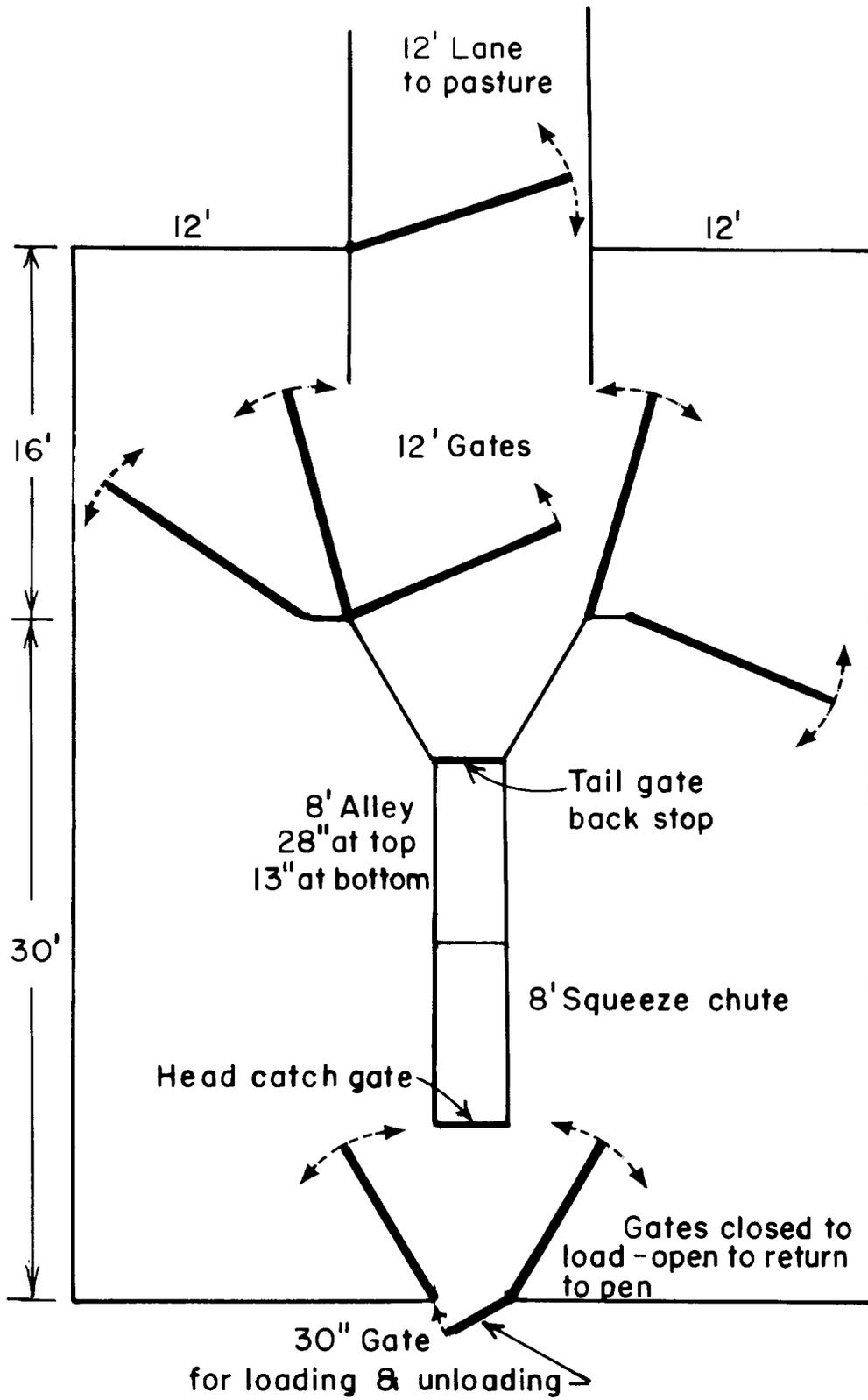


Figure 2. Set of cow pens, designed to hold 20 to 40 cows.

Ear Tagging

Ear tagging is probably the most common method of identification (Figure 3). It is not permanent, however, and tags are frequently lost. Ear tags are best used in conjunction with a permanent form of identification, such as a tattoo or brand. Prenumbered tags can be purchased. If you number your own, be sure to use an ink that will penetrate the “plastic matrix” of the tag, and allow adequate time for it to dry.



Figure 3. Ear tags provide an easy method for identifying cows and calves.

Step-by-Step Procedure for Ear Tagging

- 1) Select the tags and numbering system to be used.
- 2) Number plastic ear tags with marking fluid or ink that bonds to the plastic. Number ear tags no later than the *day before* they will be used.
- 3) Insert ear tag into the appropriate applicator. When two-part tags are used, be sure the parts line up correctly; and use the correct pin for that type of tag.
- 4) Select tagging site on the inside of the ear. Place one-piece plastic tags between the two ribs of cartilage that divide the ear, halfway between the base and tip of the ear; place two-piece tags either between cartilage ribs or below the ribs; place metal tags on the top of the ear near its base (metal tags are more apt to tear the ear if snagged on an object).
- 5) Attach the ear tag. Two-part tags are applied using a pliers-type applicator, squeezing the handles until the ear tag snaps together. Metal tags are applied

in the same manner. Knifelike applicators are used to apply one-piece tags, and must be forced through the ear using extreme care. Be sure to position the applicator so the tag will hang straight or angle away from the base of the ear.

- 6) Treat the wound with an antiseptic to prevent infection.

Tattooing

Tattooing is a permanent means of identification, but only useful at close range. Most purebred organizations require animals to be tattooed in one or both ears prior to registration. The tattooing instrument is a pliers-type device that imprints numbers and/or letters. As the handles are squeezed together, sharp, pointed, needle-like projections pierce into the ear to imprint the characters. Afterward, indelible ink is rubbed into the small punctures. Once healed, the tattoo is permanent.

Step-by-Step Procedure for Tattooing

- 1) Restrain the animal.
- 2) Select a site inside the ear for tattooing. Two ribs of cartilage divide the inside ear into top, middle, and lower thirds. Imprint the tattoo in the top third of the ear just above the cartilage rib. It is generally best not to tattoo between the two cartilage ribs, as this area is frequently used to ear tag. ***This area is explicitly reserved for brucellosis vaccination tattoos, on the right ears of heifers.***
- 3) Clean the inside of the ear where the tattoo is to be placed with a cloth soaked in alcohol.
- 4) Position tattooing instrument so tattoo will be properly aligned; squeeze handles together quickly and completely.
- 5) Rub tattoo ink into all needle marks; ink can be applied with a roll-on applicator, or rubbed in with a thumb or toothbrush.

Hot Branding

Hot (fire) branding the hide is the oldest of techniques for identifying and establishing legal title to cattle. Ownership or “ranch” brands can be registered with the Department of Agriculture and

serve to deter cattle rustling. One drawback to branding is lower hide value; some also consider it inhumane.

Brands used for individual animal identification usually consist of 3 or 4 numbers. This format permits quick identification of animals from a distance. Common locations for brands are the hip, rib, thigh, or shoulder; brands are easily applied to these locations on animals restrained in a squeeze chute, and they are easily seen from a distance. Characters are typically 3 or 4" high, with the smaller size used on young cattle and the larger size on mature cattle. Handles on the hot iron should be at least 2 1/2 to 3" long. Standard irons can be purchased commercially from livestock supply companies.

Step-by-Step Procedure for Hot Branding

1) Restrain the animal by placing it in a squeeze chute with a headgate. Apply tension to the squeeze mechanism to prevent the animal from moving.

2) Heat the irons. Electric irons can be used; these require 110-volt outlets. Electric irons heat up in about 90 seconds and maintain a constant temperature. A set of electric irons consists of 3 irons (with 3 characters per iron), so three outlets would be required to keep all the irons hot. Regular irons (iron or steel) can be heated with a propane gas burner or wood fire. The gas burner is usually built inside a drum to help contain the heat and is hooked to a propane tank to maintain a constant fuel source.

3) Check the temperature of the irons. The properly heated iron will look ash-grey in the daylight, but will glow a deep red when held in a dark place or in the bottom of a 5-gallon bucket. A black iron is too cold; it might be hot enough to burn the hair, but it will not create a permanent brand. ***A red-hot iron is too hot; it must be cooled to an ash-grey color.***

4) Doublecheck your brand; then apply the iron. Press the branding iron firmly against the hide and rocking the handle gently to distribute pressure and create a uniform impression of the brand.

Apply the iron to the hide just long enough to burn the hair and outer layer of skin. This generally requires about 5 seconds, depending on the age of the animal, hair cover, and iron temperature. The new brand should be the color of saddle leather (light tan). Repeat steps 3 and 4 until the brand is complete.

Tips for Better Brands

- Do not brand wet animals. An iron applied to wet hair loses temperature rapidly and tends to scald rather than burn the hide; this results in a scar that is slow in healing, and hard to read.
- Do not permit the iron to slip or slide during application, otherwise blotching will result.
- Clip hair over the brands in fall or winter before the calving season begins.
- Brand only when flies are not a problem. If you must brand during fly season, spray insecticide on the brand.

Freeze Branding

Freeze branding involves application of supercooled irons to the hide. This destroys the pigment-producing cells (melanocytes) in hair follicles, with minimum damage to the follicle itself. When done correctly, white hair replaces pigmented hair, resulting in a legible brand. Freeze branding black or dark-pigmented cattle produces a highly visible brand due to the contrast in color (Figure 4). Legible brands can also be produced on lighter pigmented cattle. On white cattle, however, it is necessary to destroy the hair follicle and create a "bald" or "firebrand" effect.

Freeze branding was developed with the expectation of producing more legible brands more humanely than by fire branding. It was expected that freeze branding would cause less hide damage and, furthermore, that brands would be readable in winter months when the hair coat was long. Disappointments include: (1) brands still need to be clipped in the winter for complete legibility; (2) the process is relatively expensive for small herds; and (3) brand visibility is not as good on yellow, white, or red cattle as on darker cattle. Additional complaints include increased branding time; waiting for hair to

regrow; availability and cost of coolants; and the many variables that can effect brand quality, such as hide thickness and color, exposure time, breed (dairy versus beef), and degree of pressure applied to the irons.

Various methods can be used for freeze branding; techniques include using different types of coolant (dry ice and alcohol versus liquid nitrogen), methods of clipping (degree of closeness), and lengths of exposure time. Work at the University of Florida has shown that branding with dry ice and alcohol on a coarsely clipped area results in 90% to 95% readability, and exposure time is less critical than with liquid nitrogen.



Figure 4. Properly applied freeze brands provide an effective method of identification for dark-pigmented cattle.

Step-by-Step Procedure for Freeze Branding

1) Check and clean your irons. Freeze branding irons should be made of copper or copper alloy. Four-inch irons are recommended for older cattle, 3-inch irons for calves.

2) Cool branding irons in a refrigerant.

One method uses liquid nitrogen (-344° F). Place 3 to 4" of liquid nitrogen into a styrofoam cooler or insulated bucket, then add irons. About 5 quarts of liquid nitrogen are needed for 20 head of cattle.

A second method cools irons by placing them in a mixture of 95% to 99% isopropyl, methyl, or ethyl alcohol and dry ice (-112° F). The ratio of alcohol to dry ice is not critical. One lb dry ice per animal

branded is a good rule of thumb. (*Recipe for 20 head: 1 gal alcohol + 20 lb dry ice, placed in a styrofoam cooler.*) Pour enough alcohol into the ice chest to cover the heads of the branding irons. Crush dry ice into small, marble-sized chunks. Add about 2" of crushed ice (enough to cover the bottom).

Both methods require more refrigerant to cool the irons initially than to re chill them between animals. Additional refrigerant (either liquid nitrogen, or alcohol and dry ice) should be added as needed to keep the irons covered.

3) Fill a 1-quart squeeze bottle with 95% to 99% isopropyl, methyl, or ethyl alcohol to use as a wash in Step 7.

4) Restrain the animal in a squeeze chute. Usually, an animal will jump and squirm when the iron is first applied to its hide. (After about ten seconds, the extreme cold freezes nerve endings and the animal will usually stop moving.) Be ready for this: hold the iron in position the entire time to ensure good cold conduction.

5) Irons will be ready for use as soon as the refrigerant stops boiling. Initially, this will take about 20 minutes, depending on how many irons you are cooling at once. When boiling stops, it means the irons have reached the temperature of the surrounding refrigerant.

6) Clip the area to be branded as closely as possible. Use a No. 40 surgical clipper blade to remove the hair and "underfur," which acts as insulation and increases time required for proper branding unless it is removed. (You can use an alcohol-soaked cloth to wash the brand area. If necessary, use a stiff-bristled brush to remove dirt, hair, and dandruff before applying wash alcohol.)

7) Use the squeeze bottle to liberally apply alcohol over the branding site. Soak the area, but don't waste alcohol; you need not rub it in.

8) Put on a pair of leather gloves, remove irons from the refrigerant, and double-check your brand.

9) Prepare to keep track of branding time to ensure accurate duration of exposure.

10) Apply irons to the clipped, alcohol-soaked area, and lean on the irons to apply pressure.

11) **Amounts of dry ice and alcohol** required will vary according to temperature, humidity, and number of applications. The dry ice and alcohol solution will leach moisture from the atmosphere, diluting the solution. On days when humidity is high, you should drain the alcohol at midday and replace it with fresh alcohol. Save the alcohol you pour off and, once it warms up, recycle it as wash alcohol. Use ice chests made of styrofoam or plastic, not metal; more moisture condenses on the sides of metal containers, which dilutes the solution faster.

12) Brands will be legible once white hair replaces the pigmented hair (6 to 8 weeks).

13) **Exposure time for liquid nitrogen** is typically 20 to 45 seconds, depending upon age and breed of cattle, as well as outside temperature. During hot summer months, increase exposure time to ensure a readable freeze brand. Cattle with Brahman breeding require longer exposure times due to their thicker hides.

Exposure time for dry ice and alcohol is typically 45 to 60 seconds. Some people increase exposure time by 15 seconds for red cattle. To achieve the “bald” or “bare” brand necessary for white cattle, allow an additional 10 to 15 seconds exposure time over what is used for black cattle.

Use of Growth-Promoting Implants for Beef Cattle

Implanting cattle has long been recognized as one of the most profitable investments a cattle producer can make. Whether a producer has a few or several thousand head, properly administered implants will yield an economic return of \$15 to \$35 per head. So it makes good sense to *correctly* implant cattle for maximum returns.

Implants are placed beneath the skin on the back of an animal's ear. They apparently exert a positive effect on growth, resulting in increased formation of muscle and decreased formation of fat tissue. Table 2 shows implants available for various classes of cattle and compares approved usages; Table 3 lists their

ingredients and approved dosages. Each product is readily available and safe, and each yields a return many times greater than its cost. Implants generally increase rate of gain by 4% to 8%.

As a general recommendation, male calves should be implanted when they are castrated. But do not implant bull calves that you intend to save for breeding. Research has shown that suckling males implanted at castration achieve the same weaning weights as nonimplanted bull calves. Also, as an incentive to castrate, even though bull calves weigh more at weaning than nonimplanted steers of the same age, they generally bring a lower price per lb when sold as feeders.

Just as correct technique for implant procedures is critical, proper care and storage of implants is also important for maximum response. Many cattlemen who employ proper implanting technique fail to follow through with proper implant care and storage. Implants properly cared for will retain potency from one year to the next. Cattlemen who throw implant guns on the floorboard of the pickup, or toss leftover implants on the dash will probably not get maximum results next time they use the mishandled item(s).

The following steps are recommended to achieve maximum implant response:

- **Use Proper Restraint.** Proper implantation is accomplished most consistently when cattle are confined in a headgate, or in a squeeze chute that provides head restraint. Nose tongs can be used for better control of animals, especially if they have horns.
- **Ear Tag First.** Ear tag cattle *before* delivering implants. Implant in the opposite ear so the tag will not interfere with implant absorption.
- **Train Your Personnel.** Proper placement of implants is critical to achieving maximum improvement in weight gain and feed efficiency. Improperly placed implants will only cost you money. If you do not know proper implanting procedures, have a qualified person demonstrate them for you or your crew. Select your most conscientious crew member to administer the implants and inspect his or her work regularly.

- **Implant in the Correct Location.** For proper absorption and maximum response, implants *must* be placed in the correct location (Figure 5). All implants should be placed beneath the skin on the back side of the middle third of the ear (measured from tip to base), between the two ribs of cartilage. No implant should be placed closer to the head than the far edge of the auricular cartilage ring. Insertion site for the implant needle needs to be at least one needle-length away from the intended deposition site. Be careful not to injure major blood vessels or the cartilage of the ear.
- **Prepare the Needle Insertion Site.** The insertion site should be wiped clean with cotton or gauze, moistened with alcohol or another suitable disinfectant. Failure to follow antiseptic procedures (especially when ears are covered with fecal material) can result in infection, poor implant absorption, or implant loss.
- **Insert Needle Properly.** Grasp the ear firmly with one hand; with the other hand, insert the needle between the skin and cartilage, avoiding major blood vessels. The needle should be eased forward on a lateral plane until the full length of the needle is under the skin. It is important to keep the needle between the skin and cartilage, to form a canal for depositing the implant. ***Do not penetrate the cartilage.*** Back the needle out 1/8 to 1/4", then activate the trigger mechanism on the gun assembly and simultaneously pull the needle out with a steady, slow movement.

This procedure deposits implant pellets straight into the "canal," which should prevent broken or crushed implants that can reduce potential weight gains. Gently feel the implant; it should be positioned in the middle third of the ear, between the skin and cartilage. **Note:** Full insertion of the needle is important for implant retention and proper absorption.

- **Disinfect the Needle.** After each use, the needle should be wiped clean with cotton or gauze, and moistened with alcohol or other disinfectant.
- **Use Proper Implant Gun and Needle Care.** The implant gun requires minimum maintenance. Remove the needle assembly and plunger rod, and clean with alcohol. Clean the

dose passage with alcohol and a cotton swab or pipe cleaner. If the implanter becomes extremely dirty, it may be submerged and washed in *hot water* (use of soap or detergent is not recommended), and left to dry completely before the next use. When the needle becomes dull, promptly replace it. Regularly inspect needles for burrs. A burr can make insertion more difficult, damage implants, and affect absorption. ***Always use a sharp needle.***

- **Store Implants Properly.** Store RALGRO[®], SYNOVEX[®], Compudose[®], ImplusTM-S/-H, and CALFoid[®] in a cool, dry place, not in a refrigerator. (The highly humid environment of a refrigerator can soften certain implant pellets, and soft pellets are easily crushed.) Revalor[®] and Finaplix[®] implants, however, *should* be stored in a refrigerator (36° to 47° F), and protected from sunlight. It is also a good practice to store implant cartridges in sealed plastic bags.
- **Allow Adequate Time for Implant Procedure.** Do not sacrifice proper technique for speed. Make sure every animal is implanted correctly. If the needle pierces through the ear or penetrates a blood vessel, take time to reinsert the needle properly. (In such cases, you may, in fact, want to use the other ear.) If a major blood vessel is penetrated, the implant could be absorbed too rapidly or walled off completely. However, do not be concerned by a few drops of blood.
- **Reimplant.** Delivering a second implant during one of the production phases is an optional management tool that can increase returns from your operation. However, reimplanting is not feasible for every operation. Follow manufacturer's recommendations.
- **Reminder: Periodically Check Technicians.** A manager should make daily spot checks to ensure that personnel are using proper implanting technique.
- **Follow All Manufacturer's Recommendations.** Greater weight gains and improved feed efficiency are the dividends of proper implant procedure.

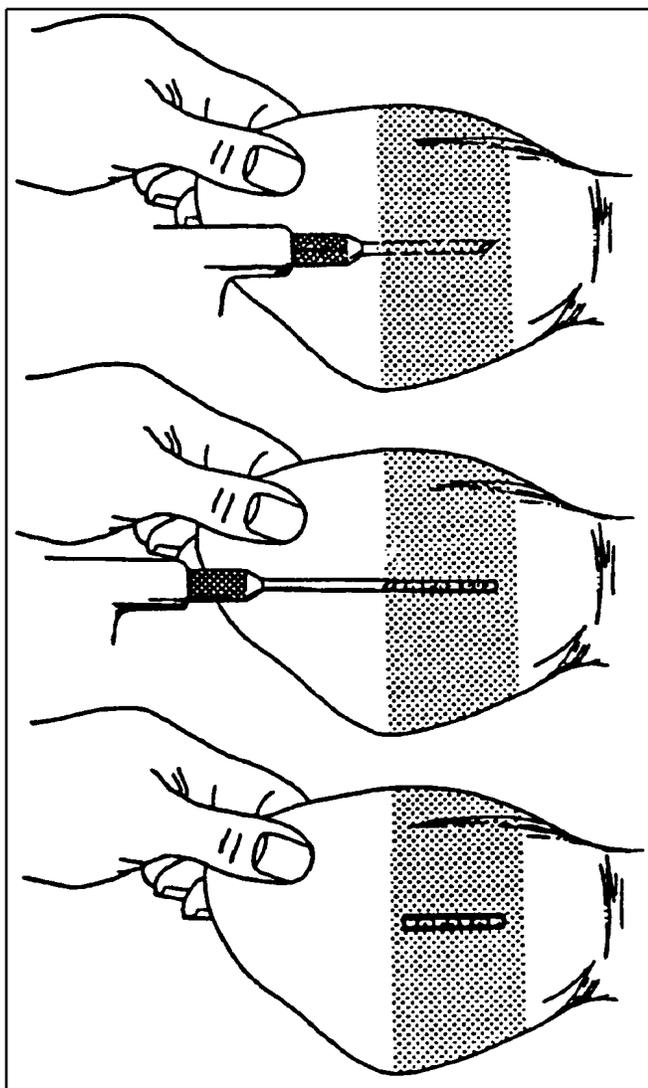


Figure 5. Proper implanting procedure.

Castration of Bull Calves

Castration is the removal or destruction of the testicles, by either surgical or nonsurgical methods. Once castrated, the male calf is referred to as a steer. Beef from steers is preferred over beef from bulls because castration improves the color, texture, tenderness, and juiciness of the meat. And cow-calf producers and stocker operators benefit from castrating bulls because the market pays a premium for steers (usually \$2 to \$6/cwt), partly because of consumer preference and partly because of their quieter disposition and ease of handling in the feed yard. The negative side of castration is that *bulls* naturally have faster growth rates, better feed efficiencies, and higher carcass cutabilities than steers.

Bull calves should be castrated as soon after birth as possible. You can castrate newborn calves when they are ear tagged and implanted. In some herds, it will not be practical to castrate that early if herd sire prospects are not selected until weaning. However, older and heavier bulls generally bleed more, and suffer more setback. The best seasons to castrate are spring and fall because flies and maggots are less abundant, so they are less likely to increase irritation and infection of the wound. Avoid castrating during periods of intense heat or on cold, wet days. ***All bull calves should be vaccinated with tetanus anti-toxin when castrated.***

Surgical Castration

Of the several methods of castration, surgical castration is most commonly used. While any surgical method will accomplish successful removal of the testicles, not every method will permit the scrotum to drain properly while healing. Two methods are generally recommended: cutting off the lower third of the scrotum, or slitting the scrotum down the side. A sharp, sterile pocketknife works fine for making the incision. However, specially designed castration knives are also available.

Once the incision is made, squeeze the testicles through the incision one at a time. Pull on the testicle and, using the thumb and index finger of the other hand, separate the testicle and cord from surrounding connective tissue. Sever the spermatic cord as high as possible by scraping with the knife blade, or use an *emasculator*, which crushes as it cuts (this avoids hemorrhage in older calves). Apply an effective antiseptic, and a fly repellent if needed.

Nonsurgical Castration

Emasculatome (Burdizzo®). This is the preferred method of nonsurgical castration, and can be used at any time of year without concern for open wounds. But “clamped” bull calves can become staggy (i.e., they develop some physical characteristics of bulls) if the procedure is not performed properly.

Clamping is best done with the calf standing, and with tailhold applied (grasp the tail near its base and bend it sharply upward and over the back, toward the

calf's head). Each spermatic cord should be crushed separately. Position one cord against the outside of the scrotum and clamp approximately 2" above the testicle. Be sure that the emasculator closes properly. Leave the emasculator in place for about a minute. Crushing the cord should make the testicle atrophy and become nonfunctional.

It is a good practice to clamp each cord twice. Repeat this procedure on the other cord, making sure to leave the middle (septum) unclamped for adequate circulation to the scrotum. If you clamp all the way across the septum, the scrotum could slough off and expose the testicles.

Elastrator. Effective only on calves less than one month old, the elastrator consists of a special rubber band, which is applied around the neck of the scrotum with a forceps-like instrument. Use the instrument to expand the elastrator; press both testicles through the band; release band and remove applicator. Testicles and scrotum will fall off in about 2 to 4 weeks. Elastrators can only be used before calves' testicles become too large to pass through the band.

The elastrator method has some serious disadvantages: tetanus can be a problem when the bottom of the scrotum atrophies and sloughs off; the rubber band sometimes breaks and voids the procedure; occasionally, one of the testicles will remain unaffected by the procedure. Also, complete removal of the scrotum is objectionable to some producers.

Chemical Castration. The most recently developed castration technique, chemical castration, entails injecting a chemical directly into each testicle of bull calves weighing less than 150 lb. Testicles are forced down into the scrotum, and the injection is delivered from the top, down into the middle third of each testicle. The appropriate amount of chemical injected into the testicle causes degeneration of testicle tissue. Some producers have had mixed results with this procedure.

Dehorning Calves

Buyers of feeder calves prefer animals without horns. Dehorning reduces the possibility of injury and

reduces bruising. Cattle without horns require less space at the feedbunk and in transit. Also, horned animals are more difficult to catch in a headgate, and more likely to injure the handler during processing.

To minimize stress, dehorn animals as early as possible, preferably at less than two months of age. As calves get older, the procedure causes more trauma, more bleeding, and increased chance of infection. Once a calf develops its "horn" sinus, cutting the horn out will leave an open hole down into the sinuses of the head. Remove horns early when little or no cutting is required!

During fly season or extremely cold weather, avoid dehorning cattle by any method that requires cutting. Maggots can be a problem during hot weather, and the exposed sinuses can lead to respiratory problems during extremely cold weather.

Calves can also be "dehorned" genetically, by using polled animals in the breeding herd. But calves born with horns should be dehorned as soon and humanely as possible, using one of the following methods.

Caustic Paste or Stick. This method can be used on very young calves (up to 2 or 3 weeks of age), when only a button can be felt. Clip hair around the base, then slice off the end of the horn button with a sharp pocketknife to allow the dehorning chemical to penetrate the horn. Apply a ring of petroleum jelly around the base of the horn button to protect skin. Apply caustic stick or paste according to label directions; rub product on horn until blood appears. Keep the calf away from its dam until treated area has hardened and dried. Be careful to avoid contact of the chemical with the calf's eyes.

Spoon, Tube, or Knife Dehorners. Effective on horn buttons or small horns that are just emerging. These tools separate the horn from adjoining tissue with very little bleeding (Figure 6). Clean the area around the horn with a disinfectant. The cut, made around the base of the horn, should include about 1/8" of skin and should be 1/4 to 1/2" deep. After removing the horn, apply antiseptic (and insect repellent if needed).

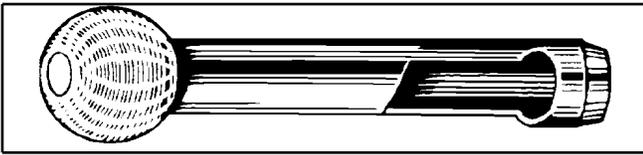


Figure 6. Tube dehorner.

Hot Iron and Electric Iron Dehorners. These are excellent tools for dehorning calves with buttons or small horns (Figure 7). Fire-heated irons usually come in sets, so the proper-sized cup can be selected to fit over the base of the horn; heat these irons to a dull red. Electric irons are designed to maintain correct temperature; they also come with different sizes of cupped ends to fit over the horn. Success depends upon holding the iron in place long enough to destroy the ring of growth cells around the base of the horn. Skin will look copper or bronze colored when the procedure is complete. The horn or button can then be knocked off with the iron, or left to drop off in a few weeks. Practically bloodless, this method of dehorning is one of the most satisfactory methods available, when properly used on horns of appropriate size.

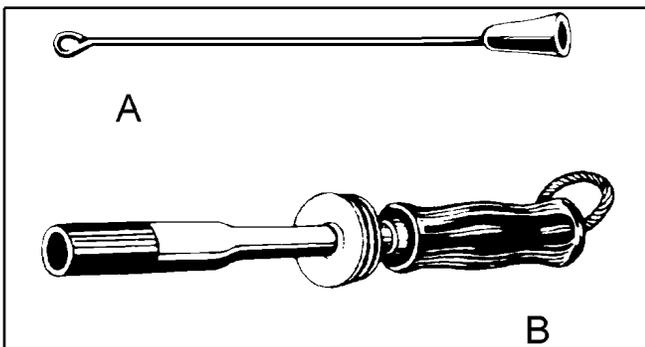


Figure 7. Hot iron (A) and electric iron (B) dehorners.

Barnes-Type Dehorners. Use of this tool could be necessary if dehorning is delayed until weaning (Figure 8). Horns must be small enough so the instrument can fit over horns and grip a basal ring of skin and hair, as well. These dehorners are available in calf and yearling sizes. The older the calf, the greater the potential for complications with this method.

Close handles to fit blades around the base of the horn; then spread handles and twist, applying considerable pressure. Control bleeding by using forceps to pull exposed arteries: pick up artery (bleeder) with forceps; twist and pull artery until it

breaks and retracts into surrounding tissue. A hot iron or electric dehorner can be used to cauterize small blood vessels. Treat the wound with antiseptic spray, and fly repellent if needed. Do not use blood clotting powders if there are openings into the sinus cavities. Place a thin layer of cotton over exposed sinus cavities to keep out foreign particles, like dust or dirt.

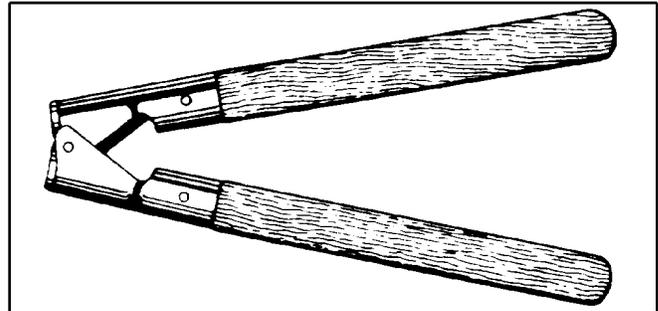


Figure 8. Barnes-type dehorners are available in calf and yearling sizes.

Removing Large Horns. Cattle with horns too large to remove with any of the preceding methods can be dehorned using saws (Figure 9), guillotine clippers (Figure 10), or obstetrical wire. *Removing a ring of skin and hair around the base of the horn is essential in all methods of dehorning, not only to prevent regrowth, but to expose the arteries so hemorrhaging can be controlled.* Dehorning wounds in large cattle heal slowly and require a lot of care to prevent sinus infection and fly strike. Cost and risk factors should be carefully weighed against expected benefits. It is advisable to consult with your local veterinarian prior to dehorning adult cattle.

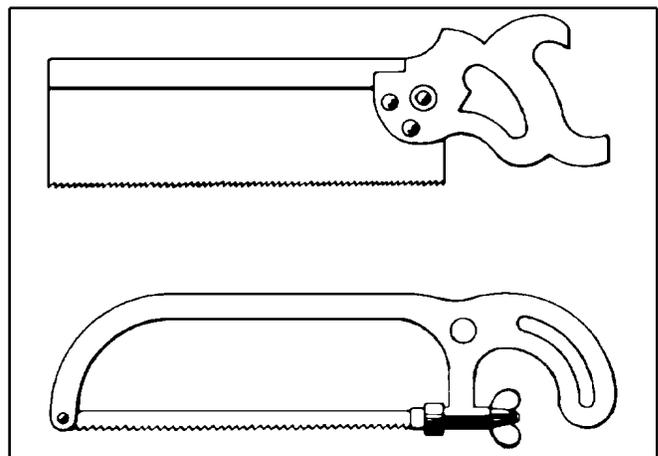


Figure 9. Two types of hand saws commonly used for dehorning.

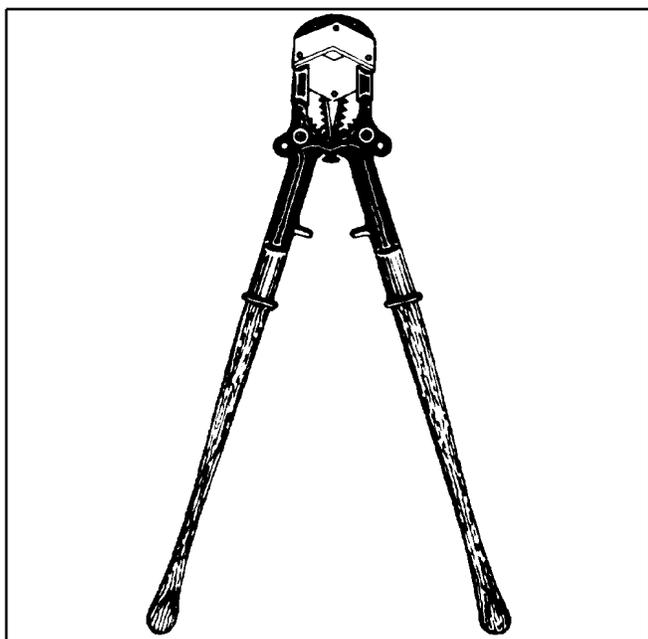


Figure 10. Guillotine clipper used for dehorning; at least two sizes are usually available.

Administering Animal Health Products to Cattle

This section can be used as a reference to guide your processing crew in the proper administration of animal health products. The first way to avoid problems is simply to buy and store drugs properly, and to follow label instructions. Secondly, it is important to *administer* drugs properly. Generally, drugs used by producers and veterinarians are broadly classified as either pharmaceuticals (used for treatment), or biological (used for prevention). Both types are essential to adequate herd health programs. The following guidelines can help you achieve maximum results when handling drugs and working cattle.

- **Check Expiration Date.** Never use a product past its expiration date!
- **Buy Only Quantities Needed for Immediate Use.** Buying in large quantity can lead to waste if products are not used before their expiration date(s). Remember, a vaccine cannot be saved once its container is opened; it will not be effective for later use, and could also become contaminated. Some drugs, and most vaccines, need to be refrigerated at 40° to 50° F.
- **Do Not Combine Vaccines.** Mixing two different vaccines will not produce one vaccine with combined protection. Mixing unlike products can destroy the effectiveness of *both* products. If the combination you want is not available, give separate injections of the individual vaccines.
- **Use Transfer Needles.** When a product such as a modified live vaccine needs to be reconstituted, use a transfer needle to make the process easier and more sanitary. To use a transfer needle, place one end into the sterile liquid or diluent, and the other end into the freeze-dried cake of bacterin or vaccine. A vacuum should pull the liquid immediately into the vial containing the bacterin. If no vacuum exists, discard the vaccine: it could be contaminated.
- **Keep Mixing.** Before using any vaccine (especially those in large-dose bottles), mix thoroughly. Also, periodically stop and shake the bottle again to prevent the vaccine from settling out (which results in administration of inconsistent amounts of antigen, per injection). Modified live vaccines, once mixed, begin to lose potency. Mix only enough vaccine to last 30 minutes. Keep the vaccine cool and out of sunlight.
- **Choose the Correct Needle.** Correct needle size and length are both important to ensure a drug is injected into the animal properly and with minimal tissue damage. Use only 16- or 18-gauge needles, 1/2 to 3/4" long, to administer *subcutaneous* injections (under the skin). And use only 16- or 18-gauge needles, 1 to 1 1/2" long, to administer *intramuscular* injections (in the muscle).
- **Separate and Mark Syringes.** Make sure that syringes for modified live vaccines are kept separate from syringes used for bacterin or killed products. Mark the modified live syringes to prevent mix-up. If traces of bacterin remain in a syringe that is later used for a modified live product, the bacterin could destroy the modified live vaccine.

- **Expel Air from Syringes.** Fill the syringe, then force out any trapped air by pressing the liquid vaccine all the way to the needle's tip. Air trapped inside a syringe will be injected along with the vaccine, which can result in incorrect dosage or leakage of the vaccine from the injection site.
- **Properly Restrain Animals.** Proper restraint is essential. It not only minimizes human injury, but allows you to work cattle in a manner that minimizes damage to animals and reduces the risk of injection-site reactions.
- **Choose the Best Route of Administration.** Labels will indicate acceptable routes of administration. A label might specify only one route or it might provide options. When given an *option* for delivery of injections, choose the subcutaneous route (under the skin) over intramuscular (in the muscle). The “tent” method is the preferred technique for subcutaneous injection.
- **Choose the Best Injection Site.** Convenience is not the major criterion in selection of the injection site(s). The “best” location is the site where a product will generate the most benefit, without risk of damage to expensive cuts of meat, or injury to the animal.
- **Clean the Injection Site.** Sanitation is essential. Make sure the injection site is clean and (especially) free of mud and manure. Also avoid injecting into damp or wet skin.
- **Collect Used Needles.** Place used needles in a rigid plastic container; to dispose of them, present the container to a sanitary landfill representative, or to your veterinarian. Destroy disposable syringes so they cannot be reused or misused. **Read labels:** Some drug and vaccine containers require incineration prior to disposal. Used needles, scalpels, etc., are considered medical waste; they must be handled and disposed of in accordance with the laws that govern medical waste.

Selecting Vaccination Sites

An animal's immune system begins processing a vaccine in its lymphatic system. The lymphatic system consists of series of lymph nodes, located throughout the body, which receive fluids drained from body tissues. Following vaccination, the vaccine “antigens” are transported via lymph ducts to regional lymph nodes for processing; the system of processing these antigens normally stimulates an animal's immune system to increase resistance to the specific disease(s).

In cattle, the regional lymphatic systems involved in processing vaccines are basically arranged in “quadrants,” two forequarter quadrants and two hind-quarter quadrants (Figure 11). Each quadrant is capable of processing vaccine antigens. But since antigens are processed by the regional lymphatic system closest to the injection site, any single quadrant can be overloaded if too many vaccine antigens are delivered locally. For this reason, when administering multiple vaccines during processing, you should distribute the different vaccinations between the animal's four lymphatic quadrants.

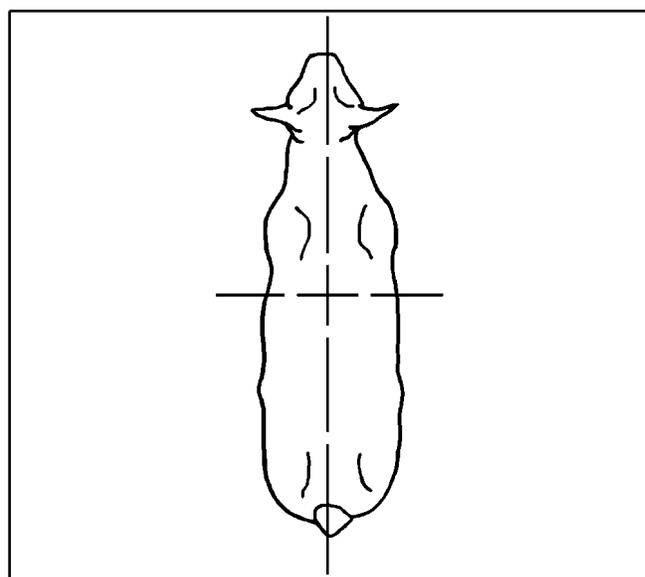


Figure 11. Four quadrants associated with vaccine administration in cattle.

Intramuscular Injection

Intramuscular means “within the muscle.” The preferred sites for intramuscular injections (Figure 12) are in the neck.

Technique: Insert the needle straight through the skin, deep into the muscle (Figure 13). Use a 16- or 18-gauge needle for this method. A needle length of 1" works best for calves and yearlings; for large cows and bulls, a 1 1/2" needle can be used. Insert the needle, deliver the injection into the muscle, then hold the needle in place for several seconds prior to withdrawal (this ensures proper placement of the injection and reduces "leak back"). If you notice any leak back, pat the injection site to seal the skin.

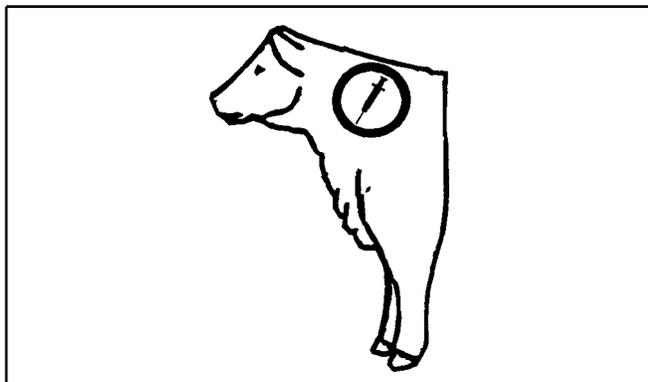


Figure 12. Preferred site for most injections is in front of the shoulders.

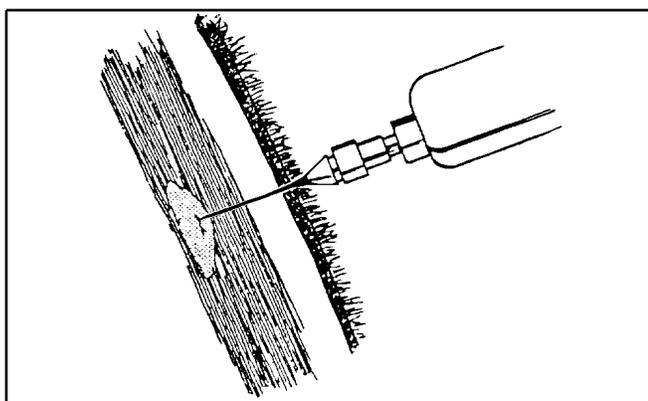


Figure 13. Needle placement for intramuscular injection.

Subcutaneous Injection

Subcutaneous means "under the skin." The preferred site for subcutaneous injection (Figure 14) is in the neck.

Subcutaneous "Tent" Method

Technique: The "tent" method is the most reliable way to ensure proper needle placement for subcutaneous injections. Grasp the animal's skin, pulling it away from the body to form a "tent." Insert needle into the tent formed between the skin

and muscle, then inject the product (Figure 14). Use a 16- or 18-gauge needle, 1/2 to 3/4" in length, for this method.

The loose skin on either side of the neck is an ideal site to form the "tent." But unless you are experienced at holding cattle be extremely cautious when reaching into the chute to grasp the neck skin. If the animal is improperly restrained, it can jump forward and cause your hand to be pinned between its shoulder and the head catch of the chute.

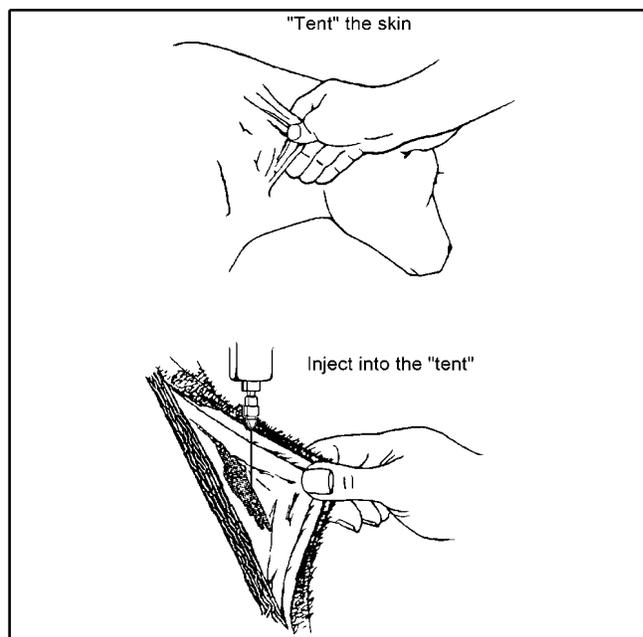


Figure 14. Subcutaneous injection: "Tent" method.

Subcutaneous "Angle" Method

Technique: Use a 16- or 18-gauge needle, 1/2 to 3/4" in length, for the "angle" method of subcutaneous injection. Insert needle through the skin at a 10° to 15° angle, then inject the product (Figure 15). For calves, use a 1/2" needle to prevent depositing the vaccine into underlying muscle. Longer needles (less than 1") can be used for adult animals, depending on hide thickness.

The "angle" method of subcutaneous injection is much faster than the "tent" method. But because improper placement of the vaccine occurs more frequently with the angle method, it is recommended only for individuals experienced with the technique.

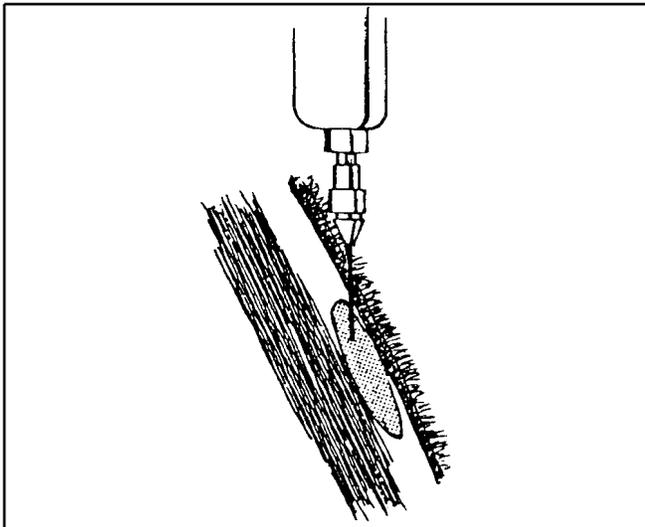


Figure 15. Subcutaneous injection: "Angle" method.

Other Methods of Administering Vaccines

Multiple Injections in the Neck. When more than one injection is required on the same side of an animal's neck, (1) allow at least 4" between injections; and (2) deliver no more than 10 ml per injection site. Figure 16 illustrates possible injection sites for a 21 to 30 ml dosage.

Intranasal Administration. This method is used exclusively with "temperature-specific" modified, live IBR-PI₃ virus vaccines. Rehydrate the vaccine with the diluent supplied. Shake and administer a 2 ml dose using a cannula or a syringe with the needle removed. *Squirt 1/2 dose (1 ml) up each nostril.* (See Figure 17.)

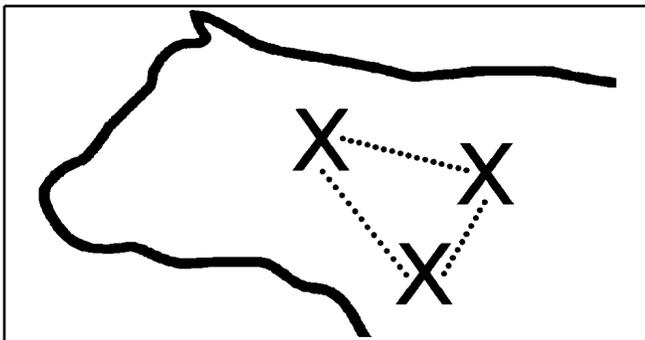


Figure 16. Sites for multiple injections in the neck.

Pour-Ons and Spot-Ons

Following are guidelines for use of pour-ons and spot-ons, alone and in combination:

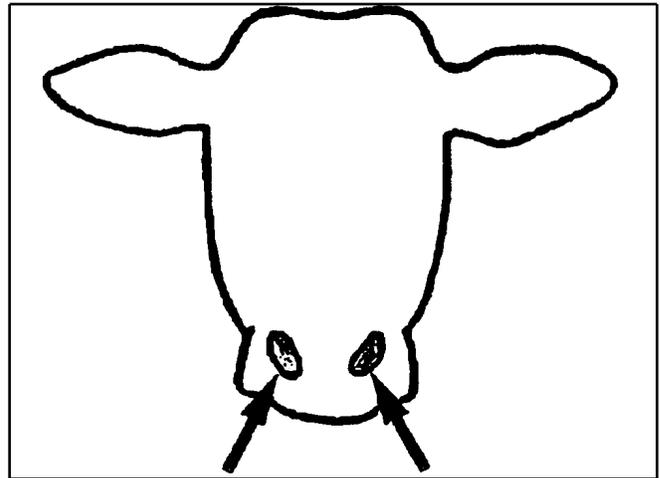


Figure 17. Sites for intranasal vaccine administration.

Single Pour-On—Distribute the product along the midline of the back, from the shoulder to the rump area (Figure 18).

Two Different Pour-Ons—Pour one of the products along the midline of the back in the shoulder and rib area; pour the second product along the midline of the back in the loin or rump area (Figure 19). *Do not overlap application sites of the two products.*

Spot-On—Deposit the product in *one* spot on the midline of the back, in the shoulder or rib area (Figure 20).

Spot-On and Pour-On—Deposit the spot-on in *one* spot on the midline of the back, in the shoulder or rib area; distribute the pour-on along the midline of the back, in the loin or rump area (Figure 21). *Do not overlap application sites of the two products.*

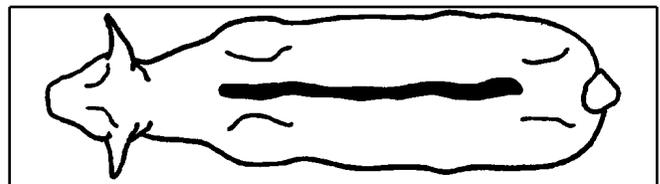


Figure 18. Distribution for a (single) pour-on dewormer.

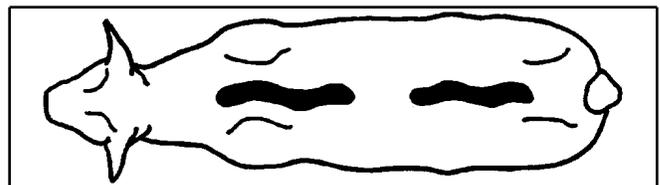


Figure 19. Distribution for two different pour-ons applied at the same time.

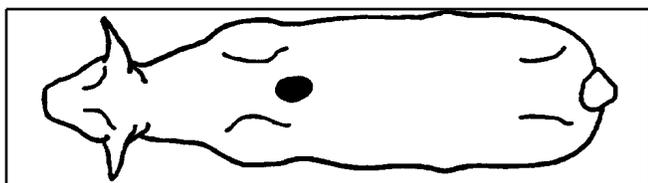


Figure 20. Distribution for a spot-on dewormer.

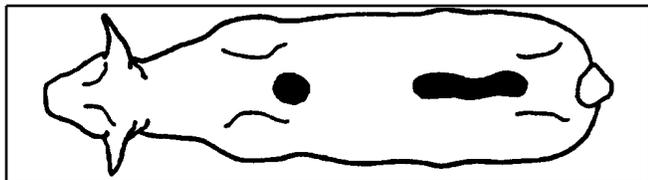


Figure 21. Distribution for spot-on and pour-on applied at the same time.

Deworming Procedures

Most deworming agents for use on individual animals can be administered by at least one of these methods:

- Subcutaneous injection.
- Pouring the product onto the animal's back.
- Orally, using a bolus, drencher, or paste/gel gun.
- Rumen injection.

Subcutaneous injection and pour-on techniques have been discussed in preceding sections; techniques for oral administration of boluses, drenches, pastes/gels, and procedure for use of the rumen injector are discussed in the following sections.

Bolus

Oral dewormers available in the form of a bolus are administered using a plastic or metal applicator. The bolus should be properly placed in the applicator, inserted at the back of an animal's tongue, and then deposited in the throat. When a bolus is improperly administered, cattle can crush the bolus and/or spit the entire bolus on the ground. Care should be taken not to unduly force the applicator down the animal's throat. Caution should also be exercised when forcibly handling an animal's head (especially in handling horned cattle) so the handler does not risk injury.

Drenching

Most oral dewormers are available in the form of a drench. Drench deworming has become extremely popular for processing large numbers of cattle. The hooked applicator tubes on drench guns allow workers to stand beside a restrained animal's head and insert the hooked end into the mouth without touching the animal (Figure 22). Once the tube is positioned, pull back until the bend is in the corner of the animal's mouth and squeeze the gun. With this method, there is no need to press your body against the animal's head, or to lift its head to apply the dewormer.

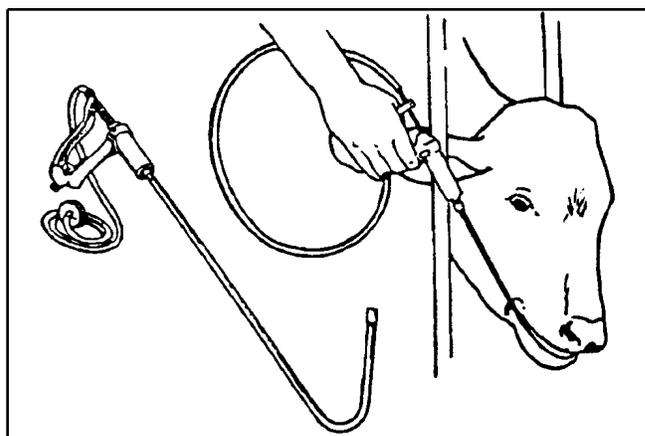


Figure 22. Equipment for drench deworming.

Paste/Gel Application

Oral dewormers available in paste/gel forms are administered with a caulking-type applicator. Paste/gel dewormers will usually adhere to an animal's tongue, but you should still deposit the dewormer onto the rear area of the tongue to ensure the animal swallows it. To accomplish this, you might have to press the animal's head against the headgate with your body, then lift its head. Or, a "hook" adapter which screws onto paste/gel tubes is available to allow administration without requiring the head to be penned or lifted (Figure 23). Place the hooked tube onto the rear of the tongue, pull back until the bend of the hook fits into the corner of the animal's mouth; squeeze the gun.

Rumen Injection

A new concept in the administration of dewormers, the rumen injector delivers the dewormer

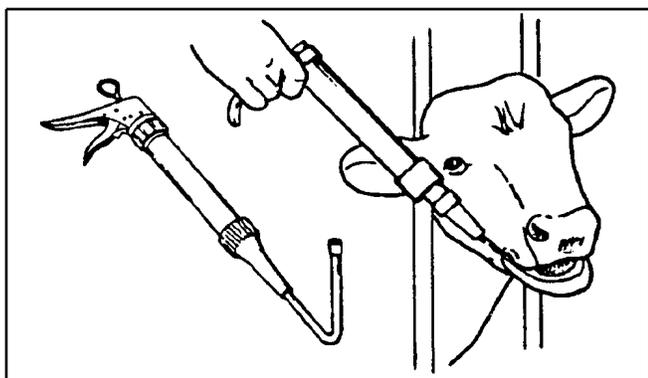


Figure 23. Equipment for administering paste/gel dewormers.

directly into the rumen (Figure 24). Presently, only one dewormer, 22.5% oxfendazole, is available for use with the rumen injector. The following steps outline the procedure for using a rumen injector:

1) Grasp the injector handle with one hand, pointing the shrouded end (clear plastic covering the needle) away from your body. Set dosage adjustment according to the weight of the animal, then cock the injector by pulling the shroud backward into the injector.

2) Standing on the animal's left side, position the shroud of the cocked rumen injector inside the triangle formed by the last rib, point of the hip, and shelf of the spinal column.

3) Press the rumen injector into the animal's side: this collapses the shroud into the injector, and compresses layers of skin into a solid block against the ruminal wall.

4) Fully depressing the shroud activates a springloaded plunger which thrusts the needle into the ruminal cavity, instantaneously delivering the liquid dewormer.

5) Pause for a second or two, then withdraw the injector. The shroud will return to its fully extended position as the injector is withdrawn.

Beef Quality Assurance

The first beef quality assurance program in the United States was developed in 1986 by the cattle feeding industry, in cooperation with the National Cattlemen's Association. The program was developed in response to complaints by packers and meat cutters

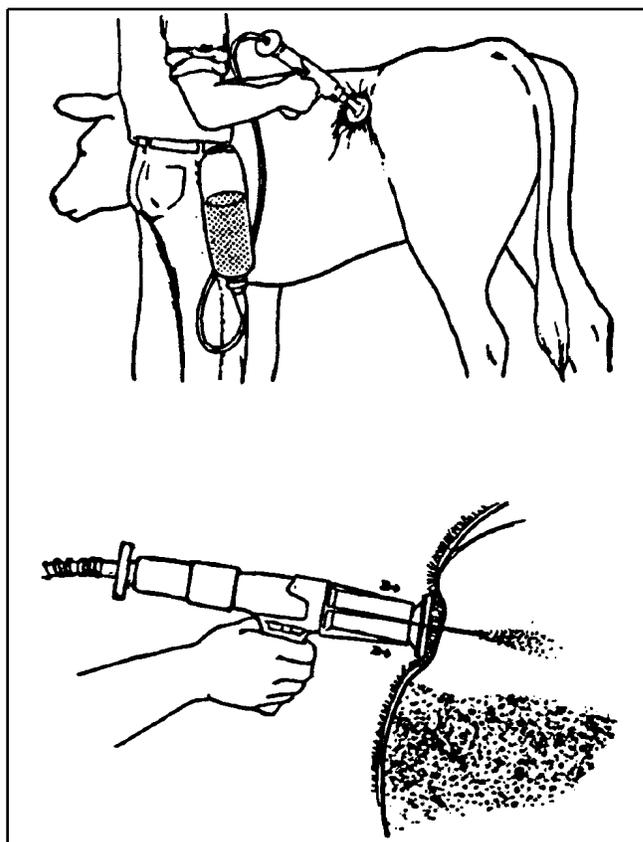


Figure 24. Technique for rumen injection.

concerning lesions and blemishes in meat, which they had to trim out and discard.

In an attempt to recoup the economic loss incurred by these trim-outs, packers and meat cutters began charging feedlots for the value of trim-outs. It was later discovered that many of these imperfections were caused, not by *feedlot* management, but by the way cattle were treated by the cow-calf producer, dairyman, and backgrounder. As a result, the Florida Beef Quality Assurance Program was developed to help educate producers on proper ways of handling cattle to minimize carcass damage, and to promote marketing of "healthy cattle that remain healthy."

The Florida Beef Quality Assurance Program is partially funded by the Florida Beef Council, Inc. The program is directed by a beef industry committee selected by the following associations and business groups:

- Florida Cattlemen's Association
- Florida Farm Bureau

- Florida Dairy Farmers, Inc.
- Florida Veterinary Medical Association
- Florida Association of Livestock Markets
- Florida Department of Agriculture and Consumer Services
- University of Florida
- USDA/APHIS Veterinary Services
- Allied Beef Industry
- Beef wholesalers and retailers

You may request assistance from any of the groups involved with this important, statewide program. Take advantage of these resources and develop a “Quality Assurance Program” for your own operation. (The processing map in Figure 25 can help you start; it provides a sample format for recording administration of animal health care products.)

Beef producers are no longer just in the business of raising cattle—they are in the business of producing food. To survive and prosper in this consumer-driven industry, and to sustain consumer demand for beef, producers must take every step possible to ensure that our beef supply remains safe, appealing, and wholesome. The consumer will accept nothing less. Every producer plays a role in sustaining consumer demand for beef. Regardless of your place in the food production chain, your role begins with a commitment to wholesome beef production. By making this commitment, everyone involved can help ensure continued economic success for the beef cattle industry.

Estimating Age of Cattle by Their Teeth

If you do not know how old a cow is, there are ways you can estimate its age. Such knowledge is invaluable to cattlemen. The best decisions on purchasing or culling commercial cattle are often based on age. For example, if you were purchasing a group of “4- or 5-year-old” cows, it would be an expensive lesson to learn they were actually 10 years old, or older.

Characteristics of teeth vary among individual cattle, and between herds. And factors such as nutritional background, genetic difference, and geographical location account for most of these differences. But despite individual differences, when an animal's age is unknown, examination of the teeth serves as the best method for determining age.

Only the front “cutting” teeth (incisors) are important in calculating age beyond 30 months. (A cow has no upper incisors, of course.) The eruption patterns of premolars and molars are helpful in determining age of cattle younger than 30 months. The eight incisors on the lower jaw appear at different stages and exhibit varying degrees of wear, depending upon age.

By the time a calf is about a month old, it has eight temporary incisors. These temporary teeth are shed and replaced by permanent teeth, in pairs. The first pair comprises the two central incisors in front. The two teeth on either side of the first form the second pair, and so on, for the third and fourth pairs.

At 19 to 20 months of age, the first permanent incisor appears. By 24 months, the central incisors are fully erupted and in line. The following pattern of growth and wear emerges after 2 years of age:

- **2 Years**—The central permanent incisors (pinchers) are fully developed.
- **2 1/2 Years**—The second set of incisors (one on each side of the pinchers) is cut; by age 3, they are fully developed.
- **3 1/2 Years**—The third set of incisors is cut; by age 4, they are fully developed and beginning to wear.
- **4 1/2 Years**—The fourth set of incisors (corner teeth) is cut; by age 5, they are fully developed.

Age determination beyond 4 1/2 years is less accurate, determined mainly by surface wear on the eight incisor teeth. The central pair begins to show wear at 5 years of age; the second pair at 6 years; the third pair at 7 years; and the corner teeth at 8 years. Teeth begin to take on a “pegged” appearance at age 7 (that is, the gums begin to recede from the base of the teeth). By age 10, the corner teeth show

Pregnancy testing is an important tool that can improve efficiency in beef cow-calf operations. Early pregnancy determination in beef cows and heifers affords several advantages:

- Open cows can be culled prior to overwintering (the most expensive feeding period).
- More selection pressure can be placed on heifers. Retain those that conceive early in the breeding season.
- Early warning of breeding problems is provided.
- Pregnancy of females for sale can be guaranteed.

Practice—and lots of it—is the key to palpation. However, *do not* attempt palpation unless a trained and experienced palpator is present to assist and talk you through the procedure. Unless you are skilled at this procedure and use it frequently, it is best to get your veterinarian to do the testing. In that case, your role should be to supervise the operation and critically observe the cows. You can then cull any unsound, unhealthy, and undesirable-type cows along with the open cows.

Developing a Controlled Breeding Season

Recent surveys indicate that less than 10% of the cow herds in Florida are on a controlled, seasonal breeding program. These studies also indicate that the vast majority of cattlemen in Florida leave their bulls with the cow herd for 6 months a year, or more. In herds using a year-round breeding program, about 40% of the calf crop is born during summer months (May-August). Past research has shown that these summer calves can be 100 lb (or more) lighter at weaning than spring-born calves.

Still, producers are apparently very cautious about using a controlled breeding season. Many producers feel they can best utilize their “bull power” year-round. Some seem to think it is too much trouble to set aside bull pastures for the “off-season.” Others fear a reduction in their total calf crop if they go with a controlled breeding season,

and many cattlemen say they would rather have a late calf than no calf.

The following presents some compelling advantages of maintaining a controlled breeding season:

- **Improved Marketing.** A larger, more uniform calf crop in terms of age and weight will receive a premium when sold.
- **More Effective Use of Production Records.** Relative comparisons are more accurate between calves born within a shorter time span. Adequate performance includes both heavy weaning weights and regular calving intervals (every 12 months).
- **Improved Cow Herd Nutrition.** A restricted time period for calving enables cattlemen to better utilize feed resources. During the breeding season they can count on feeding only lactating cows, rather than trying to feed both wet and dry cows.
- **Improved Herd Health and Management.** Cows require more attention during calving season than during any other production phase. It is extremely difficult to provide necessary care when cows are calving on a year-round season. Procedures such as vaccination, castration, dehorning, implanting, ear tagging, deworming, and pregnancy testing are all more easily implemented within a controlled breeding program.

A short breeding season of 90 days or less is recommended, whether a producer uses a split calving season (e.g., fall and spring) or a single calving season. The bottom line is, a short breeding season is usually more profitable than a long, sustained breeding season. Calves born within a short calving season can all be weaned at the same time, and they will be more uniform in age and weight for marketing.

Summer calving should be avoided in the state of Florida. (Summer-born calves are those born from mid-May to early September.) The most desirable calving season for Florida farms and ranches varies among operations. Factors such as marketing

strategies, labor and feed supplies, and seasonal weather patterns must be considered when choosing a breeding season, relative to the calving season.

The following procedure is recommended for converting from a year-round breeding program to a 90-day controlled breeding season, over a 3-year period:

1) Build a well-fenced bull pasture to confine the herd bull(s) during the off-season.

2) Remove herd bull(s) on a date that corresponds with the latest date you want calves to be born.

3) Pregnancy check all cows 60 to 90 days after bulls are removed. Cull all nonpregnant, dry breeding-age females and all nonpregnant cows with calves 5 months of age or older.

4) Put bull(s) back with the cow herd for the duration of your breeding season. (This will be 6 months the first year.)

5) Producers that have problems getting first-calf heifers to rebreed may want to begin breeding replacement heifers 3 to 4 weeks earlier than the mature cow herd. Bulls should be left with replacement heifers for 90 days.

6) Follow the same steps the second year, but limit breeding season for the mature cow herd to about 4 1/2 months.

7) Follow the same steps the third year, but limit breeding season for the mature cow herd to 90 days. Following pregnancy testing, cull all open cows and heifers.

Using this system the breeding season can be further reduced to 60 (or even 45) days. However, for most Florida cow-calf operations, a 90-day breeding season is ideal. Limited breeding seasons can also be implemented in much less time than with this 3-year method, but more rigid culling rates are required, and more problems are guaranteed.

Figures 5 and 11 through 25 were from E.J. Richey's Keeping a Record of Administering Animal Health Products to Beef Cattle, University of Florida, Gainesville, 1998.

Table 1. International year/letter designations.

Year	Letter	Year	Letter
1991	A	1996	F
1992	B	1997	G
1993	C	1998	H
1994	D	1999	I
1995	E	2000	J

Table 2. Approved usage of growth stimulant implant.

Class of Cattle	Implants										
	Ralgro [®]	Synovex [®]			Compudose [®]	Implus [®]		Calf-oid [®]	Finaplix [®]		Revalor-S [®]
		S	H	C		-S	-H		-S	-H	
Suckling											
• Steers	yes	no	yes	yes	no	no	yes	no	no	no	no
• Bull calves ^a	no	no	no	no	no	no	no	no	no	no	no
• Replacement heifers	no	no	yes	no	no	no	no	no	no	no	no
• Nonreplacement heifers	yes	no	yes	no	no	no	yes	no	no	no	no
Growing ^b											
• Steers	yes	no	no	yes	no	no	no	no	no	no	no
• Nonreplacement heifers	yes	yes	no	no	no	no	no	no	no	no	no
Finishing											
• Steers	yes	yes	no	yes	no	no	yes	no	yes	yes	yes
• Heifers	yes	no	no	yes	no	no	no	yes	no	no	no
Withdrawal time ^c (days)	0	0	0	0	0	0	0	0	0	0	0

^aBull calves intended for breeding.

^bGrowing = 400 + lb.

^cNumber of days before slaughter.

Table 3. Growth stimulant implant ingredients and dosages.

Product	Active Ingredient	Dose, mg
Ralgro [®]	Zeranol	36
Synovex S [®]	Estradiol benzoate/progesterone	20/200
Synovex H [®]	Estradiol benzoate/testosterone propionate	20/200
Synovex C [®]	Estradiol benzoate/progesterone	10/100
Compudose [®]	Estradiol-17B	24
Implus-S [®]	Estradiol benzoate/progesterone	20/200
Implus-H [®]	Estradiol benzoate/testosterone propionate	20/200
Calf-oid [®]	Estradiol benzoate/progesterone	10/100
Finaplix-S [®]	Trenbolone acetate	140
Finaplix-H [®]	Trenbolone acetate	200
Revalor-S [®]	Estradiol trenbolone acetate	24/120