

Hand-raising a baby calf requires a commitment to providing adequate nutrition, housing, and care to give the calf the best chance to grow into a healthy, productive adult. This information is designed to help provide a better understanding of generally accepted calf management guidelines and how each recommendation benefits the calf. It is not intended to provide treatment recommendations - there is no substitute for sound information from your veterinarian.

INDIVIDUAL HOUSING IS BEST TO HELP KEEP PRE-WEANED CALVES HEALTHY

Cattle are herd animals that need social interaction, but calves are healthiest and grow best when they are housed individually before weaning. Individually housed calves can do just as well if they are housed outdoors in a suitable shelter, or inside a bright, well-ventilated barn. Single calf pens can still be placed in close enough proximity to allow calves to hear and see each other, but not have direct contact.

The most popular form of outdoor housing for bottle fed calves is a **calf hutch** made from durable plastic or fiberglass. This kind of material allows for easily cleaning and sanitizing between calves. Attach a 3-1/2 to 4 foot high section of wire panel (hog panels work well) bent into a “U” shape to form a tidy pen and shelter. Most commercially available calf hutches also have racks for a bottle and two buckets (feed and water). Place the hutch on a well drained surface such as sand or gravel and secure it with heavy stakes to prevent it from blowing away in strong winds. A hutch placed facing southward, in an area with some protection from the wind, provides a surprisingly warm and secure shelter even in a cold weather climate.



Photo courtesy of Hampel Corp. (Calf Tel)

An indoor pen inside of a well-lit barn is also a good choice as long as it allows for easy cleaning, and the barn has good ventilation without being drafty. It is harder to rotate pen spaces for disease control because there is typically much less space to work with indoors, but this can be overcome with excellent sanitation. A completely indoor environment is nice for feeders, especially in bad weather.

Whichever type of individual housing you choose, place the enclosures far enough apart to prevent direct nose to nose contact between animals, and locate young calves away from older animals to minimize the chance of spreading disease. Provide an area of at least 12-16 square feet that is deeply bedded to help keep the calf comfortable, clean and dry (the entire inside of a hutch is recommended). A thick layer of clean straw or wood shavings will not only absorb urine and moisture, it will help insulate the calf from the cold barn floor or ground underneath, and will provide him with a comfortable place to lay down. During cold weather, straw also allows the calf to “nest” or nestle down into the straw to stay warmer. Strip and replace soiled bedding if possible, or add enough fresh bedding on top to create a clean, dry bedding pack for the calf. Strip the entire bedding pack, clean and sanitize the pen or hutch before introducing the next calf. If possible, allow the pen or hutch to sit empty for a month or more to help prevent transmission of disease. Healthy calves can be transitioned to group housing after weaning.

Group housing of young bottle calves is not generally recommended for several reasons:

1. Direct contact with a single sick calf can mean rapid spread of disease.
2. Hungry bottle calves will suckle on just about anything they have access to, including their pen-mates.
3. When calves are group fed they must compete for each meal, and smaller or less aggressive calves may not get enough milk, starter feed, or water.
4. It is impossible to monitor milk, feed, or water consumption when calves are group fed.
5. Housing multiple calves in a pen requires much more frequent cleaning of the pen and feeding containers.

MANAGE THE TRANSITION TO GROUP HOUSING TO REDUCE STRESS

If possible, wait several days after weaning the calf before you transition to group housing. Newly weaned calves are typically stressed, and most will suckle on anything they find, including another calf. This increases the chance of spreading disease, so it is best to give the calf some time to adjust to being weaned before giving it pen-mates. This is also a good time to introduce any new feeds (such as hay or grass) or feeding equipment you will be using in the new group pen. Slowly acclimate the calf to a group environment by housing it in a small group of calves (no more than 3 or 4) that are a similar age and size. Watch calf behavior and feed consumption to identify any health problems and address them as early as possible.

AFTER DAY ONE – SELECTING THE RIGHT MILK REPLACER IS VERY IMPORTANT

For a bottle calf, milk replacer will be the primary source of nutrition for several weeks. The young calf can already digest high-quality milk replacer, but it will need to gradually develop the ability to digest grain and hay in the first few weeks of life. Whenever possible, select a milk replacer that is **agglomerated** (also called **instantized**) to mix easily in warm water. A product that mixes well will also provide more consistent nutrition for your calf by ensuring that he consumes the same product throughout the entire meal.

THERE ARE 3 MAJOR CHARACTERISTICS TO CONSIDER WHEN SELECTING A MILK REPLACER

1. **Protein source** is the most important factor you should consider when choosing a milk replacer. Milk-derived proteins, and plasma and serum proteins are the most digestible sources of protein and will support the best growth and health. Egg protein and plant proteins are less digestible but can be an economic alternative to the more expensive milk and plasma proteins. Soy flour is the least digestible protein ingredient that is commonly used, and should not be fed to calves less than 3 weeks old.
2. The **amount of protein, fat, and fiber in the formula** must be guaranteed on the tag or label and should be carefully considered. The most common nutrient profile for milk replacers is 20% protein and 20% fat, but the range in available products is wide (18% to 28% protein, and 10% to 24% fat). The standard “20/20” is a good choice for most feeders, and the best place to start for comparing products. Fiber is a good indicator of digestibility in a milk replacer formula – all-milk and plasma formulas should show less than 0.20% fiber maximum on the tag. Some soy protein formulas (typically those with soy flour) can contain as much as 1.00% fiber and should not be fed to very young calves.
3. **Additives and medications** can make a big impact on calf health and growth if they are chosen carefully based on your farm’s management level and performance expectations. Non-medicated additive options can be numerous depending on what brand or manufacturer of milk replacer you choose. The list of approved milk replacer medications is short, and likely to become even more limited in the near future due to concerns about development of antibiotic resistance in humans.

Calf Milk Replacer Medications

*It is important to note that no medication is effective for treating ALL causes of calf scours. Viral pathogens (example, Rotavirus or Coronavirus) and certain microscopic parasites (such as Cryptosporidium) do not respond to antibiotics and must be prevented, where possible, with good sanitation.

Neomycin and Oxytetracycline (commonly referred to as “NT”, “Neo-Terra[®]” or “Neo-Oxy”) can be included at a lower level labeled to “aid in the **prevention** of bacterial scours,” or at higher levels labeled to “aid in the **treatment** of bacterial scours.” This medication combination is most effective at treating scours associated with *E. coli*.

Oxytetracycline (commonly abbreviated “OTC”) and **chlortetracycline** (“CTC”) are approved for inclusion at low levels and labeled for “increased rate of weight gain and improved feed efficiency.” This drug level is too low to impact calf scours.

Lasalocid (brand name Bovatec[®] – commonly abbreviated as “Bov”) is included at a fixed rate to provide 1 milligram per kilogram (2.2 lbs) calf body weight daily, and is labeled for the **control** of coccidiosis caused by *Eimeria bovis* and *Eimeria zuernii*.

Decoquinate (brand name Deccox[®] – commonly abbreviated “DQ” or “DX”) is included at a fixed rate to provide 0.5 milligrams per kilogram (2.2 lbs) calf body weight daily, and is labeled for the **prevention** of coccidiosis in ruminating and non-ruminating calves (including veal calves) and cattle caused by *Eimeria bovis* and *Eimeria zuernii*. *Deccox is considered more effective than Bovatec for *Coccidia* control, but is also considerably more expensive.

CALVES THRIVE ON ROUTINE - FEED MILK REPLACER CONSISTENTLY AT REGULAR INTERVALS

Calves should be fed at least twice daily at the same time each day, preferably early morning and evening. A third milk feeding during the day may be needed to provide extra nutrients and energy during cold weather, or for very small or weak calves.

The recommended equipment list for milk replacer feeding is the following:

1. 2 or 3 quart bottle and nipple, or a 2 gallon pail (separate one for each calf)
2. 2 gallon or larger bucket to mix milk replacer in if you are feeding by bottle
3. Source of clean, hot water, and a thermometer for measuring water temperature
4. Wire whisk, preferably stainless steel, for mixing
5. Bucket and bottle brushes, clean rinsing liquid detergent, and bleach for cleaning and sanitizing feeding equipment
6. Rack to allow feeding equipment to air-dry after sanitizing – thorough drying and exposure to sunlight will also help disinfectant equipment.

ALWAYS USE THE MEASURING CUP PROVIDED IN YOUR BAG OF MILK REPLACER

Most milk replacers have a plastic measuring cup provided in the bag, and all products must include mixing and feeding directions on the label or tag. It is important to always use the measuring cup provided in the bag, because milk replacers can vary in density (weight per unit of volume) between formulas and brands. If you use a measuring cup that was not sized for your milk replacer, you may not be providing the correct weight of milk replacer powder, and this can result in over or under feeding. For best accuracy, weigh the full measuring cup of milk replacer periodically to verify the correct amount is being fed. Remember to weigh the empty cup and subtract the cup weight from your result.

MIX MILK REPLACER AT THE CORRECT TEMPERATURE FOR BEST PERFORMANCE

Most milk replacers are designed to be mixed with warm water at a temperature of approximately 110° -120°F. Making sure the water is warm enough is important because you must melt the fat for it to go into solution. If the water is too cold, the fat may separate or a portion of the powder may sink to the bottom. If the water is too hot (over 140° F), the proteins coating the fat can be damaged, causing the fat to separate and leave a greasy residue. Damaged proteins lose nutritional value, and can sometimes be seen as white flecks or chunks in the solution.

To ensure complete mixing, always mix in a pail or bucket even if you are going to feed the milk replacer by bottle. Add the warm water, adjust the temperature if needed, and then sprinkle the milk replacer powder on top of the water. Mix thoroughly with a wire whisk until the milk replacer is completely dissolved. Allow the mixed solution to cool to 100°-105° F before feeding. Stir the solution immediately before feeding or pouring into a bottle for feeding. Do not leave milk replacer sitting out (in a bottle or pail) for longer than 1 hour – bacteria can grow rapidly in warm milk.

FEEDING MILK REPLACER IN A PAIL CAN SAVE TIME BUT REQUIRES A LITTLE TRAINING

Feeding milk replacer in a pail can save time and make cleaning the feeding equipment easier, but it does leave the liquid milk replacer exposed to more contamination than a bottle. Training the calf to drink from a pail requires a little patience but is relatively simple. A hungry calf will eagerly suckle on a finger placed in its mouth. Insert a clean, preferably gloved finger into the calf's mouth with the pail of warm milk replacer directly below. Once the calf begins suckling, gently lower your hand into the pail until the calf's muzzle is in the milk. After a few tries the calf will learn to drink milk from the pail. It may take several feedings before the calf learns to go straight to where his milk is. If the calf resists, try using a shallower pail (a clean gallon ice cream pail is handy) or one made from more translucent plastic – sometimes having his head too deep in a dark pail (above his eyes) can make a calf nervous to start. Consistency and patience are keys to successful training.





COLD WEATHER FEEDING – MORE MILK REPLACER CAN HELP KEEP CALVES HEALTHY AND GROWING

During cold weather, the calf's energy requirements increase because they use more calories to keep warm. Young calves (less than 3 weeks old) are most vulnerable to cold stress, mostly because they have very little body fat to burn for energy. In fact, a young calf starts to feel cold at 50°F, and can actually starve to death in really cold weather if not provided with extra energy in the diet. A good rule of thumb is to add a third feeding of milk replacer during the day for calves less than 3 weeks old if the daytime temperature is below freezing (32°F), and the calf is in cold housing (outdoor hutch or in an unheated barn). Start with a half bottle on the first day or two, and then increase gradually to a full bottle if needed. This will increase energy and nutrient intake to help keep the calf healthy and growing. The extra feeding will also have a “warm soup” effect, making the calf more comfortable with a warm belly full of milk.

PROVIDING STARTER GRAIN AND WATER EARLY IS THE KEY TO SUCCESSFUL WEANING

Successful weaning can only be achieved when the calf is consuming enough solid feed and fresh water to provide adequate nutrition without milk. The calf's ability to digest feeds is dependent on developing the size and bacterial population of its **rumen**, which is the first of the four stomach compartments found in **ruminant** animals such as cattle, sheep and goats. High-starch feeds like calf starter grain help the bacterial population grow rapidly, but forage (hay or grass) can actually slow the rumen development process in a very young calf. It is also very important that the calf has constant access to fresh, clean water to optimize rumen development – the bacteria need water to grow, and the calf is much more likely to consume the dry feed if it can wash it down with a drink. Calf starter grain and clean water should be available free choice (as much as the calf will consume) starting in the first week of life. Do not feed hay or allow access to large amounts of grass until the calf is weaned completely off milk.

CALF STARTER FEEDS – QUALITY MATTERS

Calf starter grain is typically available either as a textured feed with a combination of corn, oats, a protein/vitamin/mineral pellet, and molasses, or may be in the form of a complete pellet. Whatever the form, calf starter should be highly palatable, nutritionally-balanced for calves, and free of **fines**, which are very small particles that can be dusty, and may contribute to respiratory disease or digestive upset. Calf starter should be at least 18% protein, but formulas are available as high as 24% protein. The benefit of higher protein should be balanced against the extra cost.

CALF FEED AND WATER INTAKE STARTS SLOWLY BUT RAMPS UP QUICKLY

Calves typically consume only a little water and calf starter before two weeks of age. Start by offering a small amount of calf starter (a handful up to about 1/2 pound) to provide enough for the calf to nibble on while avoiding waste. Providing fresh calf starter and clean water in clean pails every day is the best way to stimulate consumption. Dirty or old calf starter should be discarded and the pail scrubbed and sanitized – bacteria grow rapidly in soiled or damp feed. Closely monitor water availability during hot weather, because young calves can easily become dehydrated if they do not have enough fresh water available.

CALF STARTER CONSUMPTION SHOULD DETERMINE WEANING TIME, NOT AGE

Most calves can be weaned from calf milk replacer between 6 and 12 weeks of age, as long as they are healthy and are consuming at least 2 pounds of calf starter each day. A calf that is eating starter consistently can be weaned “cold turkey” or you can reduce the amount of milk fed per day for a short period to promote starter intake and prepare the calf for weaning. A common approach is to cut back to a once-daily milk feeding for 7-10 days before weaning. Remember, the calf must be consuming enough calf starter to support health and growth without milk. It is also best to avoid weaning during other stress, such as transport, vaccination, dehorning, etc., or when the calf is sick.

ADDITIONAL RESOURCES

Your livestock veterinarian and local university extension agent are excellent resources for calf management information, as well as many online sources. Please visit the Learning and Resource Center at www.savacaf.com for some helpful online links.