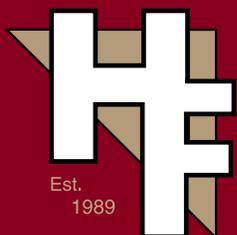


Working With Dairy Cattle



**HOLSTEIN
FOUNDATION**

"Developing Dairy Leaders for Tomorrow"

“Working with Dairy Cattle” is designed for youth interested in developing a dairy cattle project. It was created to help young people build skills in selecting, raising, and managing a dairy heifer from a calf to a milking cow.

For more information contact:

Holstein Foundation
 PO Box 816
 Brattleboro, VT 05302-0816
 Telephone: 800-952-5200

Information and editorial guidance provided by:

Kelli Dunklee
 Ed Peck
 Dr. Katherine M. Swift
 Lindsey Worden

Objectives of Working with Dairy Cattle

Your heifer project will provide you with an opportunity to raise dairy calves and learn more about various management procedures. This handbook is not a complete directory of everything you will need to know to raise a calf. Instead, it is a guide which provides hints that will help make your experience of raising a calf both educational and successful. The information provided has been collected from a variety of sources such as state extension bulletins, University publications and 4-H handbooks.

Becoming involved with cattle will give you the chance to raise and care for dairy animals, from calves to cows. A project such as this can help you ...

- develop basic techniques in feeding and caring for an animal;
- learn the principles of good record keeping;
- develop basic marketing principles;
- gain experience in buying, developing and showing an animal;
- learn how to present an animal and yourself before the public;
- develop good, personal character;
- gain leadership experience.

Local breed clubs, 4-H clubs and FFA chapters may offer additional aid and instruction to help you get involved in the dairy industry. Two approaches that have been used are:

1. THE “BIG-BROTHER” APPROACH - You may be assigned to an individual adult who is knowledgeable about dairy cattle. The adult will assist and advise you in selecting a calf, feeding the heifer, breeding her, preparing for a show and any other management decisions you need to make.
2. THE PROJECT LEADER and ASSISTANT - Two or more adult leaders will work as a unit to help the group of youth interested in dairy with the management decisions outlined above. The leaders either volunteer or are appointed.

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Selecting Your Heifer

As you begin your project, you must decide whether you want a replacement project or a breeding project.

A replacement heifer will be sold just prior to calving. You will make arrangements for selling the animal at that time.

A breeding project includes calves that are kept and raised beyond calving. You will need to learn more about milking procedures and develop other skills necessary for managing lactating animals.

When beginning your search for a project animal, you should consider getting assistance or advice from an experienced breeder. This may be a knowledgeable neighbor or even a family member such as a parent or sibling.

Whomever you choose should help you decide what selection information is important. What are your goals for this project? Most people want to have a show winner. However, to be profitable and stay in the herd, your heifer will have to be a good producer with functional type when she is a mature cow. Make certain that the selected animal fits your overall goals for this project.

With your goals clearly in mind, you may begin searching for your project animal. Neighboring breeders or your own family are often a good place to begin the process. They may be willing to sell you a high-quality calf at a reasonable price. Buying from someone you know also provides the advantage of knowing the environment where the calf was born and where the dam is producing.

Local breed sales and herd dispersals are other options for purchasing your animal. Breed sales tend to emphasize animals of higher genetic merit and ancestor performance. For this reason, animals in breed sales tend to sell for a higher premium. Higher price, however, does not guarantee a superior animal.



Herd dispersals are different from breed sales as the animals are from one particular herd when the dairy is no longer continuing operation. Dispersals include both the top and bottom of the herd and, as with any sale, need to be considered on an individual animal basis.

The environmental conditions in which a calf is born and its ancestors are kept play a large role in each animal's performance. Therefore, you must consider management of the herd you purchase from. You want to begin your project by investing in a superior animal.

When looking for a calf, you likely will use pedigree information to make wise purchases. Pedigrees provide performance and genetic facts needed by potential buyers.

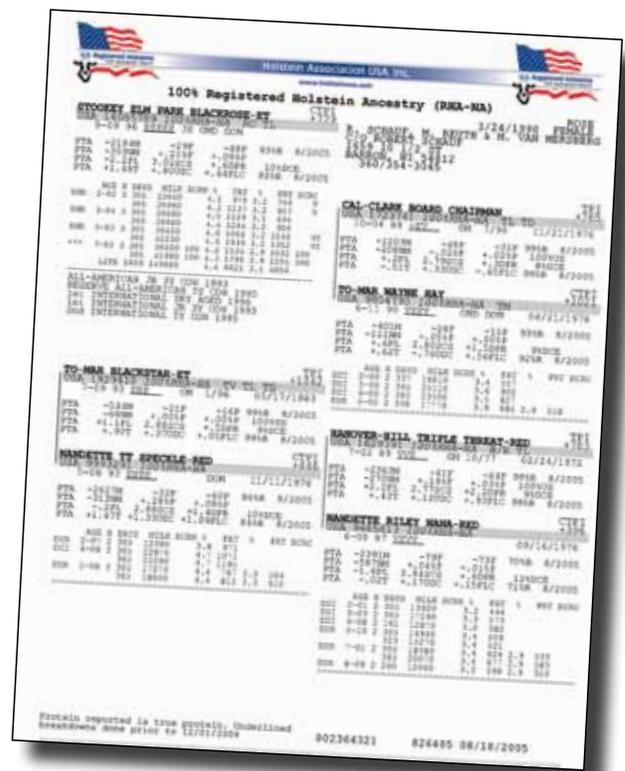
A pedigree is simply a record of an animal's ancestry. It provides genetic and performance information on the individual and its ancestors. Sire and dam information can help predict how well a heifer will milk and classify as a mature cow. You should look for the pedigree information that will tell you how close that animal might come toward meeting your specific goals.

To effectively analyze a pedigree, you should be familiar with the information provided on it. The Holstein Foundation workbook, *“Pedigree Questions and Answers,”* covers this topic in more detail. Some information provided on pedigrees includes:

1. **PTPI (Pedigree Total Performance Index)** estimates the ability of the young animal to transmit a combination of production and type traits.
2. The **P level** indicates the young animal's percentile ranking based on PTPI and compares registered animals of the same sex born in the same year.
3. **PTAs (Predicted Transmitting Abilities)** express the level of genetic superiority that an animal is expected to transmit to its offspring for a given production or type trait. These values are used to rank animals based on their genetic merit.
4. **TPI (Total Performance Index)** and **CTPI (Cow TPI)** combines PTA protein, PTA fat, PTA type and Udder Composite index to rank animals on their ability to transmit a balance of these four traits.
5. The **Udder Composite index (UDC)** combines linear type trait information on seven udder traits into a single number value.

When reviewing a calf's pedigree, consider the following:

- a. The dam should have above average PTAs for milk, fat and protein production. The cow should be functionally sound for type. Evaluate her classification for final score and udder and be certain that her hind legs and feet are free of serious defects.
- b. The sire should be high-ranking for PTAs of the production traits as well as for overall type. He also should improve one or more functional type traits. Functional type traits include the udder traits and rear legs and feet.
- c. The maternal grandsire also may be evaluated for genetic merit when performance information on the dam is not available. (For example: if the dam is a two-year-old with no completed production records or no PTA information.)



A calf sired by an outstanding, young, unproven sire also could be selected for your project, providing the sire meets your individual pedigree requirements. His dam should have a high genetic merit for milk, fat and protein and have an acceptable classification score. The young bull's sire should be among the breed's top bulls based on his PTAs for both type and production.

You may choose to study the records of maternal sisters and the maternal granddam to further evaluate the pedigree. However, primary emphasis should be given to the sire, dam and maternal grandsire.

The following checklist describes some pedigree information that you may find helpful in your selection. Generally, you will want the heifer's sire and dam to be above average for these genetic measures.

- What is the heifer's PTPI?
- What is her P level?
- What are the sire's PTAs for all production traits?
- What is the sire's PTA for type?
- What is the sire's TPI?
- What is the dam's CTPI?
- What is the dam's PTA for protein, fat, milk and type?
- What are the dam's milk production records?
- What is the dam's final classification score?
- When is the animal born?

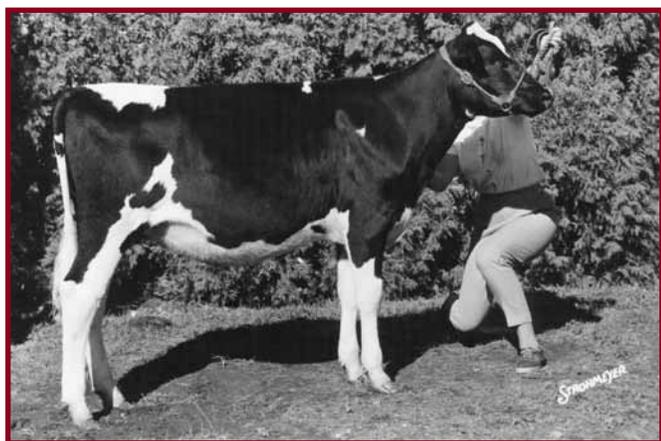
Even though we recommend that these performance guidelines be met, common sense and good judgement should be used when selecting your project heifer. Careful consideration also should be given to the physical appearance of the animal itself.

For young animals, major emphasis should be placed on functional type traits that will determine whether the calf will develop into a productive cow. A heifer that has good feet and legs and shows outstanding breed character with a deep, open-rib has a better chance of developing into an outstanding dairy cow.

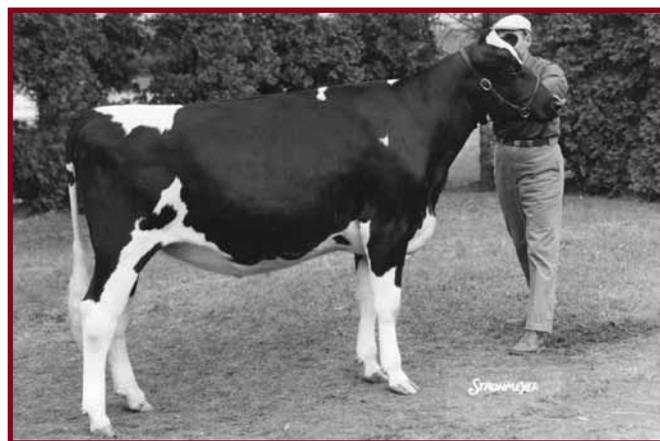
Udder development is difficult to predict; however, teat placement can be emphasized in young heifers. Future teat size also can be determined fairly accurately. Udder shape and strength of attachments in a heifer are difficult to determine, except occasionally when the udder has begun to develop.

If you select your heifer by combining pedigree promise and physical appearance, you will have a better chance of developing a top animal. Of course, proper care and management also must be followed.

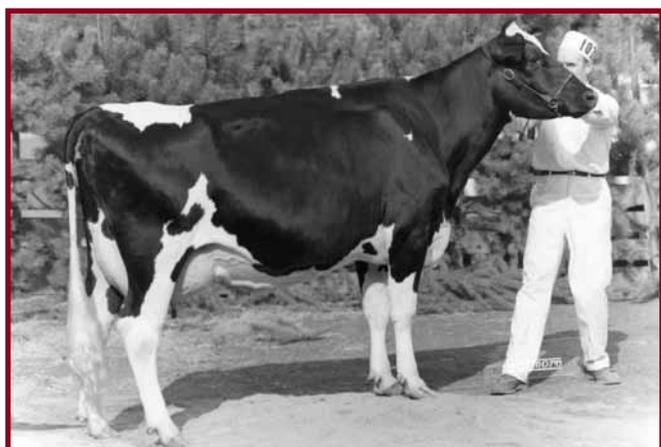
From a Calf to a Cow



Triune as a calf.



Triune as a yearling.



Triune as a young cow.



Triune as a mature cow.

Feeding Your Heifer

No matter how good your heifer looks or how high her genetic make-up is when you start your project, proper feeding and management is of primary importance in raising a healthy dairy animal. As the heifer grows, she will go through various stages of nutritional requirements. You should be familiar with all of them to be certain that your investment remains healthy and productive.

The information included in this workbook should give you a general idea of how to meet your animal's nutritional needs. However, it should be viewed merely as recommendations. For more information on proper ration balancing and specific feeds best for your situation, you should contact a professional dairy nutritionist.

Feed for your heifer can be grouped into two general classes: forages, such as grass, hay and silage; and concentrates, such as corn, oats and soybeans. Dairy cattle are considered ruminants because they can utilize forages by digesting fiber, which is forage's major component.

All feeds can be sources of nutrients. The six major nutrients needed by dairy cattle are carbohydrates, fats, protein, minerals, vitamins and water. These nutrients are used by the animal for body maintenance, milk yield, growth, pregnancy and body conditioning. For practical purposes, body maintenance and growth needs are the major factors to consider in calf and heifer rations. Body maintenance and milk production are the main needs for dairy cows.

A calf's nutritional needs are the most crucial immediately after its birth. The calf is born with little or no protection against disease. But, Mother Nature has allowed for protection by having cows produce colostrum. Researchers recommend feeding 4 quarts of colostrum within the first six hours of life.

Colostrum is the first milk secreted by the cow after giving birth. Colostrum is the best source of nutrients for a newborn calf. It also provides calves



with antibodies that will help develop resistance to diseases and infections. Colostrum is one of the most important steps to increasing survival and health of newborn calves. The total amount of colostrum fed within the first 24 hours should equal 12-15% of the calf's birth weight.

Once the calf has been fed colostrum for a day or two following birth, it should be fed an amount of whole milk equal to eight percent of the calf's birth weight each day. If your calf weighs 90 pounds, for example, feed 7.2 pounds of milk daily. An equivalent amount of high-quality milk replacer or stored colostrum may be used instead of whole milk. When the calf is four weeks of age, the milk can be diluted gradually by increasing the amount of water. A healthy calf can be taken off the milk diet completely when it is 6-8 weeks old provided that it has begun eating a balanced grain mixture. This process of changing the calf's diet from milk to water, grain and forages is known as "weaning."

Successful early weaning occur when calves begin eating a starter ration at an early age. Starter feed is the first feed offered to calves. It should be a very palatable, coarse-textured or pelleted concentrate.

You can encourage a calf to eat starter by placing a handful of starter in a milk pail or on the calf's muzzle immediately after it has finished drinking milk. Keep the starter fresh by feeding small amounts. Once the calf is consuming 1.75 to 2 pounds of starter a day and begins eating good quality forage for three consecutive days, it is ready to wean.



Forage is an important part of a dairy heifer's diet

When the liquid feed portion of young calves' diets is reduced at weaning, the calves must be fed adequate substitutes. These substitutes should be a good quality free-choice grain mixture and an ample supply of high-quality forage. Calves and older heifers require a high level of nutrition for continued normal growth.

There are additional reasons besides weaning to start calves eating grain and forages at an early age. An important part of early calf nutrition is to develop a fully-functional rumen. Immediately after weaning, young heifers consume smaller amounts of forage compared to the amount of grain mixture. This ratio will change as the calf's rumen develops.

Supply free-choice hay in an area easily accessible to the calves. The forage should be fine-stemmed, mold-free, hay that is a mixture of legume and grass. As the calf grows and develops, forages can become a higher proportion of its diet and slightly lower-quality forage may be fed. After the calf is 6 months old, pasture also can be used as forage when an adequate amount is available.

Heifers need supplemental grain regardless of the type of forage fed. The grain mixture should have a high protein level. The amount of grain fed will depend upon the animal's age and on the forage quality.

Total mixed rations (TMRs) are a mixture of all feeds eaten by the animals, including forages, grains and minerals blended together and fed free-choice to animals. TMRs can be fed to heifers at least 2 months of age and are recommended particularly for heifers

older than 6 months. Feeding complete rations encourages heifers to consume several small meals during the day and leads to better feed digestion.

The objective of a proper feeding program for heifers is to encourage rapid growth without excessive fattening. Periodically checking weight and height of heifers also can help you evaluate your feeding program. Use a scale or a tape to monitor heifer weight gains. Also observe body condition and skeletal growth. Over-conditioned heifers may be receiving too much feed or the ration may be low in protein. Lack of condition generally indicates underfeeding or poor-quality feed.

The following table lists recommended Holstein heifer weights and heights based on age.

Age (Months)	Weight range (lbs)	Height range (inches)
1	100 - 150	32 - 36
2	125 - 200	33 - 37
3	190 - 250	34 - 38
4	225 - 300	36 - 39
5	290 - 350	37 - 41
6	330 - 400	38 - 42
7	390 - 450	40 - 43
8	430 - 510	42 - 45
9	500 - 575	43 - 46
10	550 - 625	44 - 48
11	600 - 675	46 - 49
12	650 - 725	47 - 50.5
13	700 - 775	47.5 - 51
14	750 - 825	48 - 51.5
15	800 - 900	48.5 - 52
16	850 - 950	49 - 52
17	900 - 1000	49.5 - 52.5
18	950 - 1050	50 - 52.5
19	1000 - 1100	50 - 53
20	1050 - 1150	51 - 53
21	1100 - 1200	51.5 - 53.5
22	1175 - 1300	52 - 54
23	1250 - 1450	53 - 54.5
24	1300 - 1500	53.5 - 55

Source: Cargill Animal Nutrition

Housing for Your Heifer

Until your calf reaches 10 weeks of age, and for the first several weeks after its purchase, you should keep the calf in an individual pen or calf hutch. This is the best way to prevent spreading disease.

Your calf's pen can be quite simple. However, several features you should consider in selecting or building individual pens are:

1. The pen should have solid walls on three sides to prevent drafts and keep calves from sucking each other, and be easy to clean.
2. The pens should be approximately 24 square feet in size with a water cup, grain box and hay rack within the walls.
3. The calf should be well-bedded with material that will keep it both clean and dry.
4. The pen should provide adequate ventilation.
5. The pen should be in a convenient location with an arrangement that will encourage quality care and observation.

Your calf may be moved to a pen with other weaned calves of similar age when it is weaned and consuming adequate hay and grain. This pen also should be clean, dry, well-ventilated and provide shelter for calves during bad weather.

Weaning time is a critical and stressful period in a dairy calf's life. Sound management practices will help to minimize the stress. Maintaining a clean, fresh supply of water, weaning calves from milk and milk replacers two weeks prior to moving them, and weaning in small groups will help reduce the calves' trauma.

As the calf grows, it may be placed in larger groups. But, about 25 square feet per calf and adequate feed space always should be allowed. Shelter does not have to be fancy. The shelter merely should provide protection from bad weather and be clean and well-bedded. Proper ventilation and humidity control will promote growth and reduce incidence of respiratory diseases in confined calves.



Health and Management of Your Heifer

Your animal's health will be another critical management area in raising a sound heifer. After purchasing your heifer, you should contact a local veterinarian. This will give you a chance to become acquainted with the vet before your heifer requires health care. Be sure to know the veterinarian's phone number so that you can call immediately when your heifer becomes ill or is injured.

The following section will give you broad information on general health and management procedures. For further information, contact your adult leaders or veterinarian. If your heifer shows any signs of illness, don't wait long to request assistance.

Disinfect Navel at Birth

When caring for a newborn calf, the navel should be dipped with an iodine solution to prevent infection. Since the navel's umbilical vessels connect directly to various internal organs, infection at this site can be very harmful to the newborn. Dipping the navel must be done shortly after birth and before the navel is dry.

Identification

Positively identify each calf before removing it from the dam. Permanent identification is required to register purebred calves. Correct identification records also are needed for genetic evaluations of the animal, its parents and its progeny. You may use a numbered neck strap or plastic ear tags for temporary identification. Enter ear tag numbers, registration numbers, birth dates, and identifications of the sires and dams of calves in a permanent record book.

Extra Teats

A good udder with four well-placed teats is important. Extra teats on an udder are unsightly, may become a site for infections, and may interfere with machine milking. A calf's extra teats should be removed as soon as they can be identified. Make sure the teat is an "extra." To remove any extra teats, clean and disinfect the area with iodine and snip the teat off cleanly with a serrated, curved shears.

Extra teats should be removed when a heifer is 2-6 weeks old and still is small and easy to handle. Only an experienced dairy farmer or veterinarian should attempt to remove teats from older heifers or cows.



Vaccination

Vaccines are available to prevent many diseases. However, all vaccinations are not necessary in all herds. No vaccinations should be used without a veterinarian's recommendation and approval. The basic vaccines to consider for routine use are listed in the following table.

Disease	Initial immunization	Booster
RHINOTRACHEITIS	4 to 6 months old single injection of Modified live vaccine	Booster with killed product 1-2 months before breeding then Booster yearly
PARAINFLUENZA	4 to 6 months old single injection	Booster with killed product 1-2 months before breeding then Booster yearly
BOVINE VIRUS DIARRHEA	4 to 6 months old single injection of Modified live vaccine	Booster with killed product 1-2 months before breeding then Booster yearly
BRSV	4 to 6 months old single injection	Booster with killed product 1-2 months before breeding then Booster yearly
BRUCELLOSIS	Heifers, 4 to 10 months old Age varies by state	None - vaccination must be given by vet
BLACKLEG	Single injection or combined vaccine	Repeat in 3 weeks Booster yearly
LEPTOSPIROSIS	Single injection or vaccine containing five species	Repeat in 3 weeks Booster yearly
CALF SCOURS ROTA-VIRUS	Calves, orally at birth	Cows, 1 month before calving
E. COLI	Oral vaccine for calves at birth Cows - injections 2 months & 3 weeks before calving	Booster at 30 days in milk
PINKEYE	Heifers, beginning of fly season	Repeat in 3 weeks to 1 month Repeat again in the middle of fly season

All given in combination.

Dehorning

Horns serve no useful purpose for modern dairy cattle. They can be a nuisance and often cause body and udder injuries. Proper dehorning while horn buttons are very small can be a neat, clean job that causes the animal little discomfort. Several methods of removing horns exist. The best method depends on your resources and preference.

Caustic potash sticks work well when the calf is very young. By moistening the stick and rubbing it on the horn button, the caustic will work at destroying the horn. Caution should be taken to prevent using too much caustic and to avoid contact with your skin or other calves. Use on calves over 3 weeks old.

Electric or gas dehorners are similar to soldering irons and can be used to destroy horn buttons by burning to kill the nerves and blood vessels supporting the horn's growth. Use on calves over 4 months old.

Gouging or scooping out the horns with proper equipment can be done by experienced individuals. However, it may cause excessive bleeding and serious infections.

Saw or horn clippers can remove large horns on older animals. This method requires more labor and should be done during the winter to avoid infection and contamination by flies.

Scours

Scours, a health problem of young calves, is characterized by diarrhea and dehydration. The two main sources of scours are infections and nutritional imbalances. When this problem exists, continue to feed milk, feeding smaller amounts more often.

Feed electrolytes in between times. These solutions can be purchased from veterinarians or farm supply stores. Always provide sick animals with a warm, dry place that is isolated from other animals. Gradually replace the electrolyte solution with milk as the calf recovers. Calves with severe scours, dehydration, or unable to rise need veterinary care.

Pneumonia

Poor ventilation, stress and constant exposure to pneumonia-producing organisms make calves more prone to pneumonia. A calf's temperature is the best indication of whether it is sick. Normal rectal temperature is 101- 102 degrees F. Calves with pneumonia often have a temperature over 104 degrees F in addition to having labored breathing.

Unless you are experienced with calves that have pneumonia, contact your veterinarian. Antibiotic treatment usually is suggested for calves with elevated temperatures. Fresh air and sunshine often aid recovery.

Hoof Care

Hoof care has a significant impact on a cow's mobility and how well she milks. Proper foot care is important because infection resistance, mobility and conformation affect an animal's production level and also performance at shows. To establish a foot-care program, you must determine when an animal's hooves need to be trimmed. In pasture conditions, feet usually don't need to be trimmed. However, with confined housing, such as tie-stall or free-stall barns, routine trimming of dairy animals' feet becomes essential. Until you are familiar with the procedures and skills necessary to trim the hooves yourself, it is recommended that you hire a

professional trimmer or consult your veterinarian or adult leader.

Other Problems

You should become familiar with other potential health problems as you get involved in your dairy project.

Fly control is very important to help keep your heifer free of disease. You should keep her pen clean at all times to reduce fly breeding areas and use a form of fly control daily during the fly season on the heifer and the environment.

Ringworm is an unsightly skin disease, but it causes no economic losses. Ringworm lesions caused by this fungus infection generally heal without treatment in 2-3 months, although surface treatment with fungicides or antiseptics will decrease recovery time. This disease can spread to people.

Bloat is an extreme accumulation of gas in the calf's stomach. It may be caused by abnormal feeding. The accumulated gas must be released immediately and a veterinarian should be contacted.

A **navel hernia** occurs when the abdominal wall at the calf's navel does not close properly. It can be identified by a lump in the abdominal area of the animal. Most navel hernias are caused by a navel infection and should receive attention from your veterinarian.

Pinkeye is characterized by reddening and swelling of the eye membranes and watery discharge from the eye. Treat cases promptly with antibiotics and shield the affected eye from sunlight with an eye patch.

Internal parasites may cause loose stools and fresh blood in feces. Follow a deworming program for pastured animals since they are likely to become infected with stomach worms. Consult with a veterinarian to diagnose the parasite and formulate a treatment and prevention plan.

Preparing Your Cattle for Show or Sale

Whatever plans you have for your heifer, make certain that she is kept fit and in proper condition. You easily can adjust any plans for your heifer in a relatively short time, when she consistently is kept in good condition. A well-kept heifer looks better in a show, sale or advertisement and can bring additional pride to its owner.

Training

You should properly train your heifer to lead even if you do not plan to show her. A trained heifer is easier to work with on a daily basis. Training begins by tying your animal with a rope halter so that she becomes familiar with it. Once she has become comfortable with the halter, teach her to walk forward slowly. Your heifer should take short steps while keeping her head up and alert. She eventually should begin walking forward when you exert only slight pressure on the halter.

Teach her to easily set up in the proper leg positions. For calves and heifers, the rear leg closest to the camera or judge should be set slightly back. For cows, the leg nearest should be slightly forward. In both cases, front feet should be placed squarely underneath the shoulders.

With proper training, your animal should lead in a way that will help overcome her faults. Use a leather show halter during the last part of the training to get the animal accustomed to the chain under her jaw.



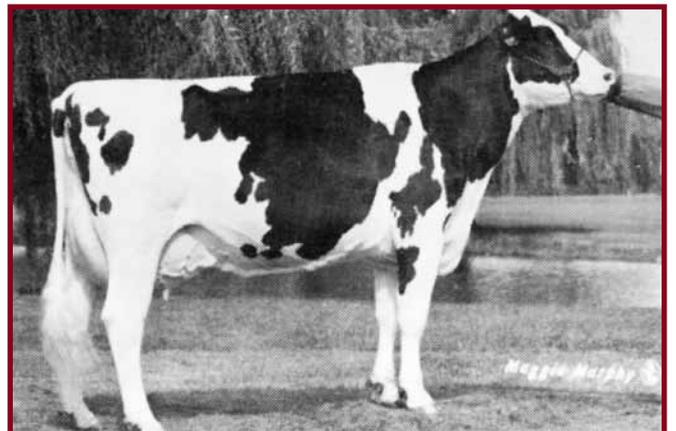
Fitting

To keep your animal looking her best, you should follow proper feeding practices. You also should keep her hooves trimmed and in good condition. Nothing will make the hair coat shine better than a daily brushing and rubdown. Regular washing also will help to keep your heifer clean and easy to manage.

Clipping can accent your heifer's strengths and detract from her weaknesses. Clipping can be tailored to each individual animal although the basics are the same for all animals. Final clipping should be done about two days before a show or sale. The best way to learn how to clip is by watching experienced people and then practicing on your own.



When setting up a heifer the rear leg nearest the judge/photographer should be set back.



For a cow, the nearest rear leg should be set slightly forward.

Merchandising

Merchandising is an important aspect of the registered dairy cattle business. If you have the opportunity to sell one of your animals to another producer for a good price, don't hesitate to do so.

Selling your animals is the best way to promote your breeding program. The sale income should be enough so that you could buy another animal or two for yourself. Various outlets to merchandise your animal include private treaty sales, consignment sales, invitational sales or through a consultant.

Showing

Local, state and national shows help to promote your cattle as well as yourself. Receiving a high placing on your animal can be rewarding for you and possibly increase your animal's value at the same time.

When showing, your main responsibility is to have your animal look her best at all times. To do this, you need to be as prepared as your animal. Not only should your cattle be well-kept, but you also should have a clean, neat display and be courteous to other people at the show.

With patience and experience you will learn how to show your heifer in a manner that will attract attention to her strengths and overcome her faults. This task can be difficult for even the most experienced exhibitor, but practice will help improve your technique.

Advertising

You may wish to advertise your heifer to get the word out about her quality. This can be done in your state breed magazine as well as in local publications. Advertising will alert others about your heifer and give you a chance to display her merit and your accomplishments with her.

You should try to include several items when developing an ad for your heifer. Most important is a professional quality picture that has been carefully posed to exhibit the heifer at "her best." This, along with a good headline, will attract attention to your ad and get people to read it.

Secondly, include type and production information on your heifer's sire and dam. Depending on the size of the ad, you also might want to include the dam's picture.

Thirdly, you'll want to include the name and performance information on the service sire if your heifer is bred.

Finally, you'll want to mention some specific details about your heifer. Such items may include: show placings, perhaps your heifer's size and milk production records if she has calved.



Selecting a Service Sire for Your Heifer

You must keep a number of items in mind when selecting a service sire for your heifer. First, make sure your heifer is growthy enough to be bred. If you've done a good job caring for her, she should be ready to breed at 12 to 15 months of age. A weight of at least 800 lbs. is desirable at the time of first breeding.

Next, use semen from the best service sire you can find and afford to buy. He should be higher ranking than your animal's sire to achieve genetic progress in your breeding program. Production and type proofs of the service sire should rank high among the breed, and, the higher the better! The more selective you are, the more valuable your heifer will be if you sell her and the more her offspring will be worth.

Finally, select a high-ranking service sire that also transmits strengths which offset one or two major weaknesses of your heifer. Emphasize the trait or traits within your specific breeding goals that need the most improvement. When selecting a service sire for a heifer, also consider the sire's calving-ease score. A well-grown heifer bred to a calving-ease sire has fewer calving problems.

Sire Summaries are an excellent source of information on sires that you may want to consider. Calving ease information also is provided. For more information on how to use Sire Summaries, refer to the Foundation workbook, *"Understanding Genetics & The Sire Summaries."*

Sire Selection Checklist

The following checklist includes some criteria you may want to consider when selecting service sires for overall herd improvement.

- Traits to be emphasized according to herd breeding goals
- PTA values for production and type traits
- Linear Composite Index values
- Reliability of bull information
- Availability and cost of semen
- Pedigree information
- Calving ease of service sire

If you are rebreeding a cow who previously has calved, you should consider the same basic criteria as when selecting a service sire for a heifer. It is recommended that cows be bred back 45-90 days after calving to maintain an economical reproductive cycle.

Watch your animal for heat closely during her next estrous cycle following breeding. If she does not come back into estrus, she may be pregnant. For lactating cows, milk progesterone tests can be done which may indicate if a cow is near heat or not. A vet should pregnancy check your animal two to three months after breeding if you suspect she is pregnant.

The gestation period of dairy cattle is about 280 days. However, it can range from 275 to 285 days and still be considered normal.

Preparing for Calving

A maternity stall should be provided for your heifer or cow to calve. The pen should be thoroughly cleaned and disinfected. A good method is to scrub the stall with hot water, soap and disinfectant with a bleach solution.

Apply lime or other granular material to the floor before covering it with adequate amounts of dry, comfortable bedding. This will provide better footing which may help prevent stifle injuries and udder trauma during calving. A well-drained paddock or small pasture with shade is a good calving area during mild, dry weather.

When the birthing process begins, observe your animal frequently to make sure the birth is progressing normally. Most cows calve without assistance. However, if complications occur, call your vet or other experienced adult for assistance. Heifers and younger cows are more likely to require assistance than older cows.

Following Delivery

Once the calf is delivered, immediately clean the mucus from its nostrils and make certain that it is breathing properly. If the calf fails to start breathing, stimulate the nerve in the nostril. This can be done by various means, but inserting a piece of straw about two inches up its nostrils usually works well.

Normally, the cow will start licking the calf. This not only dries the calf, but also stimulates blood circulation. If the mother doesn't lick the calf, rub it briskly with a cloth. Immediately after birth, disinfect the navel cord and make sure the calf receives colostrum.



Milking Procedures

Like most other mammals, cows produce milk to feed their young. However, modern dairy cows have been bred to produce far more milk than a calf ever could consume. This milk is produced from a mammary gland which we refer to as “the udder.” You must know how to properly milk and care for a lactating cow to insure good health and top production.

The milk taken directly from a dairy cow has excellent quality. This quality cannot be improved, only maintained. For this reason, it is very important that you control milk contamination from outside sources. Potential contaminants include unhealthy cows, a dirty environment, unsanitized milking equipment or polluted water sources.

Milk production should help you make a profit in your dairy project. Efficient and proper milking techniques will help you get the best returns from your breeding, feeding and herd health practices. The following milking procedures are recommended:

1. Check for abnormal milk. Before cleaning the teats, check for abnormalities in all four quarters by stripping-out a few streams of milk. If the milk shows signs of mastitis, the cow’s milk should be kept out of the milk supply and the cow treated accordingly.

2. Wash the udder with an approved sanitary solution mixed in warm water. Remove any dirt particles that are present on the teat to prevent them from entering into the milk. Washing the udder also will stimulate the cow’s brain to release the hormone oxytocin into the bloodstream. Oxytocin releases the milk within the udder and prepares for its removal from the body.
3. Dry the teats thoroughly. This is particularly important. When teats are not dried completely, droplets of liquid containing dirt particles and infectious organisms form on the teat ends. The vacuum created when the milking machine is placed on the cow can cause these contaminants to be back-jetted into the udder. Wet, dirty teats also adversely affect milk quality.
4. Pre-dipping teats generally is recommended to kill any harmful organisms remaining on the teat. The approved pre-dip solution should be left on the teat approximately 15 seconds. Again, be sure to dry the teats thoroughly. If pre-dipping is done, you may choose to skip the washing step.
5. Attach teat cups one minute after you began stripping the teats. Try not to allow a teat cup to squawk. Squawking means air is being admitted into the teat cup causing a reverse flow of air in the other teat cups. This increases the possibility of bacteria being jetted into the milk and even the udder itself.
6. Remove the machine by turning off the vacuum at the claw when milk flow has ceased. Most cows require four to seven minutes to completely milk out. Do not machine strip the cow by holding down on the machine before removing it. Machine stripping is an unnecessary means of removing residual milk from the udder and may cause serious stress and injury to the udder.
7. Dip teats in an effective sanitizing solution immediately after removing the milk machine to kill any lingering bacteria. Dipping teats also helps protect the teats from bacteria between milkings.



Make sure your milking equipment is clean and sanitary before milking each cow. The equipment also should be checked regularly to make sure that it is functioning properly.

Dairy Herd Improvement (DHI) records can be an excellent tool to manage your herd's milk production. The DHI Association is a nationwide milk-testing service which measures milk quantity, components and quality on a regular basis. These records can lead to increased income. The reports can help you determine how much to feed each cow to meet her individual needs. They serve as a day-to-day management guide, helping you identify the lower-producing, unprofitable cows to cull.

If your herd already is enrolled in a DHI program, new cows will be enrolled automatically when they freshen with their first calf. If your herd is not on

test, contact the state DHIA or local extension office to get additional information about enrolling your cows in a testing program.

An additional option available through a regular DHI program is Dairy Herd Improvement Registry (DHIR). DHIR is similar to Official DHI, but is available only for registered cows. It often is used to help sell cattle since the DHIR pedigrees have more production information, such as 365-day records and complete lactations. DHIR also tracks cows for Honor List and other recognition programs.

Another option, the DHI Somatic Cell Count Program (SCC), helps determine the level of udder infection present in each cow. You can use the SCC information to monitor udder health, select cows for treatment, identify animals that should be culled and identify healthy cows for purchasing.

Milking Cows Tips

- Avoid exciting the cows and handle them carefully so they associate milking with a pleasant experience.
- Use individual paper towels or cloths to clean each udder.
- Milk cows with healthy udders first.
- Milk mastitis infected cows last.
- Milk cows treated with antibiotics separately for the recommended withdrawal period. Milk contaminated with antibiotics cannot be used for human consumption.
- Cull cows with badly damaged udders and chronic mastitis.



Feeding the Lactating Cow

Nutrition is the single most important factor in determining the level of milk production. Feed also accounts for over one-half of the cost related to producing milk. Therefore, nutrition and feeding may be the key to success in your dairy project. Feeding and management guidelines for the calf from birth to freshening were discussed earlier. Following are similar guidelines for your lactating cow.

Forage Consumption

Approximately two-thirds of the total nutrients fed to cows come from forages. These forages' quality is a very important factor influencing milk production. One indicator of forage quality is dry-matter content. Dry-matter is the total amount of nutrients and material that would remain in a feed if all of the water was removed.

Estimated daily intake of forages is based on a cow's body weight and forage quality. The following guidelines are suggested for estimating consumption of air dry hay (90% dry matter) fed free-choice:

Forage Quality	Lbs. daily intake/ 100 lbs. body weight
Excellent	3.0
Good	2.5
Average	2.0
Fair	1.5
Poor	1.0

If silage is substituted for dry hay, you should estimate three pounds of silage for each one pound of expected hay intake. Pasture intake usually will be higher than silage at the same dry-matter percentage.

Research indicates that forage intake can be stimulated by feeding several times daily and by providing a variety of forages.



Concentrate Feeding

While the dairy cow has considerable rumen capacity, her large nutrient needs cannot be met by forages alone. Concentrates increase a dairy ration's energy content. The concentrate mixture you feed should include grains, mill feeds, protein supplements and minerals.

The kind of mixture fed will vary with the source and cost of ingredients as well as the animal's protein requirement. The amount fed will depend on forage consumption and the animal's needs above those supplied by forages, including needs for milk yield and composition. Concentrate intake is affected by palatability and the amount of time the cow has to consume the feed.

TMR Feeding

A total mixed ration (TMR) fed free-choice is an excellent means of increasing a lactating animal's feed intake. However, with a TMR, careful ration balancing and a more complex feeding system are necessary. If you are considering using a TMR, it is recommended that you work with your local feed mill or a private feed consultant. They can help you establish a feasible and efficient feeding program.

Points to Remember in Feeding for Milk Production

1. Feed young, growing cows for more than maintenance and milk production to insure continued growth and development.
2. Finely ground forages should not be fed separately to lactating cows. They tend to lower milk components.
3. It is best to always feed some hay with silage.
4. Have water available at all times. Cows in full production will consume three to five pounds of water for each pound of milk produced (including water in feed).
5. Cows should be brought into peak milk production as soon as possible after calving. This can be accomplished best by gradually building up the amount of grain fed until there is no further increase in production. The amount of grain fed should be adjusted throughout the lactation as milk production changes.
6. Work with a veterinarian or nutritionist to develop the best ration for the environment and feeds available.

Treatment During the Dry Period

Prior to their next calving, lactating cows need a period of rest from producing milk. This time, known as the dry period, allows the cow to restore body reserves and use additional nutrients for final growth and development of the calf she is carrying.

The recommended length of a dry period is 45 to 60 days, but it can vary slightly depending on a cow's age and her physical condition. When a cow is dried off, you should do it abruptly. Removal or reduction of feed often is useful in reducing milk production.

During the drying-off process, the udder should be checked frequently. After the last milking prior to the dry period, treat each quarter with an antibiotic recommended by your vet. Treatment of dry cows is important to cure any existing infections that have persisted through the lactation. Most new mastitis cases occur at the beginning of the dry period. Infusing each quarter after the last milking also prevents many new infections.

A low-energy ration should provide sufficient amounts of protein, minerals and vitamins during the dry period. This allows cows to calve with adequate but not excessive body fat, protein and nutritional reserves.

Grass forages are ideal for dry cows. They provide the cow with feed that can be consumed in large quantities without supplying a high level of nutrients she does not need.

The grain requirement is minimal. However, feeding at least three pounds per cow daily throughout the dry period is recommended.

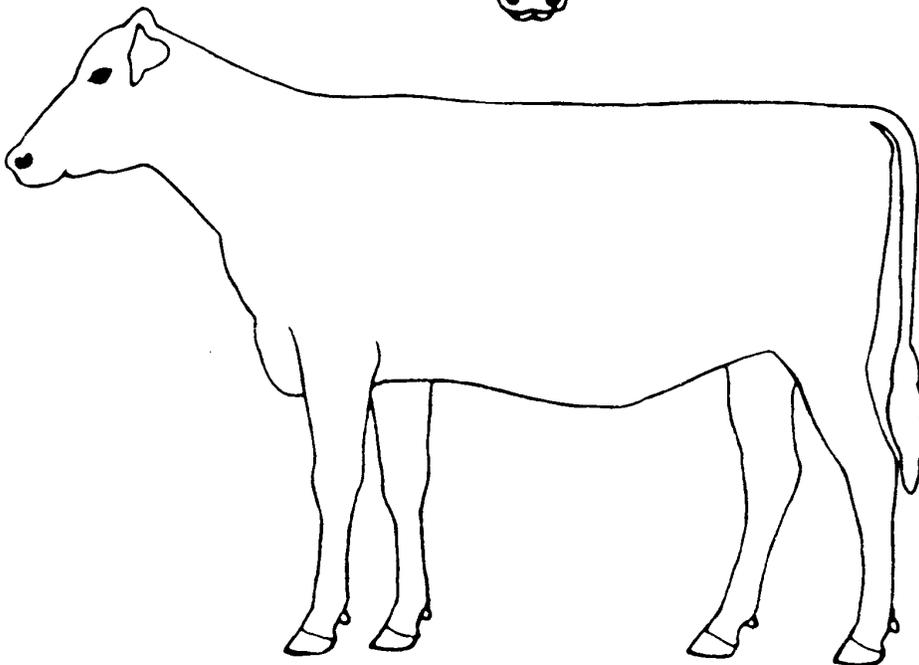
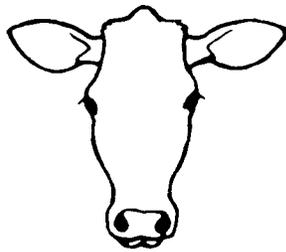
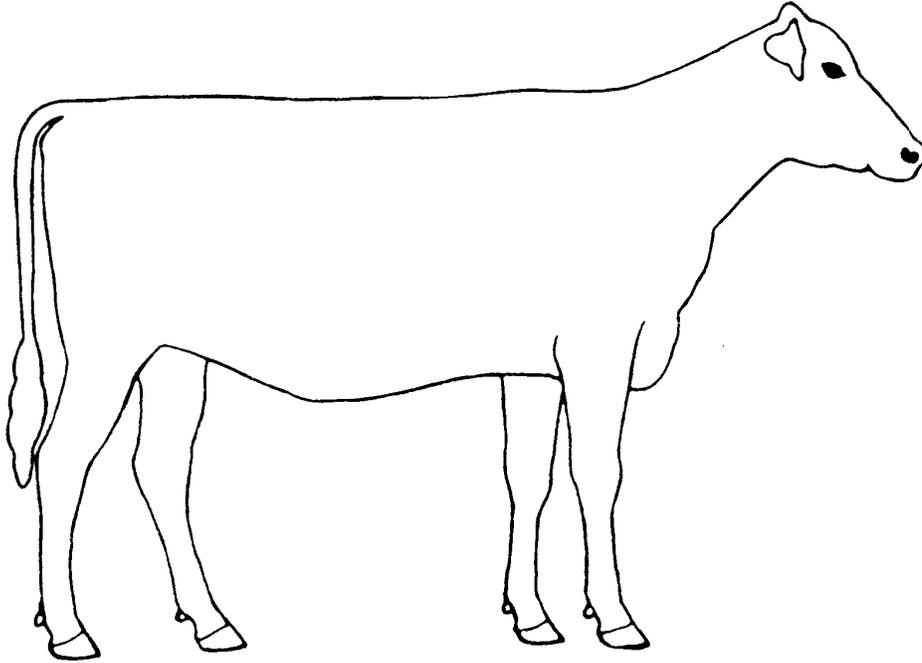
During the last two weeks of the dry period, you should increase grain moderately while maintaining proper protein and mineral levels. Forages similar to those fed to the milking cows should begin to be included in the ration.

Properly managing the dry cow can decrease the occurrence of disorders at or near calving time. The table below lists some common disorders you should watch for.

Disorder	Cause	Prevention/Treatment
UDDER EDEMA	Swelling of udder caused by fluid retention	Avoid excess salt during dry period
MILK FEVER	Calcium imbalance	Balance minerals in ration
KETOSIS	Energy imbalance	Avoid obesity in dry and fresh cows
RETAINED PLACENTA	Hormonal imbalance	Supplement Vitamin E and selenium in diet
DISPLACED ABOMASUM	Lack of bulk in rumen	Feed high forage dry matter

Identification

Diagram of color markings or photographs of your project animal



DAIRY COW UNIFIED SCORECARD

Breed characteristics should be considered in the application of this scorecard.

MAJOR TRAIT DESCRIPTIONS

There are four major breakdowns on which to base a cow's evaluation. Each trait is broken down into body parts to be considered and ranked.

1) Frame - 15%

The skeletal parts of the cow, with the exception of rear feet and legs. Listed in priority order, the descriptions of the traits to be considered are as follows:

Rump (5 points): Should be long and wide throughout. Pin bones should be slightly lower than hip bones with adequate width between the pins. Thurls should be wide apart. Vulva should be nearly vertical and the anus should not be recessed. Tail head should set slightly above and neatly between pin bones with freedom from coarseness. **Front End (5 points):** Adequate constitution with front legs straight, wide apart, and squarely placed. Shoulder blades and elbows set firmly against the chest wall. The crops should have adequate fullness blending into the shoulders. **Back/Loin (2 points):** Back should be straight and strong, with loin broad, strong, and nearly level. **Stature (2 points):** Height including length in the leg bones with a long bone pattern throughout the body structure. Height at withers and hips should be relatively proportionate. Age and breed stature recommendations are to be considered. **Breed Characteristics (1 point):** Exhibiting overall style and balance. Head should be feminine, clean-cut, slightly dished with broad muzzle, large open nostrils and strong jaw.

2) Dairy Strength - 25%

A combination of dairyness and strength that supports sustained production and longevity. Major consideration is given to general openness and angularity while maintaining strength, width of chest, spring of fore rib, and substance of bone without coarseness. Body condition should be appropriate for stage of lactation. Listed in priority order, the descriptions of the traits to be considered are as follows:

Ribs (8 points): Wide apart. Rib bones wide, flat, deep, and slanted towards the rear. Well sprung, expressing fullness and extending outside the point of elbows. **Chest (6 points):** Deep and wide floor showing capacity for vital organs, with well-sprung fore ribs. **Barrel (4 points):** Long, with adequate depth and width, increasing toward the rear with a deep flank. **Thighs (2 points):** Lean, incurving to flat and wide apart from the rear. **Neck (2 points):** Long, lean, and blending smoothly into shoulders; clean-cut throat, dewlap, and brisket. **Withers (2 points):** Sharp with chine prominent. **Skin (1 point):** Thin, loose, and pliable.

3) Rear Feet and Legs - 20%

Feet and rear legs are evaluated. Evidence of mobility is given major consideration. Listed in priority order, the descriptions of the traits to be considered are as follows:

Movement (5 points): The use of feet and rear legs, including length and direction of step. When walking naturally, the stride should be long and fluid with the rear feet nearly replacing the front feet. **Rear Legs-Side View (3 points):** Moderate set (angle) to the hock. **Rear Legs-Rear View (3 points):** Straight, wide apart with feet squarely placed. **Feet (3 points):** Steep angle and deep heel with short, well-rounded closed toes. **Thurl Position (2 points):** Near central placement between the hip and pin bones. **Hocks (2 points):** Adequate flexibility with freedom from swelling. **Bone (1 point):** Flat and clean with adequate substance. **Pasterns (1 point):** Short and strong with some flexibility, having a moderate, upright angle.

4) Udder - 40%

The udder traits are evaluated. Major consideration is given to the traits that contribute to high milk yield and a long productive life. Listed in priority order, the descriptions of the traits to be considered are as follows:

Udder Depth (10 points): Moderate depth relative to the hock with adequate capacity and clearance. Consideration is given to lactation number and age. **Rear Udder (9 points):** Wide and high, firmly attached with uniform width from top to bottom and slightly rounded to udder floor. **Teat Placement (5 points):** Squarely placed under each quarter, plumb and properly spaced. **Udder Cleft (5 points):** Evidence of a strong suspensory ligament indicated by clearly defined halving. **Fore Udder (5 points):** Firmly attached with moderate length and ample capacity. **Teats (3 points):** Cylindrical shape; uniform size with medium length and diameter; neither short nor long is desirable. **Udder Balance and Texture (3 points):** Udder floor level as viewed from the side. Quarters evenly balanced; soft, pliable, and well collapsed after milking. **(Note: In the Holstein breed, an equal emphasis is placed on fore and rear udder (7 points each). All other traits are the same as listed above.)**

TOTAL

Perfect
Score

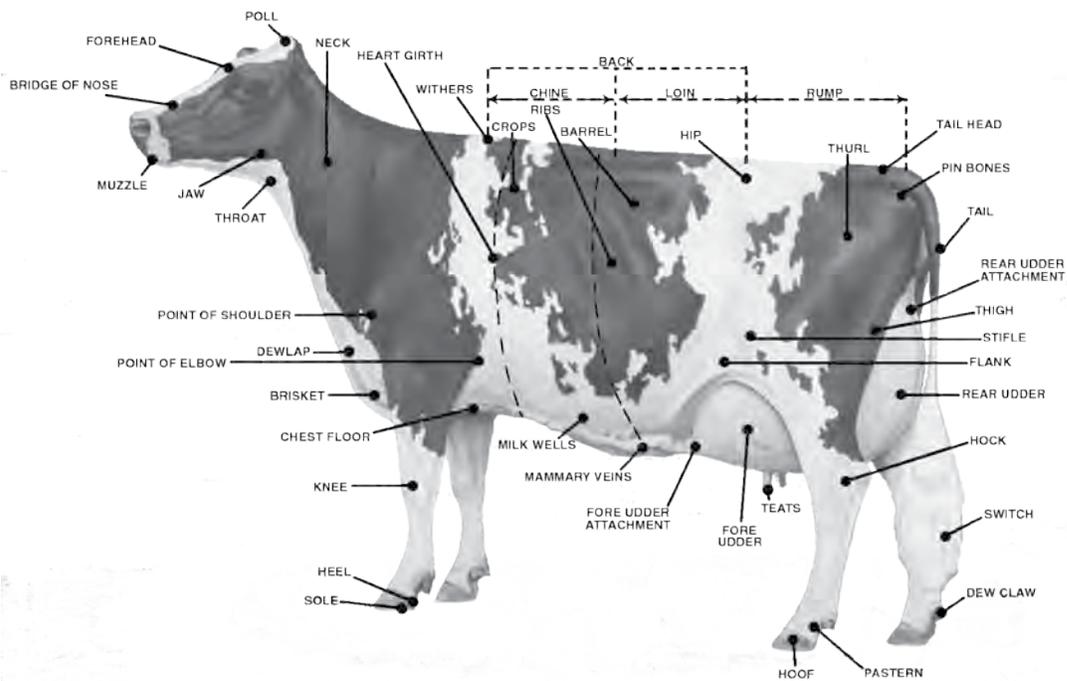
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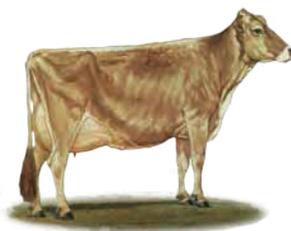
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THE SEVEN BREEDS



Ayrshire



Brown Swiss



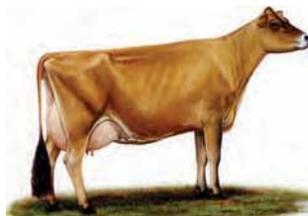
Guernsey



Red & White



Holstein



Jersey



Milking Shorthorn

BREED CHARACTERISTICS

Except for differences in color, size, and head character, all breeds are judged on the same standards as outlined in the Unified Score Card. If any animal is registered by one of the dairy breed associations, no discrimination against color or color pattern is to be made.

Ayrshire Strong and robust, showing constitution and vigor, symmetry, style and balance throughout, and characterized by strongly attached, evenly balanced, well-shaped udder.

HEAD- clean cut, proportionate to body; broad muzzle with large, open nostrils; strong jaw; large, bright eyes; forehead, broad and moderately dished; bridge of nose straight; ears medium size and alertly carried.

COLOR- light to deep cherry red, mahogany, brown, or a combination of any of these colors with white, or white alone, distinctive red and white markings preferred.

SIZE- a mature cow in milk should weigh at least 1200 lbs.

Brown Swiss Strong and vigorous, but not coarse. Adequate size with dairy quality. Frailness undesirable.

HEAD- clean cut, proportionate to body; broad muzzle with large, open nostrils; strong jaw; large, bright eyes; forehead, broad and slightly dished; bridge of nose straight; ears medium size and alertly carried.

COLOR- body and switch solid brown varying from very light to dark; muzzle has black nose encircled by a white ring; tongue and hooves are dark brown to black.

SIZE- a mature cow in milk should weigh at least 1400 lbs.

Guernsey Strength and balance, with quality and character desired.

HEAD- clean cut, proportionate to body; broad muzzle with large, open nostrils; strong jaw; large, bright eyes; forehead, broad and slightly dished; bridge of nose straight; ears medium size and alertly carried.

COLOR- shade of fawn and white markings throughout clearly defined.

SIZE- a mature cow in milk should weigh 1200-1300 lbs.; Guernsey does not discriminate for lack of size.

FACTORS TO BE EVALUATED

The degree of discrimination assigned to each defect is related to its function and heredity. The evaluation of the defect shall be determined by the breeder, the classifier or judge, based on the guide for discrimination and disqualifications given below.

HORNS

No discrimination for horns.

EYES

1. Blindness in one eye: *Slight discrimination.*
2. Cross or bulging eyes: *Slight discrimination.*
3. Evidence of blindness: *Slight to serious discrimination.*
4. Total blindness: *Disqualification.*

WRY FACE

Slight to serious discrimination.

CROPPED EARS

Slight discrimination.

PARROT JAW

Slight to serious discrimination.

SHOULDERS

Winged: *Slight to serious discrimination.*

CAPPED HIP

No discrimination unless affects mobility.

TAIL SETTING

Wry tail or other abnormal tail settings: *Slight to serious discrimination.*

LEGS AND FEET

1. Lameness- apparently permanent and interfering with normal function: *Disqualification.*
- Lameness- apparently temporary and not affecting normal function: *Slight discrimination.*
2. Evidence of crampy hind legs: *Serious discrimination.*
3. Evidence of fluid in hocks: *Slight discrimination.*
4. Weak pastern: *Slight to serious discrimination.*
5. Toe out: *Slight discrimination.*

UDDER

1. Lack of defined halving: *Slight to serious discrimination.*
2. Udder definitely broken away in attachment: *Serious discrimination.*
3. A weak udder attachment: *Slight to serious discrimination.*
4. Blind quarter: *Disqualification.*
5. One or more light quarters, hard spots in udder, obstruction in teat (spider): *Slight to serious discrimination.*

Red & White Rugged, feminine qualities in an alert cow possessing adequate size and vigor.

HEAD- clean cut, proportionate to body; broad muzzle with large, open nostrils; strong jaw; large, bright eyes; forehead, broad and slightly dished; bridge of nose straight; ears medium size and alertly carried.

COLOR- must be clearly defined red and white; black-red and brindle is strictly prohibited.

SIZE- a mature cow in milk should weigh at least 1400 lbs. and be well balanced.

Holstein Rugged, feminine qualities in an alert cow possessing Holstein size and vigor.

HEAD- clean cut, proportionate to body; broad muzzle with large, open nostrils; strong jaw; large, bright eyes; forehead, broad and moderately dished; bridge of nose straight; ears medium size and alertly carried.

COLOR- black and white or red and white markings clearly defined

SIZE- a mature cow in milk should weigh at least 1400 lbs.

UDDER- equal emphasis is placed on fore and rear udder (7 points each), all other traits are the same as listed on the PDCA scorecard.

Jersey Sharpness with strength indicating productive efficiency.

HEAD- proportionate to stature showing refinement and well chiseled bone structure. Face slightly dished with dark eyes that are well set.

COLOR- some shade of fawn with or without white markings; muzzle is black encircled by a light colored ring; switch may be either black or white.

SIZE- a mature cow in milk should weigh at least 1000 lbs.

Milking Shorthorn Strong and vigorous, but not coarse.

HEAD- clean cut, proportionate to body; broad muzzle with large, open nostrils; strong jaw; large, bright eyes; forehead, broad and slightly dished; bridge of nose straight; ears medium size and alertly carried.

COLOR- red or white or any combination (no black markings allowed).

SIZE- a mature cow in milk should weigh 1400 lbs.

6. Side leak: *Slight discrimination.*

7. Abnormal milk (bloody, clotted, watery): *Possible discrimination.*

LACK OF ADEQUATE SIZE

Slight to serious discrimination. (Note: Guernsey does not discriminate for lack of size.)

EVIDENCE OF SHARP PRACTICE

(Refer to PDCA Code of Ethics)

1. Animals showing signs of having been tampered with to conceal faults in conformation and to misrepresent the animal's soundness: *Disqualification.*
2. Uncalved heifers showing evidence of having been milked: *Slight to serious discrimination.*

TEMPORARY OR MINOR INJURIES

Blemishes or injuries of a temporary character not affecting animal's usefulness: *Slight to serious discrimination.*

OVERCONDITIONED

Slight to serious discrimination.

FREEMARTIN HEIFERS

Disqualification.



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Our series of Holstein Foundation workbooks are provided free of charge as an educational resource for dairy youth and adults around the world. The development of these workbooks is supported by contributions from generous individuals who believe in the Holstein Foundation's mission of promoting and supporting programs that provide leadership for the dairy industry. If you would like to make a gift to help ensure we can continue providing these resources, please complete this form and return it to the address below. Donations may also be made with a credit card online at www.holsteinfoundation.org.

Full name, as you would like to be recognized for your gift:

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I would like to make a one-time / monthly (circle one) donation to the Holstein Foundation, in the amount of \$ _____ for a period of _____ months.

This gift is a memorial gift in memory of _____.

Instructions _____

A note will be sent to the family of the above individual, notifying them of your gift.

Checks should be made payable to "Holstein Foundation" and sent to the address below.

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With questions, contact Jodi Hoynoski at 800.952.5200, ext. 4261 or jhoynoski@holstein.com.

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Other Holstein Foundation Programs:

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