CIR947

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Managing a Dairy Cow on the Ranchette [1]

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Owning a Dairy Cow

Maintaining a dairy animal on the ranchette or farm is popular in many areas of Florida. In addition to providing a certain amount of recreation and enjoyment for the owner, it allows a person the opportunity to be involved in an agricultural enterprise and yet maintain other responsibilities. Also, if youth are present in the home, animals may be used for 4-H and FFA projects.

There are five major breeds of dairy cattle in the United States from which one may select a dairy animal. The five breeds are Ayrshire, Brown Swiss, Guernsey, Holstein and Jersey. Minor breeds are Dutch Belted, Milking Shorthorn and Red Danish. Most ranchette owners prefer the Jersey and Guernsey breeds since they are smaller and their milk contains more milk fat and a richer color (4 to 6% fat). Milk from the other breeds will contain from 3.5 to 4% fat with the Holstein having the lowest milk fat test.

Many ranchette owners enjoy starting with a small calf or young heifer and watching them grow. The problem with this approach is that you may encounter calfhood problems such as scours and parasites. We would recommend starting with a springing heifer (heavy in calf) and enjoying the fruits of your labor in a few weeks. As soon as the cow freshens (calf is born) the lactating period begins.

Lactation is the period from freshening to drying off during which milk is secreted. Usually lactations are about 305 days in length.

The first milk after calving is called colostrum. Colostrum contains about 23% total solids as compared to 12-13% for whole milk. It is higher in protein, energy, minerals and vitamins. Also, it contains antibodies or immunoglobulins (a protein) that provide protection to the newborn calf against diseases and invading organisms. It is important that the newborn calf receive form 1 to 2 quarts of colostrum during the first 6-12 hours after birth.

Colostrum milk is usually discarded or fed to calves and other livestock. While it is highly nutritious, colostrum is more dense than regular milk and in rare cases may contain some blood if injury to the mammary gland has occurred prior to calving. After 4-5 days, the milk should be normal and have a good appearance.

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Peak milk production will occur within 4-6 weeks after calving. Dairy cows may produce from 4 to 12 gallons (8.6 lbs/gallon) per day depending on the breed, quality of cow, feeding program, and care given to the cow. The cow should be milked twice per day so long as she is producing in excess of 3 gallons per day. A number of dairy farmers milk their cows three times daily. In general, milking 3 times a day will result in approximately 15% more milk when compared to 2 times a day milking. Low producing cows may be milked once daily.

Proper Milking Procedures

Proper milking procedures are important for the prevention of mastitis and for complete removal of all milk from the udder. The milking process begins with washing the udder and drying with a single-service paper towel. Next, check for abnormal milk by milking 2-3 squirts from each teat onto a surface (not hand) suitable for detecting abnormal milk such as flakes in the milk. This procedure stimulates milk let-down as well as the removal of milk in the teat that is higher in bacteria. Also, if mastitis is detected, treatment with a suitable antibiotic may be required. If a quarter is treated with an antibiotic for mastitis, the milk should not be used for human consumption as indicated on the label.

Movement of cows should be done in a gentle and quiet manner. Any disturbance causing cows to become frightened will interfere with milk letdown. Oxytocin, a hormone released from the pituitary gland into the blood, is responsible for the milk let-down reflex in the mammary gland. When a cow is stressed or frightened, adrenalin is released which prevents the secretion of oxytocin and milk let-down.

Feeding the Calf

Proper feeding of the newborn calf is important. The first 24 hours of life are critical for the newborn calf. It is very important that the calf receive colostrum during the first few hours of life. Colostrum contains antibodies which give the calf protection against diseases. The greatest absorption of colostrum by the calf occurs in the first few hours after birth. If the calf does not nurse soon after birth, provide help to assure consumption of colostrum. The calf should be limited in nursing or removed from the cow after 1-2 days. Scours or calf diarrhea may result if a calf is allowed to nurse a dairy cow at will.

Continue the calf on milk or milk replacer for 4 to 8 weeks, depending on growth and health of the calf. After 4 to 5 weeks, the calf may be weaned if eating 1-2 pounds of calf starter (grain) per day. A general guideline for the amount of milk to feed daily is 8 to 10% of the initial bodyweight (6-8 lbs) of the calf. Best results are obtained when milk is fed twice daily with regularity while avoiding abrupt changes in amount or composition.

The calf's appetite increases as it grows. The offering of a good starter ration to the calf at 2-3 days of age is an excellent way to meet this increasing need. A good calf starter should contain about 16-17% crude protein if all concentrate and 15% protein when containing 12-15% cottonseed hulls. Some of the grain should be in the cracked, rolled or whole form. Variety is more important in a calf starter than in the older heifer ration. Pelleting is another method of increasing palatability when the ingredients are finely ground.

The calf starter should be supplied in an amount the calf will eat in one day. It is frequently advisable to reduce the milk intake by one-half a few days prior to weaning. This will encourage intake of calf starter.

The feeding of roughage is usually started 3-4 weeks of age. Quality of hay for young calves is more important than quantity. As the calf reaches 3-4 months of age, green chop, pasture or silage may be fed as a source of roughage.

Heifers can grow at an adequate rate (1.5 to 1.8 lb for Holsteins and 1.2 to 1.4 lb daily for Jerseys) on high quality forage but under most Florida conditions, some grain is needed to assure proper growth. Where good pasture is available, heifers supplemented with 3-5 lbs of grain containing 15-16% crude protein per day make good growth.

Calves on pasture and receiving very little grain should be supplemented with minerals. A complete mineral will usually contain both minerals and vitamins. Usually, it will contain about 30% salt, 6-10% phosphorus and 12-16% calcium.

A feeding program should be planned for the dairy heifer that will give her every opportunity to develop a healthy and strong body. Clean, fresh water should be readily available at all times since young heifers will consume 1 to 1.5 gal/day/100 lbs of body weight.

A heifer should be bred when she is about 14-15 months of age (Table 1). The main factor influencing time to breed is body size. First calf heifers have more difficulty calving than larger, older cows; therefore, they should be from 500-800 pounds in body weight at breeding time, depending on breed. Heifers which calve at a smaller size and younger age should grow to normal size if fed well as a heifer and throughout the first lactation. (For more details on growing replacements see Circular 770 .)

Feeding the Lactating Cow

It is important to feed the lactating cow a good balanced ration. In general, cows in lactation should receive 8-12 lbs of hay (bermuda, etc.) and 1.0 lb of grain (16% protein) for 1.5 lbs of milk. Cows receiving fair pasture and 5-7 lbs of hay should receive about 1.0 lb of grain for 1.7 lbs of milk. If good pasture is available with 4-5 lbs of hay, feed 1 lb of grain for 2 lbs of milk. Grain is usually fed while the cow is being milked.

Another method is to feed grain and roughage together in what is called a total mixed ration (TMR). A TMR combines grain and roughage in an amount that can be consumed in one day to provide the nutrient needs of a cow producing a given amount of milk. The rate of feeding a TMR with cottonseed hulls is about 1 lb of TMR for 1 lb of milk. A TMR containing cottonseed hulls contains about 14.5% protein and 18-19% fiber. A TMR may also contain corn silage or ground hay. In this case, the ration would have to be mixed at the farm. It is always good to feed some hay (approximately 3-7 lbs daily per cow).

Drying off the Dairy Cow

About 2 months before the cow is due to calve, she should be dried off or given a rest period. The best way to dry off the cow is to simply stop milking her. This causes the pressure to build in the udder, thus stopping the milk secretion process. Just prior to the time you stop milking the cow, reduce or remove grain feeding. This decreases milk production and reduces the time needed to dry off the cow. After the last milking, treat any previously affected quarter with an approved dry cow antibiotic treatment followed with a teat dip. Some dairymen treat all quarters at the time of dry off since cows frequently get mastitis during the dry period. Observe each cow closely for the first week for unusual swelling or problems. After about one week, the cow is considered a dry cow.

Feeding the Dry Cow

Research and accumulated results have demonstrated that a dry period of 45-60 days is needed to attain the greatest milk yield. This allows the mammary gland time to involute and prepare for the subsequent lactation. Maximum dry matter intake and milk production can be obtained if cows are fed during the dry period so that they are in good body condition without becoming fat.

During the dry period the dairy cow should be maintained in good condition. Thinner cows will need to gain some in extra flesh. Every attempt, however, should be made to maintain the dry cow in good flesh rather than fatten her. Dairy cows allowed to fatten in excess during the dry period have more problems than dairy cows freshening in good condition. Metabolic conditions and problems associated with nutritional inadequacies during the dry period are milk fever, udder edema, ketosis, and displaced abomasum. All may be controlled by proper feeding management. The nutrient needs of dry cows are shown in Table 2.

Most discussions of dry cow management tend to ignore fiber (roughage) since most operations have adequate silage and/or hay. In Florida, the need may become great since silage is rare in most operations and hay may be limiting or expensive. Even so, every attempt should be made to provide some long hay to heavy springing dry cows. Avoid feeding a lot of legume hay since legumes are high in calcium and an imbalance of calcium and phosphorus may occur leading to more milk fever. Also, limit silage to 20-30 lbs per day with an increase in long fiber. Heavy

springers or prepartum cows should receive rations that are very similar to the lactating cow ration in order to reduce stress brought about by changes in the feeding program at calving.

Breeding

The lactating dairy cow will show estrus (heat) after about 20-45 days in lactation. During the estrous cycle, there is a period called estrus when the animal is sexually receptive to mating. The estrous cycle is from 17 to 23 days in length, so heat occurs about every 21 days. The estrus period lasts about 11 hours in Florida cattle. Signs of heat during the period are: mounting other cows, restlessness, bawling, discharge of clear mucous from the vulva, and redness and swelling of the vulva. It is usually best to breed the cow on the first heat after 50 days in lactation and toward the end of the estrus period. Contact your local County Extension agent about a source of semen. Make arrangements for receiving the service prior to the need for the service.

Manure Management

Manure management frequently becomes a problem as more and more animals are concentrated on a small acreage. To be safe, do not purchase more animals than your land acreage and housing facilities will allow you to manage without destroying the grass sod on the pasture. In general, about 1 to 2 animals per acre is recommended for ranchette owners.

The estimated amount of manure produced by dairy animals is given in Table 3 and varies some with the rate of feeding and type of ration. As an example, various estimates have shown that a 1000 lb cow produces from 60 to 86 lbs of wet manure daily.

Manure contains excellent organic matter and is frequently added to gardens, flower beds, crops, and pastures. While it is limiting in nutrients as a fertilizer, it is excellent for soil aeration and tilth, increases soil organic matter and promotes growth of microorganisms that are beneficial to plants. In contrast, too much manure added to the soil could release nutrients such as nitrogen and phosphorus that may pollute the water supply. Also, manure may be harmful to some types of plants. Check with your County Extension Agent before adding manure to soil for plants if your are unsure of its value.

Manure management becomes important as more animals are housed on the ranchette. By starting early, the problem of flies and mud can be avoided. Develop an area for manure storage so that it can be composted in a storage area until needed. Grass clippings and some of the yard trash may also be added to the degrading compost pile.

A Good Health Program

A disease is any change of the body from its normal or healthy state. A diseased animal may or may not show disease symptoms, but most diseases are identified by the appearance of certain signs. You should know your animal well so that signs of disease can be detected. Diseases may be caused by living organisms such as bacteria, virus or parasites and also by factors such as poisons or nutrient deficiencies. (See Circular 770 on raising dairy replacement heifers for more details on calf diseases and prevention programs.)

The prevention of disease is a desirable practice by animal owners. Diseases requiring immediate attention in dairy cattle are mastitis (inflammation of the udder), milk fever (occurs near the time of calving and may be noted by weakness, staggering, inability to rise and lying with head tucked in flank) and various toxic materials. (See Fact Sheet DS 12 on metabolic diseases.)

The dairy cow should be tested annually for TB and Brucellosis. Until you are sure your animal is free, pasteurize the milk since the process destroys all pathogenic organisms present.

Care of Milk in the Home

Milk should be stored in the refrigerator to assure a 2-3 week shelf life. Since milk will readily absorb vegetable, meat, fruit, and medicinal odors in a refrigerator, keep the milk container closed and cover or wrap other items stored in the refrigerator.

Milk is of excellent nutritional value for both humans and bacteria. As purchased, milk contains few bacteria. After the container is opened milk

should be handled carefully to prevent bacterial contamination. Never touch the inside of the container lip with your hands before or after pouring milk and do not drink directly from the container. If unused milk is to be saved, it should be placed in a separate container, covered with a kitchen wrap, and placed in the refrigerator.

Both the flavor and nutritional value of milk can be damaged by sunlight. Milk that has been exposed to only a few minutes of sunlight will develop an off-flavor. Sunlight causes the destruction of the vitamin riboflavin. Although not all of the vitamin is destroyed by a short exposure to sunlight, there is enough vitamin destruction to decrease the nutritional value of milk.

Pasteurized vs. Raw Milk

Pasteurized milk is milk that has been given a heat treatment to kill all disease producing (pathogenic) bacteria. Because of pasteurization, food poisoning is rarely, if ever, caused by milk. Raw milk is milk that has not been pasteurized. Many people have consumed a considerable amount of raw milk and not experienced illness. However, milk is an excellent medium for bacterial growth. Pathogenic bacteria can enter the milk from the cow, the environment, or from people who handle the milk. After entry into the milk, the bacteria can multiply and create a potential health hazard. For this reason, all milk should be pasteurized in the home. Electric pasteurizers are commercially available. These are usually automatic and the most desirable method of home pasteurization. If a commercial pasteurizer is not available, milk can be pasteurized in a double boiler. First, fill the bottom section of the boiler with water. Add milk to the top section and cover the milk. Start heating the water and check the temperature of the milk with an accurate thermometer. When the milk has reached 145°F maintain this temperature for 30 minutes. During this period, it might be necessary to remove the heat source or turn it down to prevent excessive heating of the milk. After pasteurization, cool the milk quickly by placing it in cold running water or, preferably, ice water. Rapid cooling will minimize a cooked flavor and extend the shelf life of the milk.

Buttermilk, Yogurt, Cheese and Kefir

Buttermilk, yogurt, cheese and kefir are dairy products enjoyed by many and easily made from milk. Information may be obtained in regard to recipes from your local County Home Economist or the Extension Dairy Technologist in the Food Service Department at the University of Florida.

Making Dairy Products in the Home

A variety of dairy products can be made from milk including: ice cream, cheese and cultured dairy products (cultured buttermilk, yogurt, kefir, etc.). The importance of strict sanitation practices in the manufacturing of these products cannot be understated. Steps for manufacturing cheese and cultured dairy products include incubation temperatures that allow growth of the desirable lactic acid-producing bacteria. These temperatures also encourage growth of the undesirable contamination bacteria which cause spoilage or disease. Therefore, it is recommended that a reliable source of lactic acid bacteria as a starter culture be obtained. Those cultures are available commercially or can be obtained by purchasing retail cultured dairy products (i.e., yogurt or buttermilk) from the grocery shelf.

Care must be exercised when using retail products as a source of microorganisms. Some commercial yogurt or buttermilk products do not, in fact, contain live or active bacteria, or the bacteria may not have survived during storage. Therefore, it is a recommended procedure to check the growth and activity of the starter cultures and to grow and maintain your own cultures. To do this, heat milk in a double boiler (185°-190°F for 30 minutes), cool and dispense into clean glass jars. After cooling contents to indicated incubation temperature, add approximately 3.0% of yogurt, buttermilk or commercial starter culture to a jar of heated milk. Yogurt cultures should be incubated at 95^{0}-110^{0} F for 10-12 hours while buttermilk cultures should be incubated at 70°-75°F for 16-18 hours. Following incubation, growth should be observed by checking for coagulation of the milk. This culture may be stored for up to 2 weeks in the refrigerator prior to use. Each time the culture is used to make product, a new transfer can be made in another jar of heated milk to carry the culture.

Cheese

Average cow's milk contains about 12-13% total solids, 3.5% fat, 3.2-3.5% protein, 4.9% lactose and 0.7% ash. To obtain one pound of cheese, you need 10 pounds of milk. The type of cheese that can be made ranges from soft white cheese (like Queso-Blanco) to hard-type cheeses. Curd formation is obtained by adding rennet (an enzyme from young calves stomach) or by allowing the growth of the lactic acid bacteria. Information on making cheese at home can be obtained from your local county extension agent.

Yogurt

Yogurt manufacture involves the cooperative growth of *Lactobacillus bulgaricus* and *Streptococcus thermophilous* . Generally, using skim milk or whole milk (without added nonfat dry milk) will give a consistency of thick buttermilk. Addition of nonfat dry milk (2-3 tablespoons per quart) prior to heating will result in a thick, custard like yogurt. The milk should be heated at 180°F-185°F for 30 minutes. Too low heat treatment could result in a soft watery textured product while too much heating causes graininess and improper gel formulation. After cooling, 3.0% starter culture is added and the product is incubated at 110°F until coagulation occurs (8-12 hours). Be careful, over-incubation can allow over-growth of the lactobacilli and result in a bitter, sour product. Under-incubation would favor the streptococci and result in a bland, soft product.

Buttermilk

Cultured buttermilk is usually made from skim milk. Many commercial products use aroma or flavor producing bacteria in addition to the lactic acid producers. The milk should be heated at 160°-165°F for 30 minutes. After cooling, add 3.0% starter culture and incubate at 70°-75°F for 16-18 hours.

Kefir

Kefir is a unique liquid cultured milk product manufactured from either whole milk or skim milk. The starter culture used is a mixture of lactic acid bacteria and yeast. The yeast fermentation imparts a slight carbonation and alcohol level to the product. Kefir cultures and manufacturing instructions are available through many retail health food outlets.

Table 1.

Table 1. Age and weight to breed heifers and gestation period.

Approximate Breed	Approximate Weight	Breeding Age (months)	Gestation Period
Ayrshire	600-700	14-15	278
Brown Swiss	750-850	14-15	288
Guernsey	556-650	14-15	283
Holstein	750-850	14-15	278
Jersey	500-600	14-15	278

Table 2.

Table 2. Nutrient requirements during the dry Period (Last 2 months of gestation) NRC 1989.

Body Weight	Crude Protein	TDN	Ca	Phos
----------(lb)----------				
900	1.54	9.21	.059	.036
1200	1.90	11.43	.079	.048
1400	2.17	12.83	.092	.056

Table 3.

Table 3. Total production and nutrient content of manure from various farm animals (88% water).					
Dairy Animals Size (lb)	Total Manure Production (lb/d)	Water Percent	Nutrient Content (lb/day)		
			N	P	K
150	13	88	.06	.011	.04
250	22	88	.11	.023	.07
500	43	88	.22	.024	.15
1000	80	88	.45	.094	.29
1400	120	88	.63	.131	.41.