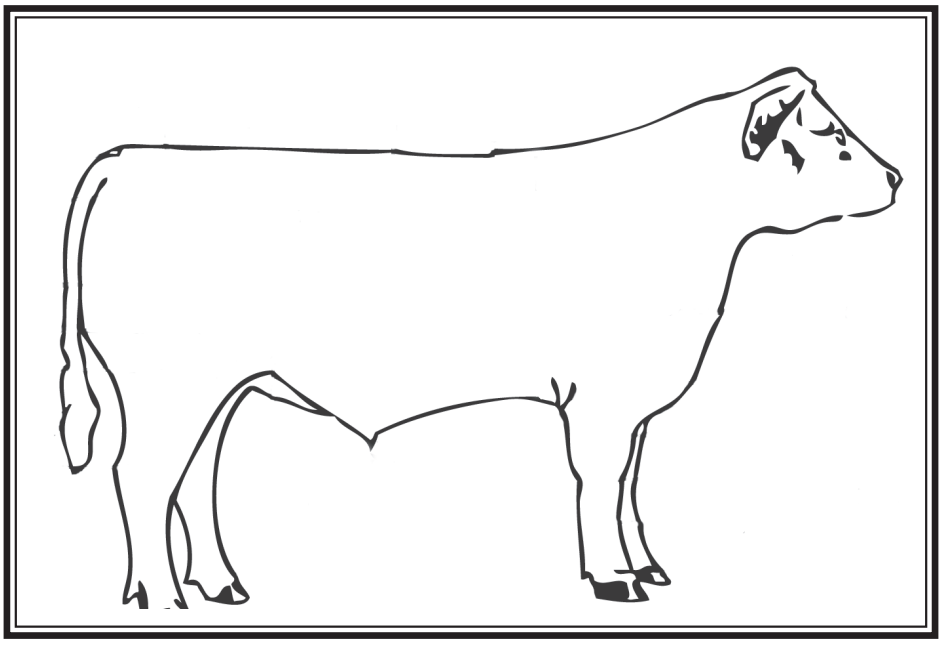
B.C. 4-H Beef Member Manual



BRITISH COLUMBIA | Ministry of Agriculture

CANADA B.C. 4-H

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4-H Motto

Learn to do by doing.

4-H Pledge

I pledge
my head to clearer thinking
my heart to greater loyalty,
my hands to larger service,
my health to better living,
for my club, my community, and my country.

4-H Grace

(Tune of Auld Land Syne)

We thank thee, Lord, for blessings great
on this, our own fair land.
Teach us to serve thee joyfully,
with head, heart, health, and hand.

Acknowledgement

Thank you to Home Economics and 4-H Branch, Alberta Agriculture, Food and Rural Development for sharing their information for this publication.

4-H BEEF PROJECT

MEMBERS MANUAL

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WELCOME TO THE 4-H BEEF PROJECT

Hi!

Welcome to the 4-H Beef Project! We're excited that you chose to become a member of this exciting and diverse project, and we hope you have a great time this year making new friends, taking part in 4-H activities, working with your animal, and learning more about beef production!

To complete your project year in 4-H beef, you must:

- complete four to six of the units in level one material;
- take part in at least 70% of club activities;
- take part in your Achievement Day;
- complete a record book; and
- have FUN!

ABOUT THE BEEF PROJECT MATERIAL...

In this manual you will find all the Level I, II, and III material that you need for your beef project. The levels correspond to the number of years in 4-H and your knowledge about beef animals. You will only be using material for your level this year, but please keep the manual together - you will only be receiving one Beef Project manual while you are a member of 4-H. Take a 3-ring binder and put this material into it. Your leader will be giving you other information during the year, and you will develop your own comprehensive book about beef production. This is also a good place to keep your 4-H diary. Make it **your** book by designing your own cover. Add any pictures or related information you can find. After you have been in the project for several years, you will have a special book.

ABOUT YOUR RECORD BOOK

You will be using the livestock record book with your beef project. The project portion of the book that you complete depends on if you have a steer or heifer. Your leader will tell you which pages to fill out. If you are a new member in the project, the amount of year-end calculation that you do is less. Spaces are there to add pictures, newspaper, or magazine clippings you have of yourself, your farm, or your beef project.

ACHIEVEMENT DAY REQUIREMENTS

For Achievement Day, you should:

- exhibit your beef project;
- take part in the showmanship and judging classes;
- display your record book that is completed to date; and
- participate in any other activities your club planned.

OTHER OPPORTUNITIES IN 4-H

Your beef project is only a part of 4-H. Many activities are offered at club, district, regional, and provincial levels. You take part in club fund-raising, social events, meetings, tours, and many more activities. Your district and regional

4-H councils sponsor workshops, sports days, public speaking competitions, and project shows. Attend a provincial program next summer or take part in fairs and shows. Your leader will be able to supply you with all the necessary forms and applications which will help you be involved with all aspects of 4-H - and have fun!

AVAILABLE BEEF PROJECTS

There are many projects that you can try:

The Fed Calf Unit is the most popular 4-H project. You select a steer calf in the fall and feed and care for it until your Achievement Day in late spring or early summer.

The Heifer Unit, the fastest growing unit in popularity, is the beginning of the breeding project. You pick a current year heifer calf and raise and show it in the spring. In the spring, you breed the animal and calf it out the following year that then leads into the cow-calf project. If you have both a steer and heifer project you only need to fill out the animal portion of the livestock record book on one project.

In the Cow-Calf Unit, you calf out the animal you used in the heifer project and show the cow with calf at foot at your Achievement Day. Some members continue this project for two years. You keep records on the animals and either keep the offspring or start you university, car, or house mortgage fund.

The Feedlot Unit or pen project is where you raise at least three head of animals for market. Members fed either heifers, cows, or steers and then marketed their project at an Achievement Day or through available selling systems.

Some 4-H members are senior members who can now develop their own projects. Projects can vary from buying some scrub cows and fattening them out to doing a study on the digestive system of the beef animal. Members develop their own record system with their leader. Your leader will have some suggestions that you could explore.

For Those of You in Level Three:

The material in this Level Three section is designed to help you...

1. Learn more about some of the new and interesting topics about beef production.

2. Make choices. Within each unit are several individual topics, with activities to accompany each topic. You are NOT required to complete all of the activities and topics in each unit. Choose the activity or activities which interest you and complete them.

3. Develop your leadership skills. Many of the activities in the senior section require that you share your work with other members. How you share this information is up to you - use your imagination!

4. Think! We have designed this material to be challenging. As senior members, you already have a good knowledge of the beef industry. Now we are challenging you to use this knowledge!

About the Beef Project Material...

In each Level Three of project material, there are several topics. You are NOT expected to learn about all of these. Choose a topic or topics which interest you and learn more about them.

There is much more information available than

we could ever provide for you. Use what other sources you can find to supplement this material.

About Your Record Book...

Since you are an experienced member, you are expected to fill out all the summary calculations. Spaces are there to add pictures, newspaper, or magazine clippings you have of yourself, your farm, or your beef project.

Ideas for Sharing Information With the Rest of Your Club

In many of the activities in this project, we ask you to share information with other members in your club.

Here are a few ideas to help you along:

1. Be organized.
2. Keep it short and simple.
3. Make it fun.
4. Use visual aids as much as possible. "A picture is worth a thousand words".
5. There are lots of people who can help you - leaders, parents, District Agriculturist's, and Regional Youth Development Specialists. Use them!

WEIGHING YOUR ANIMAL

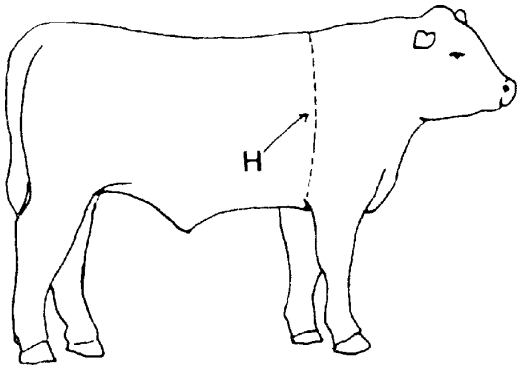
It is not always possible to use a scale when weighing your animal(s). Using a scale is the best method to get an accurate weight of your animal. However, if you do not have scales on your farm, borrow from a neighbour if possible. Remember that trucking your animal over to his farm is good practice for you and your animal.

TAPE MEASURING

One method which you can use to estimate the weight of your animal is the tape measure. Any tape measure may be used, but there are specially marked tape measures which you can purchase at most livestock and farm supply outlets.

Remember that it only gives you an estimate of the animal's weight. Variations from the actual weight may be due to the length of the body and/or the legs.

To use the measuring tape, measure the circumference of the heart girth as indicated in the diagram below. Stand the animal with the head in the normal position and the four legs set squarely under the body. Pass the tape tightly around the body just back of the shoulders at the smallest circumference.



Use one of the following charts to estimate the weight of your project. Record the weight each month on page seven of your livestock record book. You should weigh your animal on about the same day each month.

Values To Use When Estimating The Weight Of Beef Animals By Heart Girth Measurements

Metric Measurements:

Heart Girth (cm)	Heart Weight (kg)	Heart Girth (cm)	Heart Weight (kg)	Heart Girth (cm)	Heart Weight (kg)	Heart Girth (cm)	Heart Weight (kg)	Heart Girth (cm)	Heart Weight (kg)
76.2	41.3	106.7	107.0	137.2	219.5	167.6	378.3	198.1	584.2
77.5	43.1	108.0	110.7	138.4	225.0	168.9	385.6	199.4	594.2
78.7	44.9	109.2	114.8	139.7	230.9	170.2	394.2	200.7	604.2
80.0	46.7	110.5	118.8	141.0	236.8	171.5	401.9	201.9	613.7
81.3	49.0	111.8	122.9	142.2	242.7	172.7	409.6	203.2	623.2
82.6	51.3	113.0	126.6	143.5	248.6	174.0	417.8	204.5	633.2
83.8	53.5	114.3	130.6	144.8	254.9	175.3	425.9	205.7	643.2
85.1	55.8	115.6	134.7	146.1	260.8	176.5	434.1	207.0	653.2
86.4	58.1	116.8	138.2	147.4	266.6	177.8	447.2	208.3	663.6
87.6	60.3	118.1	143.8	148.6	272.5	179.1	450.4	209.6	673.6
88.9	63.0	119.4	148.3	149.9	280.3	180.3	458.6	210.8	684.0
90.2	65.8	120.7	152.9	151.1	286.7	181.6	467.2	212.1	694.4
91.4	68.5	121.9	157.4	152.4	293.5	182.9	475.8	213.4	705.3
92.7	71.2	123.2	162.4	153.7	299.8	184.2	484.4	214.6	715.8
94.0	73.9	124.5	168.4	154.9	306.6	185.4	493.1	215.9	726.2
95.3	76.7	125.7	171.9	156.2	313.4	186.7	502.1	217.2	736.6
96.5	79.8	127.0	176.9	157.5	320.7	188.0	511.2	218.4	747.5
97.8	83.0	128.3	181.9	158.8	327.5	189.2	520.3	219.7	758.4
99.1	86.2	129.5	186.9	160.0	334.3	190.5	529.3	221.0	769.7
100.3	89.4	130.8	192.3	161.3	341.6	191.8	539.0	222.3	780.6
101.6	93.0	132.1	197.8	162.6	349.3	193.0	546.6	223.5	791.5
102.9	96.2	133.4	203.2	163.8	356.5	194.3	556.1	224.8	802.9
104.1	99.8	134.6	208.7	165.1	363.8	195.6	565.6	226.1	814.7
105.4	103.4	135.9	214.1	166.4	371.0	196.9	574.7	227.3	826.0

Imperial Measurements:

Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)
30.0	91	37.5	169	45.0	288	52.5	448	60.5	661
30.5	95	38.0	176	45.5	297	53.0	460	61.0	676
31.0	99	38.5	183	46.0	307	53.5	472	61.5	691
31.5	103	39.0	190	46.5	317	54.0	484	62.0	707
32.0	108	39.5	197	47.0	327	54.5	496	62.5	722
32.5	113	40.0	205	47.5	337	55.0	509	63.0	737
33.0	118	40.5	212	48.0	347	55.5	522	63.5	753
33.5	123	41.0	220	48.5	358	56.0	535	64.0	770
34.0	128	41.5	228	49.0	369	56.5	548	64.5	786
34.5	133	42.0	236	49.5	379	57.0	562	65.0	802
35.0	139	42.5	244	50.0	390	57.5	575	65.5	818
35.5	145	43.0	253	50.5	401	58.0	589	66.0	834
36.0	151	43.5	262	51.0	412	58.5	603	66.5	850
36.5	157	44.0	271	51.5	424	59.0	618	67.0	869
37.0	163	44.5	279	52.0	436	60.0	647	67.5	886

Imperial Measurements: cont.

Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)	Heart Girth (in)	Heart Weight (lb)
67.5	886	72.0	1049	76.5	1226	81.0	1418	85.5	1624
68.0	903	72.5	1068	77.0	1247	81.5	1440	86.0	1648
68.5	921	73.0	1087	77.5	1267	82.0	1463	86.5	1672
69.0	939	73.5	1107	78.0	1288	82.5	1485	87.0	1697
69.5	957	74.0	1127	78.5	1310	83.0	1508	87.5	1721
70.0	975	74.5	1147	79.0	1332	83.5	1531	88.0	1745
70.5	993	75.0	1167	79.5	1353	84.0	1555	88.5	1770
71.0	1011	75.5	1186	80.0	1374	84.5	1578	89.0	1796
71.5	1030	76.0	1205	80.5	1396	85.0	1601	89.5	1821

PART IDENTIFICATION

Identify the following beef animal parts:

1 _____ 14 _____ 27 _____

2 _____ 16 _____ 29 _____

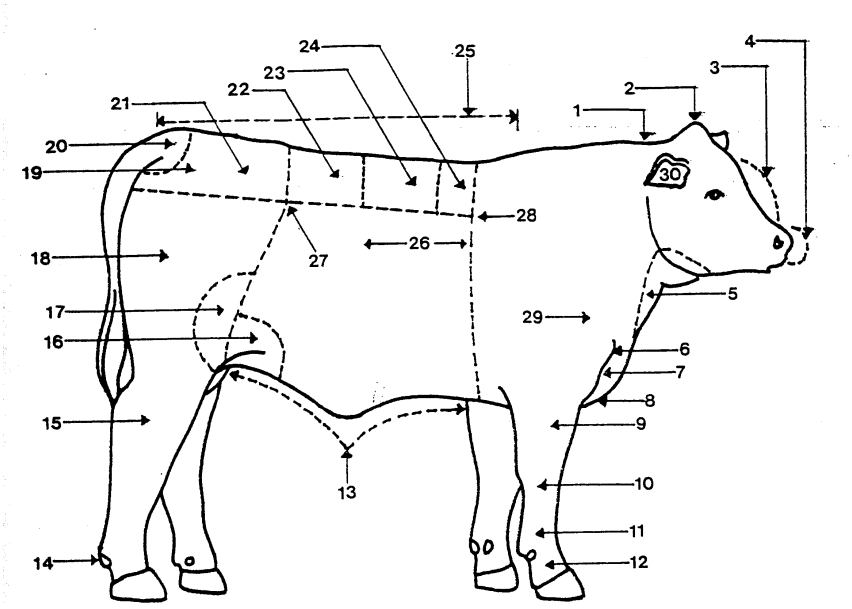
4 _____ 18 _____ 31 _____

5 _____ 19 _____ 32 _____

9 _____ 21 _____ 33 _____

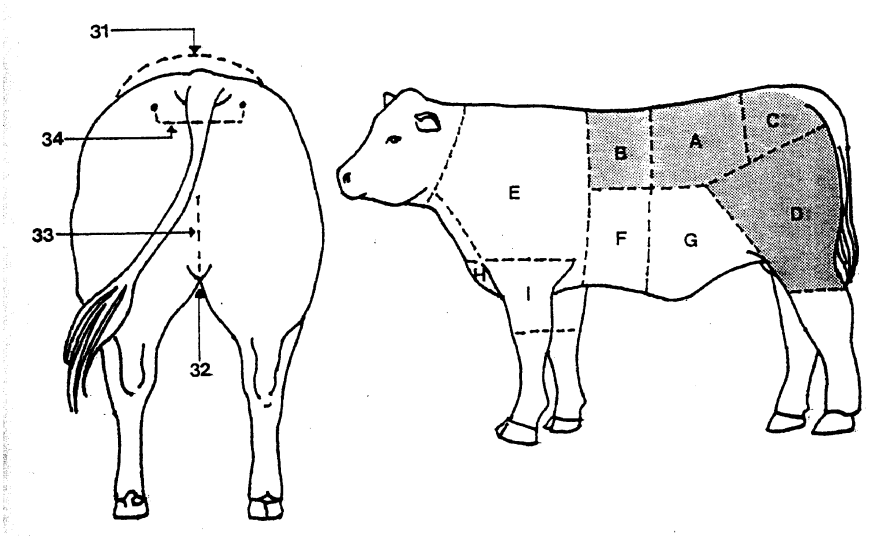
11 _____ 24 _____ 34 _____

12 _____ 25 _____



Identify the following meat cut areas:

A _____ F _____
D _____ I _____
E _____



TRANSPORTATION REGULATIONS

When you transport your livestock, you must carry a LIVESTOCK MANIFEST completed according to the regulations. Make sure that you complete this manifest before the vehicle leaves your property whenever you transport any livestock.

The owner of the livestock or his agent must complete the manifest with this information:

1. date the livestock is transported;

2. name and address of the owner of the livestock;

3. consignee's name and address;

4. number of livestock;

5. color of the livestock;

6. kind of livestock;

7. the proper description and location of the brand and other marks of ownership on each head of livestock; and

8. sign the manifest.

The operator of the vehicle transporting the livestock or the driver of the livestock must complete the manifest with this information:

1. name and address of the person who is operating the vehicle or driver of the livestock;

2. licence number of the vehicle used to transport the livestock;

3. transportation charges, if any; and

4. sign the manifest.

Livestock manifest books are available from your leader, local brand inspector or market.

THE USE OF AGRICULTURAL AND VETERINARY CHEMICALS

More and more farm chemicals are being labelled in metric units (mL, cc). The use of "cc" will be discontinued and cm3 will replace it. Items such as vaccines and oral medications will be applied directly at rates given as:

millilitres (mL)
milligrams (mg) per kilogram (kg)bodyweight
or grams (g)

Concentrated products such as horticultural, crop and pasture sprays will require dilution as:

mL/L or mL/100 L
or L/100 L

g/L or g/100 L
or kg/100 L

Application will be as mL/ha, L/ha, mL/m3 and so forth. Standard prepacked products (to avoid weighing from bulk supplies) will eventually be labelled as one pack for a certain number of litres (L) instead of one pack for 100 gallons. Animal remedies will rely on dosage rates based on live bodyweight in: millilitres per kilogram (mL/kg)Only experience will enable you to estimate live bodyweight in metric units. You will have to compare your estimates with actual measurements, i.e. at stockyards. Some animal remedies, will be simply on a per animal basis and will not require knowledge of live bodyweight.

Think metric and read all labels and instructions carefully.

If you use tranquilizers read the **label** to find out what the withdrawal regulations are.

YOU AND YOUR BEEF PROJECT

LEVEL I

ROLL CALL

How did you choose your 4-H beef project animal?

SELECTING YOUR PROJECT ANIMAL

What must you consider when selecting an animal as your 4-H beef heifer or steer? What is most important? How do you decide? In this unit we will try to answer these and other questions you might have.

When to Select

Select your beef project animal as soon as possible, preferably before November. The sooner you select your animal, the sooner you can begin working with it.

If you will be taking the fed calf project, select a animal which weighs less than 275 kgs. The actual weight and age of your animal will depend on the type of animal. The exotic breeds will take longer to finish than the traditional breeds. Know the date when your animal must be finished. This is important as you will have to know how to feed your animal to have it properly finished for Achievement Day.

When did you select your 4-H project animal? Use your knowledge about the breeds to fill in the blanks below with examples of the british and the exotic breeds.

The British Breeds	The Exotic Breeds

Heifer or Steer

The first decision you have to make is whether to feed a steer or a heifer. If you have a steer, you will sell it at the end of your project year. If you have a heifer, you can keep her and use her as a yearling project next year and then as a cow-calf project or a beef herd project.

As a producer deciding between finishing a heifer or a steer for market, you need to keep these points in mind:

1. Heifers grow more slowly, but will fatten at a lighter weight than steers.

2. Heifers require more feed per unit of weight gain than steers. Heifers are often more active, requiring that you provide more energy per unit of grain than you would for a steer.

3. Heifers finish approximately 70 kgs lighter than steers. This will vary among breeds. If you finish a heifer and a steer at the same weight, the heifer will be fatter.

4. Heifers sell for less at finish than steers. This is because heifers dress at a lower percentage than steers. There is always the possibility that the heifer may be in calf.

5. Heifer calves can often be purchased at a lower price than steers.

6. Heifer calves may be bought as breeding stock instead of being slaughtered at the end of the project year.

What did you select for your 4-H project this year?

A heifer or a steer?

Why?

Crossbred or Purebred

Another decision you must make is whether to buy a single breed or a mixture of breeds. That is, a purebred or a crossbred.

A purebred calf is one whose parents are of the same breed. No other breeds are present in their background. The animals may be registered with their breed organization. Although many people prefer a registered purebred, it is not always necessary and may cost you extra money.

A crossbred calf is one which has parents of different or mixed breeds. The calf will show characteristics of more than one breed, and hopefully, the most desirable characteristics of each of the breeds.

Commercial breeders often prefer crossbred animals for these reasons:

1. They may inherit the desirable characteristics of each breed.

2. Crossbred calves often have hybrid vigour. This means that their performance is superior to the performance of the average of their parents performance. You can see the improvements most often in fertility, growth rate and feed conversion.

3. Calves from some breeds of cows have higher pre-weaning gains because of the higher levels of milk production.

4. Crossbred calves will finish earlier than some of the larger framed purebred cattle.

Did you select a crossbred or a purebred?

Why?

The breed(s) is/are

In your own words ...

What advantages does a crossbred animal have over a purebred animal?

What advantages does a purebred animal have over a crossbred animal?

Selecting is Really Judging

Choosing your calf will be your first practice with judging. Judging is evaluating and comparing in order to select the most desirable in a group of similar objects. In your case, this will be your 4-H calf.

Follow these steps when you judge a class or when you are selecting your animal:

1. Know the characteristics of the ideal or the perfect animal.

2. Compare the animals which are available. Compare them to each other and to your perfect animal using those characteristics you identified above.

3. View the animals from a distance.

4. From a distance, view from the front and the rear.

5. Move in for a close examination of each one.

6. View once again from a distance.

7. Make your decision.

Tell me about the steps you went through in selecting your project animal.

WORKING WITH YOUR PROJECT ANIMAL

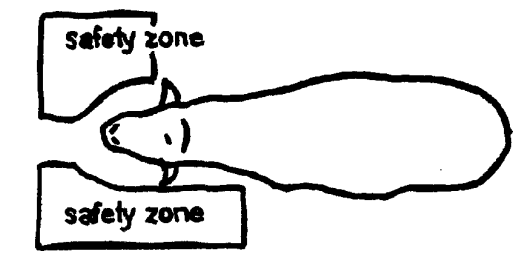
Safety First

Safety is most important at all times when you work with your project animal. Even cattle which are calm in the pen may become frightened and unmanageable when you take them outside.

Until you and your calf are comfortable with each other, have someone help you as you work together.

Always wear safety footwear when working with your calf. Steel toed boots will protect your toes if your calf should accidentally step on you. It takes only an instant for you to become injured.

The best safety zone is on the front left side of your calf. Never stand directly in front of him as he has difficulty seeing you properly and will become frightened. If you move to the right side, hold the lead shank in your left hand and make sure that the shank is under the animal's jaw and not over it.



The picture below shows the correct and most secure placement of the halter on the head of the animal. If the halter is too low on the nose, it will slip off easily. If it is too high, you will not have enough control.

too low correct halter position too high

Most important to your safety is your attitude. You will spend many hours working with your animal over the next few months. Be patient but firm. Do not lose your temper — the animal can sense when you become angry or upset.

Learn To Do By Doing

The best part of the 4-H project is that you will "learn to do by doing". Whether you are working with your animal or with the other members in your club, you will be doing and learning.

Remember - 4-H is fun!

LEVEL TWO

ROLL CALL

How did you choose your 4-H beef project animal?

MORE ABOUT SELECTION

Learn to recognize the characteristics which will combine to make an ideal feeder calf. Consider these:

1. frame size;
2. length, width and height;
3. muscling;
4. trimness;
5. age and weight;
6. temperament and disposition;
7. health; and
8. price.

Frame Size

A feeder calf must have the physical ability to reach the desired weight of 455 to 555 kgs in a reasonable amount of time. The animal must reach this weight without carrying excess fat or waste. The frame of an animal is its skeleton. If a calf has a very small frame, its frame size will never increase to a larger size. A large framed calf, if properly fed, will grow to be a large framed cow or steer.

You cannot see the actual skeleton of an animal. The frame size is indicated by the length, width and height of the animal. As a rule, do not choose a small framed calf as it is likely to be overfinished by Achievement Day. A very large framed calf is likely to be underfinished, lacking adequate muscling and finish.

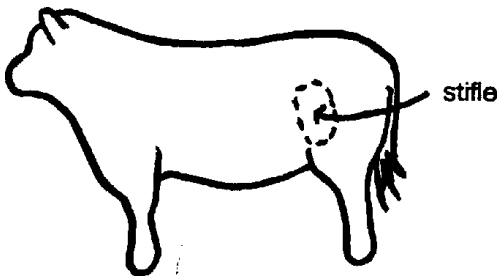
Length, Width and Height

Ideally, select a calf which is:

- long in body;
- even in width from front to rear; and
- tall and deep bodied.

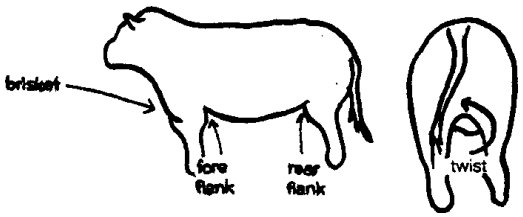
Muscling

Look at the way the calf stands. If the rear feet are placed close together, the calf likely lacks muscling. Look for thickness through the centre of he round, as this is where you find the more expensive cuts of meat. When you view the animal from the rear, it should be widest through the stifle region.



Trimness

Choose a calf which is trim, especially through the brisket, flank and twist. If your calf has excess flesh in these areas now, then it will never be a profitable animal. Mature looking calves tend to be wasty when they are finished because they begin to deposit fat earlier than a trim animal.



Age and Weight

It is very important when you are selecting animals that you know their age and weight. Both of these calves have received the same care.

Calf #1	**Calf #2**
Born: Feb 15	Born: April 1
Weight: Nov 1 - 250 kg	Weight: Nov 1 - 273 kg

Which of these two calves has been the most productive so far?

Why?

The #2 calf has gained weight at a much faster rate than the #1 calf. The #2 calf will likely continue with a higher growth rate.

Temperament and Disposition

Choose a calf which you will be able to handle. Smaller is not always better. A wild and nervous calf is not likely to gain weight as fast as a more gentle and calm calf.

Some things to look for and avoid are:

- Eyes: wild, fiery, scared;
- Legs: fidgety, tramps, kicks; and
- Stance: charging, shaking, cowering.

Look for a calf which is calm and comfortable around people and other animals.

Health

Look for a healthy calf. You should be familiar with the characteristics of a healthy animal:

- alert;
- bright, clear eyes;
- good appetite;
- drinks water provided;
- active shiny, smooth hair coat;
- pleasant breath;
- normal manure and urine;
- neither too fat nor too thin; and
- no evidence of disease or parasites.

Price

You need to know the current market value of animals similar to the one you want to purchase. Prices change constantly and it is up to you to know what is happening.

Where might you find the current market prices?

Remember that the price you pay for your calf is just the first of many expenses. You will also have to pay for halters, brushes, pails, feed, veterinary and health supplies and transportation.

At the end of the year, you will add all of your expenses to the price you paid for your calf. You want your total expenses to be less than the price you receive for selling your calf in order to make a profit. Therefore, you should keep your expenses to a minimum.

WHERE TO BUY: Auctions Vs. Private Sales

Beef calves can be purchased many places. Calves may be purchased either from an auction mart or from a private seller.

Private producers are the most common source for 4-H calves. There are several reasons for this. On the farm, you can see the conditions under which the calf has been raised. You can compare calves of similar ages and breeds and choose the one you think is most desirable. Because the breeder or owner has raised the calf, he or she

can tell you about the parentage, health and care of the animal.

Find out about these characteristics:

1. warble treatments;
2. vaccinations;
3. dehorning;
4. weaning;
5. castration; and
6. implants and hormones.

Find out what the calf has been fed. Look at the performance records of the parents if they are available.

If you plan to purchase at an auction, arrive early. Bidding takes place very quickly and you need time to examine the animals before they go into the ring.

Go out and have a look at the calves that are being offered for sale. Write down the numbers of the calves which interest you. Decide what the animal is worth and write this price down next to the number. Put marks beside the most desirable animals on your list. By doing this, you will not pay too much for your calf. Don't get caught up in the auction and bid just to buy. Remember, what you want and what you are willing to pay.

Prices vary from year to year and week to week. Adjust your expected prices to suit the market conditions.

At an auction, your expectations for quality and health should be the same as if you were buying from a private producer.

Where will you purchase your calf?

Why?

LEVEL THREE

ROLL CALL

How did you choose your 4-H beef project animal?

Topic 1:

SHARING 4-H BEEF CLUB HINTS

As level three members in 4-H, you have already experienced several project years. You are familiar with some of the do's and don'ts of working with your project animal. Each of you has different experiences and advice which you could share with beginning members.

Topic 2:

UNDERSTANDING ANIMAL BEHAVIOUR

Each species of animals has its own distinctive behaviour pattern. Cattle behave differently than horses or chickens. Pigs behave differently than sheep or dogs.

Topic 3:

WHAT'S IN IT FOR ME?

As a participant in any activity, you want to know what benefits there are for you to take part. As a level three member in 4-H, you likely have many years of experience. You know the advantages of being a 4-H beef club member.

DIGESTION IN THE BEEF ANIMAL

LEVEL ONE

ROLL CALL

Name an animal.

Is this animal ruminant or monogastric? As other members name an animal, decide if it is a ruminant or monogastric.

WHAT IS A RUMINANT?

A ruminant animal has a stomach with 4 distinct rooms or compartments. Each of these compartments has its own special job to do in digestion of the food.

A monogastric animal has a stomach with one big compartment. All the digestion work is done in this one big room. Here is an easy way to remember this:

mono = one
gastric = stomach

Because the stomachs of the ruminant and monogastric animals are so different, their diets are very different. Let's compare the diets. Tell me what foods each of these animals would eat in a normal day.

A monogastric - You
A ruminant - your Steer

What a difference there is in the foods you two eat! The reason your diets are so very different is that your stomachs have very different abilities to digest food.

WHAT IS DIGESTION?

Digestion is the preparation of food for absorption.

Before your body can use those things in the foods, your stomach must digest them so the body can absorb them. The digestive system does this by breaking the food down in to tiny bits and then breaking them down even further so they can be absorbed in to the body parts.

WHAT IS THE DIGESTIVE SYSTEM?

The digestive system is made up of all the parts of the body which have a job to do in the process of digestion.

Let's look at each of the parts of the digestive system and the jobs they have to do.
The parts of the digestive system in the beef animal are:

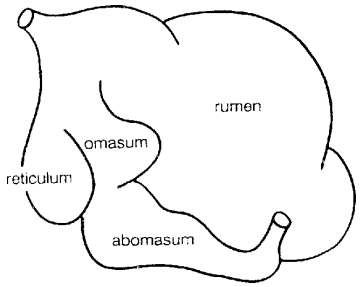
- Mouth;
- Esophagus;
- Stomach:
  - rumen or "paunch";
  - reticulum or "honeycomb" ;
  - omasum or "manyplies";
  - abomasum or "true stomach" ;
- Small Intestine;
- Large Intestine; and
- Anus.

The MOUTH takes the food into the body. The food is broken up into smaller bits by the chewing and grinding of the teeth. Saliva from the mouth helps to break the food down more. The saliva contains enzymes which attack the food.

The ESOPHAGUS is the long tube or tunnel which runs from the mouth down to the stomach. When food is swallowed, it goes down the esophagus into the stomach.

The STOMACH of the beef animal has 4 distinct compartments. This is how we know that he or she is a ruminant animal. Each of these compartments has its own special job to do in digesting food.

This is what the stomach looks like:



The first part of the stomach the food enters is the RUMEN. This is the largest compartment. In the adult beef animal, it takes up about 80% of the size of the entire stomach. The rumen mixes the food. Microbes or "bugs" attack the food and help break it down.

From the rumen, the food moves to the RETICULUM. The fine material is moved to the next compartment. The coarser food material is sent back up to the mouth for more chewing. This is called RUMINATION, or, "chewing the cud".

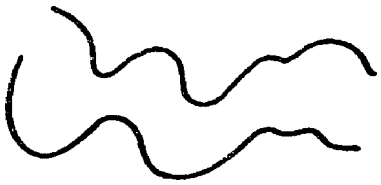
Did you know?
The cow spends up to 8 hours a day "chewing its cud". This is 1/3 of its life!

The third compartment of the stomach is the OMASUM. The omasum squeezes the fluids out of the food material.

The fourth and last compartment of the stomach is the ABOMASUM. It is also called the true stomach since it is very similar to the stomach of the human and other monogastric animals. The abomasum contains digestive juices which help to break down the food even more. In the newborn calf, the milk bypasses the first three stomach compartments and goes directly down the esophagus into the abomasum.

When the food moves out of the stomach, it no longer looks like the food which your animal ate. This food material goes from the stomach into the SMALL INTESTINE which is like a very long, thin, coiled tube. Juices are found here. These juices help to change the food material to a form which the body can absorb.

Now, the material moves to the LARGE INTESTINE. The large intestine is a shorter, fatter tube. It absorbs what is left of the liquid in the material and adds mucus to help the material travel more easily.



The final part of the digestive system is the ANUS. This is the opening in the body through which the waste material passes. This waste material is the remains or undigested food, which we refer to as manure.

WOW! Digestion is really complicated, isn't it? If any one part of this system is not working properly, the rest of the system cannot function and that can lead to real problems.

It is important that you understand how the beef animal can digest such different foods than you

or any other monogastric animal. The beef digestive system can turn some very poor quality hay and straw into valuable proteins and energy which the beef animal can use for growth and reproduction.

LEVEL TWO

ROLL CALL

Name as many ruminant and monogastric animals as you can. Make a list.

LET'S COMPARE

A good way of learning how the digestive system of the beef animal works is to compare it with that of the human.

How does your diet differ from that of your heifer or steer?

Your Diet
Your Heifer or Steer's Diet

Because your diet is so different from that of the beef animal, it is logical that your digestive system would be very different from that of the beef animal.

How is your stomach like the beef animal's stomach?

How is your stomach different from the beef animal's stomach?

The information on the next few pages will help you answer these questions.

LET'S COMPARE

We have looked at the parts of the digestive system, and already know about the role each part plays in digestion. Now let's learn some more.

Digestive Compartment	Volume as a % of the total digestive tract				
	Cattle	Sheep	Horse	Pig	Human
Total Stomach (%)	70.8	66.6	8.6	29.2	18.8
Small Intestive (%)	18.5	20.5	30.2	33.3	62.4
Cecum (%)	2.8	2.6	15.9	5.6	
Large Intestine (%)	7.9	10.3	45.3	31.9	18.8
Total Capacity	356.0	44.0	211.0	28.0	6.0

From this information, there are several interesting things to note:

1. Look at the stomach as a total percentage of the digestive tract in the ruminant animals - cattle and sheep. Their stomachs make up a large part of their digestive system. The stomachs of the monogastrics - horse, pig and man - make up a much smaller percentage of the digestive system.

2. Look at the percentage occupied by the stomach in the ruminants - cattle and sheep. Look at the total capacity of the digestive system. Figure out the capacity of the ruminant stomachs - 252 litres in the cow and 29.3 litres in the sheep. Those are tremendous capacities, especially when you consider them in relation to the size of the animal.

3. Note the percentage of the total digestive tract which is occupied by the large and the small intestines in comparison between the ruminants and the non-ruminants.

4. The horse has a large cecum, the ruminants have a smaller one, and the human has no cecum. The cecum is a small part of the large intestine and aids slightly in digestion.

5. Note that the animals which use their food for growth, fat and muscle production, and reproduction have more capacity than man, who uses his food primarily for maintenance and energy.

These are all very interesting and important points, especially for understanding how the different types of animals can utilize such different feeds.

LEVEL THREE

ROLL CALL

Name an animal

Is this animal ruminant or monogastric?

Try to come up with an unusual animal!

Welcome to the level three section of digestion in the beef animal. This is one of the most fascinating topics in beef production. There are so many things going on inside your project animal, and digestion is definitely one of the most complicated.

Your beef animal, like any other living thing, has many processes occurring at one time. These processes are interacting and dependant upon one another. In this unit, we provide information on several topics for you to examine more closely. Just picture all of these things going on at once, each with their own

cycle. Most importantly, try to appreciate the complexity of the procedures.

Topic 1:

DEVELOPMENT OF THE RUMINANT STOMACH

The ruminant stomach is very unique in the way in which it develops. There are several special features the ruminant has which enable it to digest roughages and other materials.

As we have already learned, the mature ruminant stomach has 4 compartments, each with a specific function.

Let's review:

The Ruminant Stomach

RUMEN or "paunch"

- largest stomach compartment in the mature ruminant animal;
- bacteria and microbes found here begin to break down the food, attacking the fibre in the roughages; and
- separated from the reticulum by the rumeno-reticular fold.

RETICULUM or "honeycomb"

- lined with many honeycomb-like compartments;
- liquid and finer material is moved to the next compartment;
- coarser material is returned to the mouth for more chewing;
- any foreign objects the animal takes in will lodge here; and
- this is where a magnet rests.

OMASUM or "manyplies"

- often referred to as the "bible" because of its many leaves; and
- the contractions squeeze out more fluid, grind, and move the contents to the abomasum.

ABOMASUM or "true stomach"

- most similar to the simple stomach found in other animals; and
- digestive juices are secreted here — they break down the food material further, getting it ready for nutrients to be absorbed into the blood stream.

At birth, the ruminant stomach looks quite different:

The Stomach of a Newborn Calf

In the newborn calf, the rumen is smaller in comparison to the other stomach compartments.

The OESOPHAGEAL GROOVE is a unique feature in the stomach of the newborn ruminant.

What is it?

The oesophageal groove is a tunnel created in the digestive system which allows milk to bypass the rumen.

How does it work?

When the calf sucks, reflex causes the heavy muscular folds of the rumen and the reticulum to meet. This creates the tunnel.

What is its purpose?

This tunnel leads from the oesophagus to the abomasum. Liquids which the calf takes in will bypass the rumen and go directly into the

abomasum.

How can you make sure it works?

Don't try to feed the newborn from a pail. If your calf is not nursing, make sure the calf suckles from a nipple pail or bottle. It is the suckling action and the sensitivity of the nerves to the milk which create the oesophageal groove.

If the oesophageal groove is not closing properly, the milk will enter the rumen. Bacteria in the rumen will begin to ferment the milk. This will cause the production of gas. Because the belching mechanism is not yet working in the calf, the calf cannot expel the gas properly. Calves with this problem will become paunchy or "pot-bellied".

At birth, the rumen and reticulum have only a few microbes, so the calf cannot yet digest solid foods. Shortly after birth, once the calf begins to nurse and explore its environment, the microbes will multiply.

You should begin to provide some solid food at a few weeks of age. This will help the development of the rumen microbes. Since the oesophageal groove closes only with suckling and liquid feeding, the solid food will go directly into the rumen. Once you have started feeding solid food, you can speed up the development of the stomach by increasing the amount of solids fed.

Between birth and maturity, the rumen and reticulum increase ten times in size in relation to the abomasum.

Compartment Size as a Percentage of the Size of the Stomach

	At Birth	At Maturity
Rumen	25%	80%
Reticulum	25%	6%
Omasum	10%	3%
Abomasum	40%	11%

Special Features of the Mature Ruminant Stomach:

ERUCTATION or "Belching":

When the microbes work in the rumen, large amounts of gas are produced. This gas needs to be eliminated. The rumen contracts. The gas is forced upward and out through the oesophagus. The cow "belches".

RUMINATION or "Chewing the Cud":

Rumination allows the beef animal to take food in quickly, then complete the chewing later. Once the animal is finished eating, the reticulum will force "cuds" or balls of coarser material back up to the mouth for more chewing. The animal chews leisurely on its cud before swallowing it again. The cow spends about 8 hours per day ruminating or "chewing its cud". This is 1/3 of its life!

Topic 2:

FACTORS AFFECTING FEED INTAKE

There is much variation in the feed intake between animals. Let's look at some of the different factors which can affect how much your steer or heifer will eat.

Palatability

Palatability is the overall acceptance of the animal to the feedstuff or ration. Palatability is actually determined by many factors which affect the locating and consuming of the food. These include appearance, odour, texture, taste and temperature.

Appetite

Appetite includes those internal factors which stimulate hunger in the animal. How the appetite is regulated is very complex and poorly understood. Animals have a physiological method of controlling or regulating their food intake. The hunger and satiety, or satisfaction, centres are found in the hypothalamus of the brain.

It is the acids which are produced in the rumen during fermentation which affect the appetite of the ruminant animal. If the rumen is active, it will produce more acids, and this will cause the hunger centres in the brain to send messages that the animal is no longer hungry.

Generally, animals eat to meet their energy needs. The animal has some built in mechanism which adjusts energy intake to meet the needs the animal has for energy. This is true as long as no other problems, such as disease or nutrient deficiencies, exist.

Body Weight

The energy requirements of animals are closely related to their body weights. If your animal increases from 400 kgs to 440 kgs, the energy requirements do not increase by 10%, but actually by a lesser amount, 7.4%. This is because body weight to the 0.75 power gives a close estimate of the surface area of the animal. Remember that the heat loss and heat production are directly related to the surface area.

Individuality

The individuality of the animal affects the intake differences from one animal to the next. However, because we are attempting to deal with large numbers of animals and still be economically efficient, it is difficult for us to pay individual attention to animals.

Type and Level of Production

Young animals need their nutrients for growth. Pregnancy and lactation require nutrients for reproduction. Steers need nutrients for production, and dry cows require their nutrients only for maintenance. Therefore, the type and level of production directly affects the nutrient requirements of the animal.

Miscellaneous Factors

Temperature extremes, general health of the animal and stress conditions will affect feed intake. Cleanliness of feed and water, availability of water and feeder design will also affect feed intake.

NUTRIENT REQUIREMENTS OF BEEF

LEVEL ONE

ROLL CALL

Name a nutrient.

Name a feed item which is a good source of this nutrient.

What is a nutrient?

A nutrient is something needed for life.

What is a nutrient needed for?

- maintenance;
- growth;
- production; and
- reproduction

A nutrient is like an ingredient in a recipe. If we leave an ingredient out, the food we are preparing will not turn out properly. If we leave an ingredient out of our beef animal's diet, he or she will not grow up or produce as well as we expect.

If the animal does not receive enough of a nutrient, it is said to be deficient.
There are 5 nutrients the beef animal needs in its diet. Can you name them?

Let's learn more about each of these.

Water

We don't often think of water as an important nutrient, but it is necessary for life.

How important is water?
When a calf is born, water makes up 75 to 80 percent of its body weight.

What does water do?

Water does many things:

- helps the body get rid of waste;
- helps things transport through the body;
- lubricates the joints;
- participates in body activities; and
- helps keep the body healthy.

How much water does an animal need?
The amount of water your animal needs depends on many things: body size, weight, feed consumed, the environment and the type of animal. Water should be available free choice for your animal at all times.

How can you tell if your animal is getting enough water?
The first sign you will notice if your animal is not getting enough water is a decrease in feed intake.

Water quality is important for all livestock. An abundant supply of clean, fresh water should always be available for all your animals.

Energy

What is energy?
Energy is the power the animal needs for the body to function. It receives this power from the food it digests, or the "fuel" it "burns".

The beef animal needs energy for many reasons:

- to keep warm;
- to grow;
- to produce milk and calves; and
- to move around.

It receives energy from digesting carbohydrates and fats. Carbohydrates include the sugar, starch and cellulose found in plants. The oils of soybean and canola are good sources of fats.

Too Much Energy

How can you tell if your beef animal is getting enough energy?

- becomes too fat;
- calving is difficult;
- upset digestive system; and
- lower resistance to disease.

Too Little Energy

How can you tell if your beef animal is not getting enough energy?

- slow or stopped growth;
- losing weight;
- poor hair coat;
- lower resistance to disease; and
- reproductive problems.

From these problems, you can see how important it is to provide your beef animal with the right amount of energy.

Protein

Protein is needed by the beef animal for:

- growth;
- reproduction;
- muscle development and action;
- hair growth; and
- milk production.

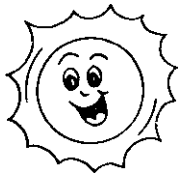
Most feeds contain some protein. However, it is often in only small amounts. The best sources of protein are:

- soybean meal; and
- canola meal.

Vitamins

Vitamins are needed for these activities:

- growth;
- reproduction;
- movement; and
- to stay healthy.



There are many vitamins. Each of them is important for specific reasons.

Minerals

Minerals are needed in the body to build healthy teeth and bones. They are also needed for other functions including the working of muscles and nerves. There are at least 19 minerals required by the beef animal. Some of these are:

Macrominerals
- those minerals required in fairly large amounts

- Calcium;
- Phosphorus;
- Magnesium;
- Potassium;
- Sodium
- Chlorine; and
- Sulphur.

Microminerals
- those minerals required in smaller amounts:

- Iodine;
- Cobalt;
- Selenium;
- Iron;
- Zinc;
- Copper;
- Molybdenum; and

- Manganese.

ABOUT SALT

Type of Salt	Minerals Contained
White	Sodium, chloride.
Iodized (red)	Sodium, cholride, iodine.
Cobalt iodized (blue)	Sodium, choride, iodine, cobalt.
Trace mineralized	Sodium, chloride, iodine, cobalt, zinc, iron, manganese, copper, selenium.

LEVEL TWO

ROLL CALL

Name a nutrient.

Name a feed item which is a good source of this nutrient.

From the answers to the roll call in your club, complete this chart. Once your roll call is finished, work together with other members to add as many items as you can think of.

NUTRIENT

Good Sources of This Nutrient

What is ESSENTIAL?

There are 5 nutrients which are essential for the beef animal. An essential nutrient is one which performs a special function in the body. Therefore, it must be available in the body if the animal is to live and function.

The essential nutrients are:

- Water;
- Protein;
- Energy;
- Vitamins; and
- Minerals.

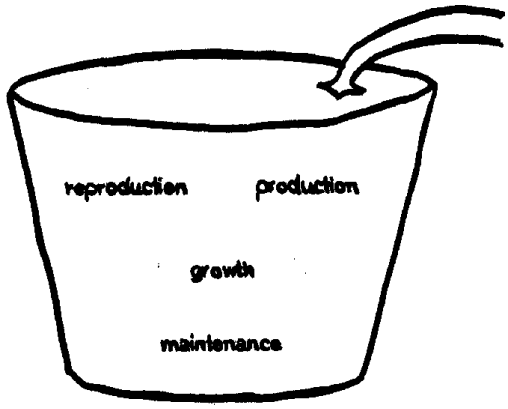
Researchers have determined that these nutrients are essential by feeding diets deficient or lacking in the specific nutrient and noting the results. They then correct the problem by adding the nutrient which was missing.

How much of a nutrient is required?

Animals have different requirements for nutrients depending upon their body activities. We can divide the animals into these groups:

- Maintenance;
- Maintenance plus growth;
- Maintenance plus production; and
- Maintenance plus reproduction.

The normal body functioning or maintenance requirements of the animal must be met first. Only then can growth, production or reproduction occur.



Remember, the bottom of the bucket must be filled before you can begin to fill the top.

There are other factors which affect the amount of each nutrient the animal needs. Some of these are:

- environment;
- temperature;
- room for exercise;
- stress;
- breed;
- age; and
- sex.

Vitamins for Beef

This chart provides a summary of information on the vitamins beef cattle require.

Vitamin	Source	Importance
A	- add to diet; and - green forages.	- most important vitamin for cattle; - needed for vision, healthy skin and tissue, bone development, reproduction; - content in feed declines as feed ages; - forages contain carotenes which the body uses to make vitamin A; and - stored in the body up to 6 months - fat soluble.
B	- made in rumen- there are many B vitamins (riboflavin, thiamine, niacin, etc.); and - not stored in the body- water soluble.	
C	- made in body	- not stored in the body - water soluble; and - humans cannot make their own, so they must receive it in their diet.
D	- sunshine; and - suncured forages.	- need for strong bones and growth; - animals kept indoors and fed silage may need to recive supplement Vitamin D; and - stored in the body - fat soluble.
E	- green forages; and - whole grains.	- works together with selenium in muscle action; and sotred in the body- fat soluble.
K	- green forages; and - made in rumen.	- needed for blood clotting; - mouldy sweet clover restricts K action; and - stored in the body - fat soluble.

LEVEL THREE

ROLL CALL

Welcome to the level three section of Nutrient Requirements of Beef Cattle. This is one of the most interesting and most important topics you will cover in your study of the beef animal.

By now you have learned plenty about beef nutrition. In this section we challenge you to take what you already know, combine it with some of the information we have presented for you and share your knowledge with other members in the club.

Topic 1:

VITAMIN AND MINERAL DEFICIENCIES

In order for your beef animal to perform to its potential, it must receive adequate amounts of all essential the essential nutrients. Underfeeding of vitamins and minerals will create a deficiency. Overfeeding may lead to toxicity.

The chart on the next pages provides a summary of the symptoms which may occur as a result of a deficiency of a particular vitamin or mineral. Note that many of the symptoms are similar for different minerals or vitamins. Keep in mind that these vitamins and minerals will often interact with one another.

VITAMIN DEFICIENCY SYMPTOMS

A	- night blindness, weakness, reproductive failure, reduced growth, increased susceptibility to disease.
D	- rickets, weakness, symp toms similar to calcium phosphorus deficiency.
E	- nutritional muscular dystrophy, staggering gait, symptoms similar to selenium deficiency.
K	- hemorrhaging, reduced blood clotting time, weakness, anemia.
thiamine	- reduced growth, diarrhea.
riboflavin	- leg paralysis, neural degeneration, reduced growth, diarrhea.
niacin	- lesions on the tongue, lips and mouth, dermatitis, reduced growth.
pyridoxine	- staggering gait, convulsions, reduced growth.

MINERAL DEFICIENCY SYMPTOMS

calcium (Ca)	- rickets in younger animals, osteomalacia in older animals, bones bend or break easily.
chlorine (Cl)	- deficiency is very rare.
magnesium (Mg)	- tetany - symptoms are unusual alertness and

nervousness, muscle twitching, staggering, convulsions.

phosphorus (P) - rickets, pica (depraved appetite, chewing on wood), stiffness in hind-quarters, poor reproductive performance, reduced fertility.

potassium (K) - hind leg stiffness, reduced feed intake, lethargy, in extreme cases - coma.

sodium (Na) - deficiency is rare, emaciation, reduced appetite, rough hair coat, staggered gait.

cobalt (Co) - pale skin, loss of appetite, watery eyes, anemic, list lessness, showing signs of starvation although food is plentiful.

copper (Cu) - related to Mo deficiency, diarrhea, hind leg paralysis, loss of hair color, rough hair coat, infertility, cardiac failure.

iron (Fe) - unthriftiness, reduced growth, anemia.

iodine (I) - goitre, birth of hairless calves.

manganese (Mn) - enlarged joints, poor locomotion, poor reproduction, deformed legs, overall physical weakness, lower fertility, increased incidence of retained placenta.

selenium (Se) - nutritional muscular dystrophy, skeletal and cardiac muscle degeneration.

zinc (Zn) - skin lesions, rough hair coat, swollen joints, parakeratosis or mange-like condition.

Salt (Na & Cl) - salivation, thirst, muscular spasms, scouring, prostra tion, upsets the tissue/water balance in the body and may lead to death.

Topic 2:

I'VE MADE A FEED

A complete feed is one which contains adequate amounts of all of the nutrients required by the animal being fed. This is a very important point for everyone to understand.

Topic 3:

UNDERSTANDING ENERGY

The importance of energy to an animal cannot be overemphasized.

Energy is defined as the ability to do work. All energy originates from the sun. Plants trap energy using photosynthesis. Animals transform this energy from the plants into heat or body products such as milk or meat.

You may have learned in school about the "first law of thermodynamics". It states that energy can neither be created nor destroyed; it is only changed from one form to another. Thus, energy in feeds which is not digested is eliminated from the body. Energy in feeds which is digested and not incorporated into the body products is lost as heat.

We measure the amount of energy in megacalories (Mcal).

1 Mcal = 1,000,000 calories or = 1,000 kilocalories

There are many types of energy. It is important that you understand what these types are and how you can use the information they give you.

GROSS ENERGY (GE):

If we were to burn a feed and measure the total amount of energy released, we would obtain gross or total energy values as follows:

FEED	GROSS ENERGY (Mcal/kg dry matter)
Corn Grain	4.43
Oat Straw	4.43
Oat Grain	4.68
Timothy Hay	4.51
Linseed Meal	5.12

These values are obtained through scientific experimentation. Note that these values do not tell us how much energy an animal can get from its feed. An animal digests its feed. Digestion is a much slower process than burning.

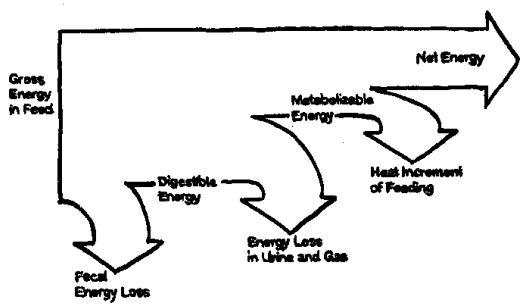
DIGESTIBLE ENERGY (DE):

Digestible energy is the most popular way to express the energy values of feeds and the energy requirements of the animal.

The digestible energy of a feed is the gross energy consumed by the animal minus the energy eliminated or lost in the feces. The fecal energy may be as high as 10 to 70 percent of the energy consumed by the animal, making it the largest loss of energy in digestion.
Cattle digest 60 to 90 percent of the energy in grains and high quality forages. However, in low quality forages such as straw, they digest only 40 to 50 percent of the energy.

The following diagram will help you understand how the gross energy of feeds is utilized by the animal.

Division of Energy Losses



METABOLIZABLE ENERGY (ME):

The metabolizable energy is equal to the digestible energy minus the energy in urine and gaseous products of digestion. The cow loses 4 to 5 percent of the gross energy through the urine and approximately 7 percent through the production of methane gas in the urine.

NET ENERGY (NE):

Net energy is equal to the metabolizable energy minus the heat increment. The heat increment is the heat which is produced when feed is taken in and digested.

TOTAL DIGESTIBLE NUTRIENTS (TDN):

TDN is an old system of measuring the available energy of feeds and the requirements of animals. It is hard to measure, inaccurate, and very confusing.

The formula for the calculation of TDN is:
TDN% = (%Crude Protein X %Digestibility)

+ (%Crude Fiber X %Digestibility)

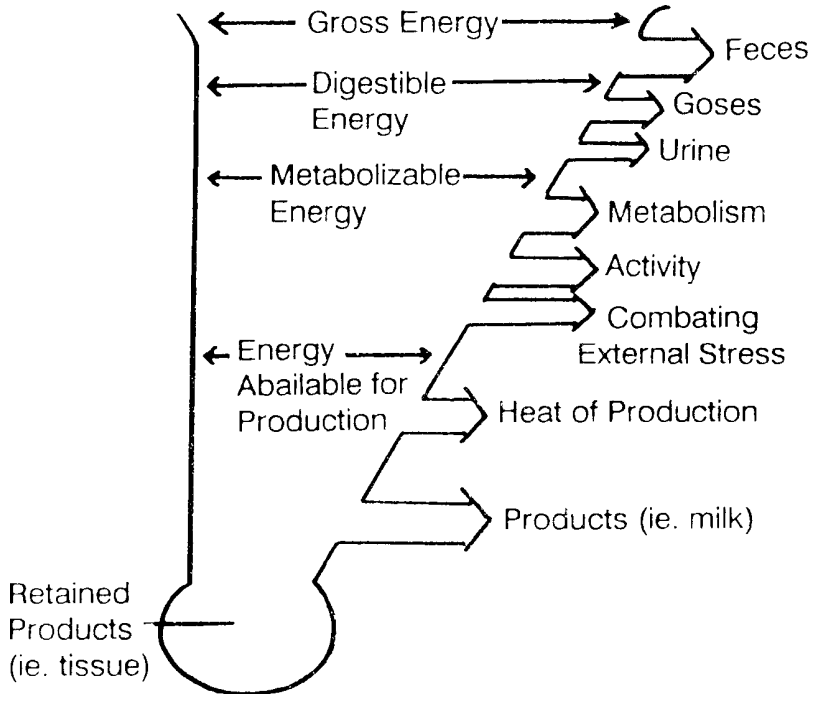
+ (%Nitrogen-free Extract X %Digestibility)

+ (%Ether Extract X %Digestibility X 2.25)

All of the energy consumed is made into one of these:

- fat;
- heat;
- wastes - feces, gas, urine; or
- body products - milk, meat, offspring.

The following diagram summarizes the manner in which the gross energy is used by the animal.



In summary, digestible energy is the value most commonly used as it is the easiest to determine and understand. However, it is important that you understand all of the values and how they are derived.

Using Energy:

FEEDS FOR BEEF

LEVEL ONE

ROLL CALL

Name a feed ingredient which is used in a ration.

RATIONS AND DIETS

Diet

A diet is the mixture or combination of feeds which provide the nutrient requirements. The diet you feed your animal contains those nutrients which keep your animal healthy, growing, producing and reproducing.

Ration

A ration is the amount of feed required by the animal daily.

The diet must contain the correct proportion of the nutrients the animal needs. The correct amount of a properly balanced diet gives you a ration which meets the animal's dietary requirements.

Tell me about the diet you are feeding your animal.

MORE ABOUT RATIONS AND DIETS

Your animal's diet will be made up of concentrates, roughages and supplements. Each of these contains necessary nutrients.

Roughages

Roughages are high fibre feeds. Roughages include hay, silage, and straw.

Concentrates

Concentrates are high energy feeds. This includes the grains.

Supplements

Supplements are a good source of one or more nutrients. They are added to the ration to make a more nutritious feed. They may provide energy, proteins, vitamins or minerals.

Salt is a mineral supplement. Salt, or sodium chloride, is important for the animal because he loses sodium and chloride through sweat and body wastes. Your animal can receive salt by licking a block or eating loose salt mixed in with the feed.

Tell me about the concentrates, roughages and supplements you are feeding your animal.

Palatability

Palatability is ... how acceptable the feed is to the animal.

Palatability is affected by the flavour, smell, appearance, texture, temperature and dustiness of the feed. The way the feed is prepared will affect each of these.

Your animal must eat enough of its ration to get the daily gains you want. If it does not eat enough, it won't get those gains and the feed

and the nutrients in the feed will be wasted.

What do you think your animal likes about the ration you are feeding?

What doesn't it like?

ABOUT ROUGHAGES

Hay

Hay is dried roughage which is harvested and stored with a low moisture content.

Two types of roughages are used for hay crops:

1. grasses; and
2. legumes - clover, alfalfa, trefoil.

What type(s) of hay are you feeding?

The most common ways in which hay is packaged today are:

1. Small square bales weighing from 20 to 30 kgs.
2. Large round bales weighing from 300 to 600 kgs.
3. Loose hay stacks weighing from 1 to 3 tonnes.
4. Large square bales weighing about 500 kgs.

Haylage

Haylage is also produced from grasses and legumes. Instead of being stored as long hay, it is chopped into shorter pieces by a forage harvester. The main difference between hay and haylage is that haylage has a higher moisture content - around 40%.

Silage

Grasses, legumes or cereals harvested the same as haylage but stored with a higher moisture content, about 60%, make silage.

ABOUT THE GRAINS

The grains are concentrates. As we know, these are the energy feeds.

Wheat

Wheat is high in energy. It should be coarsely ground or cracked and fed in small amounts along with other grains. Fine particles of wheat appear when it is processed and may cause digestive upsets or bloat.

Barley

Barley is the energy source used most often in Alberta feedlots. It has less energy than wheat, but more than oats. Barley is a very dense feed. If you compare the weight of a pail of barley with the weight of a similar pail of oats, the barley pail will be much heavier. Therefore, it is important to measure your grains by weight, not by volume.

Oats

Oats are very palatable. They are good to use when starting your animal on grain. However, because oats have less energy than wheat or barley, oats is not a very good finishing feed.

Corn

In most parts of North America, corn is the most commonly used energy feed. However, in Alberta, very little corn is used because most Alberta climate conditions are not suited for growing corn. Corn is low in calcium, but has a good phosphorus content. In most cattle diets,

corn is fed along with protein supplements.

Feed Intake

Beef cattle will eat from 1.4 to 2.7 percent of their body weight each day in feed. This amount is on a dry matter or moisture free basis. The amount consumed varies depending on the concentrate roughage ratio of the fed and the age and condition of the animal. Older and more fleshy cattle will consume less feed per unit of body weight than younger, leaner animals.

The table below lists the approximate amounts of different types of feed an animal will eat. These are based on a 90% dry matter basis.

Feedstuff	Daily Consumption As A Percentage of Body Weight
Excellent quality hay	3
Very good quality hay	2.5
Medium quality hay	2
Poor hay, oat or barley straw	1.5
Wheat straw	1
Silage (air dry basis)	2 - 3
Oats	3
Barley	2.5
Wheat	1.5 - 2

What do we mean when we say "on a dry matter basis"?

If your haylage has 40% moisture, then it has 60% dry matter - because the dry matter plus the moisture makes up the haylage or 100%. If you feed 10 kgs of haylage then you are only feeding 6 kgs of dry matter.

LEVEL TWO

ROLL CALL

Name a feed ingredient which is used in a ration.

Welcome to the level two section of feeds for beef. There is so much to learn about this topic. Talk to some of these people to find out more: District Agriculturists, local farmers, parents, feed company representatives, 4-H leaders and senior 4-H members.

FEED INTAKE

There are many factors which can affect how much feed your animal can eat. You need to know about these because they will affect the types and amounts of feeds and ingredients your animal will eat.

Factors Affecting Forage Intake:

Stage of maturity: The fibre content of forages increases as the forage matures. Higher levels of fibre in forage will reduce feed intake.

Weathering: Mould growth will reduce intake.

Forage Species: Cattle will consume greater amounts of legumes than grasses.
Physical Form: Grinding will increase forage

intake.

Grain Feeding: Grain feeding will depress feed intake, especially if grain is fed before forage.

Fermentation: Consumption of silage, on a dry matter basis, will be less than if the same quality and dry matter of hay is fed.

Factors Affecting Dry Matter Intake:

Cattle Status: Thin cattle will consume more than cattle in normal condition. Older and more fleshy cattle will consume less than younger, leaner cattle. Lactating cows will eat 40 to 60 % more than dry cows.

Weather: Cold weather will cause feed intake to increase. Warm weather will cause intake to decrease.

Nutrients: An animal which has a nutrient deficiency will have a decreased intake of dry matter.

What does all this mean?

You can use this information to decide how to adjust your animal's diet when you must change the feed ingredients. For example, if you are into some better quality hay, you can decrease the amount you need to feed.

You can also use this information when deciding how to feed. For example, you will need to feed a group of thinner cows more than a group of older, more fleshy cows.

If the weather becomes colder, you will need to increase the feed available for your animals.

DRY MATTER / MOISTURE FREE

Suppose your hay had 13% moisture. Then, it would have 87% dry matter (DM). The results you receive on your feeds may be calculated on a dry matter, a moisture-free or an as-fed basis. It is important that you are able to convert them to the format you require. Keep these formulae in mind:

$$\%DM = \left(\frac{100 - \%moisture}{100}\right)$$

$$\text{Nutrient Conc. (As-Fed)} = \text{Nutrient Conc. (Moisture Free)} \times \%DM$$

FEED PROCESSING

1. ROLLER MILL

The roller mill crushes the grain to a flat, flake like structure. There will be fewer fine particles in the feed.

2. HAMMERMILL

The grain is bashed around in the rollermill until it is small enough to fall through the screens. The holes in the screens can be varied from 1/8 to 1/2 inch in diameter. Feed companies use the hammermill to prepare feeds for pelleting.

3. PELLETING

Fats and/or molasses are added to the feed ingredients during mixing. They help the pellet hold its shape as it hardens, and reduce dustiness. Vitamin and mineral supplements are spread evenly through the feed during pelleting.

These are the steps followed in pelleting feeds:

1. The ration is mixed.
2. The feed is put through the hammermill.
3. Feed moves into steam chamber where moisture is added.
4. The feed is forced through a die to shape the pellet.
5. The pellets are put in the cooler to firm and harden.

LEVEL THREE

ROLL CALL

Name a feed ingredient which is used in a ration.

Topic 1:

MORE ABOUT FEEDS FOR BEEF

The B.C. Ministry of Agriculture, Fisheries and Food has resources on feeds and feeding beef. These are available to you. Your local district agriculturalist's office has more information. You can also contact local feed suppliers, as well as the B.C. Cattlemen's Association for further information.

Topic 2:

USING COMPUTERS FOR RATION FORMULATION

Today, there are many computer programs available for formulating rations for beef cattle. These programs are constantly being revised and updated as new information and technology become available.

Topic 3:

FEED SAMPLING

In order for you to make the best use of your feeds, you need to know exactly what is in each feed. Underfeeding livestock will limit their production potential. Overfeeding livestock will waste your valuable resources.

Griffin Labs in Kelowna, B.C. and Norwest Labs in Langley, B.C. analyzes feeds so livestock producers can make the best use of their feeds. Feed test results will help you determine the type and amount of supplements you need to provide your animal with its required nutrients.

How to Submit Your Feed Samples:

1. OBTAIN NECESSARY EQUIPMENT

Obtain sample boxes, information sheets and a core sampling tool (which you will need for baled roughages only) from your local district agriculturalist's office.

2. TAKE REPRESENTATIVE SAMPLES

Sample each of your feeds before the feeding period begins so you can use the results to help you develop the best feeding program possible. Whenever possible, sample your feeds at harvest time. Each type of feed you will use should be analyzed separately because different forage species, mixtures and cuttings, and even grains and forages from different fields, vary in nutrient content.

Baled Roughages: using the core sampling tool, take subsamples from at least 20 different bales or places in the stack. Place all samples directly into one bag.

Silage or Loose Roughages: by hand,

take subsamples from at least 20 places in the stack or silo. Put them in a pail and mix thoroughly. Then take a sample from the pail and put it into the plastic bag. If possible, freeze before mailing to minimize moisture loss.

Grains or Complete Feeds: again, take at least 20 subsamples from different locations in the bin. Put the samples in a pail and mix thoroughly. Take a sample from the pail and place it in a plastic sample bag.

3. FILL OUT THE INFORMATION SHEET

Complete the information sheets and enclose the testing fees. There is a fee for the testing. Check with your District Agriculturist.

4. LABEL AND PACKAGE SAMPLES

Seal each plastic bag with a twist tie and place it in the sample box. Label each sample box completely
and correctly.

5. SEND THE SAMPLE

Send your samples by mail, bus or courier service available at your local district agriculturist's office, to the laboratory. Send perishables by bus or courier.

6. RESULTS

In approximately four weeks, you will receive your results. Copies can also sent to your local district agriculturist and regional livestock specialist. The laboratory also keeps a copy.

What is analyzed?

A regular analysis of your sample will give this information:

- moisture content;
- pH (acidity of silage materials);
- crude protein content;
- calcium content;
- phosphorus content;
- acid detergent fibre content (roughages only);
- nitrate content (roughages only); and
- bushel weight (grains only).

If you suspect a problem, you may also, for an additional charge, have other items analyzed. These would include the minerals.

For further information on the feed sampling procedure, talk to your local district agriculturist.

Topic 4:

Putting It All Together

In these last three units, we have learned more about the digestive system, nutrient requirements and feeds for beef. Your ultimate challenge is to take everything you know about nutrition and put it all together. You need to understand how the animal works, how the feeds work and how you work - only then can you produce beef successfully.

PARASITES OF BEEF CATTLE

LEVEL ONE

ROLL CALL

Name a parasite.

What are parasites?

A parasite is any living organism which survives on or in a host animal. This organism, or parasite, gets all of its support for life from the host animal. This include its food and shelter.

There are two types of parasites. These are the internal and the external parasites. What is the difference between these two types of parasites?

An internal parasite

An external parasite

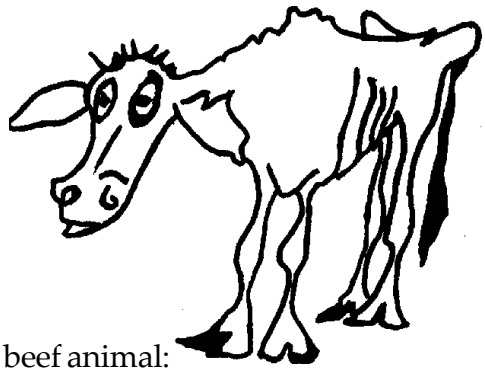
Give some examples of each of these types of parasites:

Internal **External**

Parasites and Your Beef Animals

Why do we need to worry about parasites?

Parasites harm our animals. They cause our beef cattle to be stressed. When they are stressed, they don't perform well, and they are more susceptible to disease and infection.



The healthy beef animal:

- has bright, clear eyes;
- eats regularly;
- drinks water provided;
- is active;
- has a shiny hair coat; and
- has pleasant breath.

A beef animal with internal parasites may:

- stop drinking;
- have poor feed efficiency;
- be weak and losing weight;
- have decreased milk production; and
- be generally unhealthy.

A beef animal with external parasites may:

- be uncomfortable;
- not eat or drink regularly;
- lose weight;
- have a rough and dull hair coat; and
- rub against fences, walls or trees.

The bottom line is that your beef animal will not be healthy. When they are not healthy, they will not grow or produce well. When they do not grow or produce well, this costs you money.

It is important to know that a beef animal with only a slight infection of parasites will look normal. Often, you cannot tell just by looking at the animal that there is a problem. A beef animal with a severe infection, or many

parasites, will look sick.

With good management, you will be able to control parasites on your farm. This will keep your animals happy and healthy.

Controlling Parasite Infection

It is much easier and less expensive to control parasites by preventing them, rather than having to treat your animals once they have parasites. Because beef cattle spend so much time on pasture, they are very susceptible to parasites, especially worms.

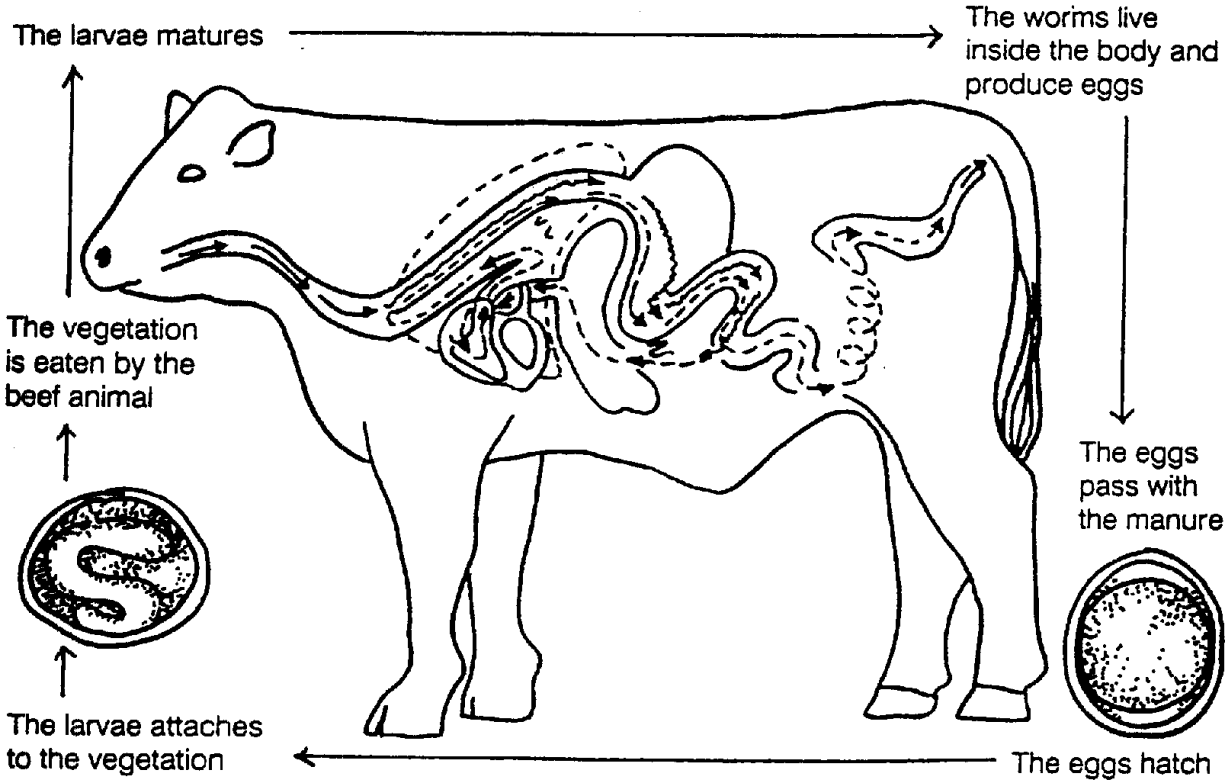
To help you better understand how the beef animal can become infected, let's look at the life cycle of a common internal parasite, the roundworm.

Life Cycle of the Roundworm

Suppose your beef animal has roundworms. The worms lay eggs while live inside the body. These eggs pass out of the body in the manure. While on the ground in the manure, the eggs grow into larvae. These larvae move from the manure to the grass. The animals eat the grass, taking the larvae into their body. Once inside the body, the larvae grow into adult worms. The cycle continues.

In Western Canada, roundworms can be found in beef and dairy cattle year round, particularly in young animals. They are often found in only small numbers. Because of this, it is often difficult to detect them.

There are three different species of roundworms which can live in the abomasum or fourth stomach of cattle:



Life Cycle of the Roundworm

Roundworm:	**Length:**
barberpole worm	35 mm.
brown stomach worm	15 mm.
threadworm	7 mm.

They suck blood while attached to the stomach wall. One or all three of these species may be found. A serious infection would include several thousand of these worms in one animal.

The threadnecked worm is a common roundworm found in the small intestine. It causes harm only when found in large numbers.

How can your animal become infected with parasites?

The first step in preventing roundworm infection in your cattle is to know how to recognize infected cattle. Roundworm infection is usually a herd problem rather than an individual animal problem. If only a few worms are present, you likely won't notice any problems.

When many worms are present, your animals will begin to lose their appetites, not gain weight, appear thin and look poorly. Some may develop scours. To be positive that worms are the problem, manure samples can be analyzed for the identification and count of eggs. This will tell which type of worm and how severe the problem is.

There are several treatments on the market. Whether or not mass treatment is necessary is an individual farm decision. Consult your veterinarian for more information.

LEVEL TWO

ROLL CALL

Name a parasite.

Have members list answers to the following using roll call:

Internal Parasites
External Parasites

Welcome to the intermediate section of Parasites of Beef Cattle. There are many parasites which can affect beef cattle. In this unit we will cover some of the more common ones and discuss their life cycles and how to identify and prevent them.

PARASITES AND HOSTS

When an animal has a parasite, that animal becomes a host. Being a host is something livestock cannot afford to do. Being a healthy and efficient producer is difficult enough without having to feed and nourish parasites.

INTERNAL PARASITES

Animals infected with internal parasites may show some of these symptoms:

- anemia;
- weakness;
- low milk production;
- poor hair growth;
- depressed appetite; and
- scours.

Roundworms

The roundworm is the most common internal parasite affecting beef cattle. For more information on the roundworm, consult Parasites of Beef Cattle in Level One.

Coccidiosis

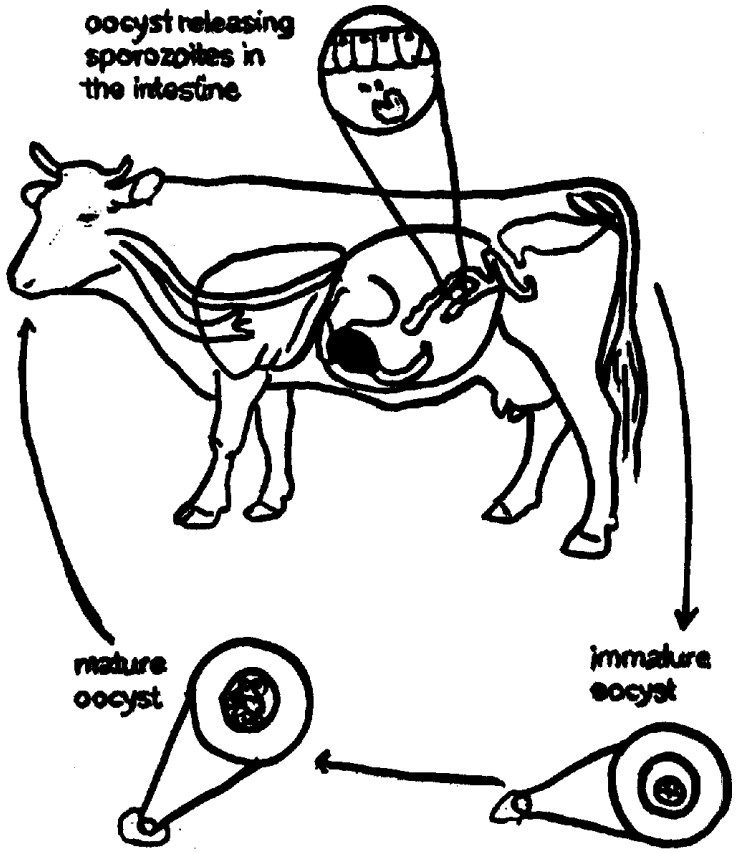
Coccidiosis is a common disease of cattle caused by a protozoa. It develops most often when weaned calves aged six to twelve months are crowded together. Calves often become infected in the winter months when placed on pastures or lots contaminated by older cattle or other infected calves.

Coccidiosis has both internal and external stages. A microscopic egg called a oocyst is passed out in the manure of animals with coccidiosis. With ideal temperature, moisture and oxygen conditions, the oocyst matures and develops eight bodies called sporozoite. Each of these is able to enter a cell in the animal's intestine after being eaten.

When the sporozoite enter the cells, they divide many times, moving into and damaging intestinal cells. When the male cell fertilizes the female cell, an oocyst is produced. This oocyst ruptures the cell and passes out of the animal in the manure.

The first sign of coccidiosis is diarrhea, which may be just watery or containing blood. Dehydration, weight loss, depression and loss of appetite may occur. When severe, death will result. Older cattle who recover from coccidiosis may be immune but will continue to pass oocyst in their manure, infecting other animals.

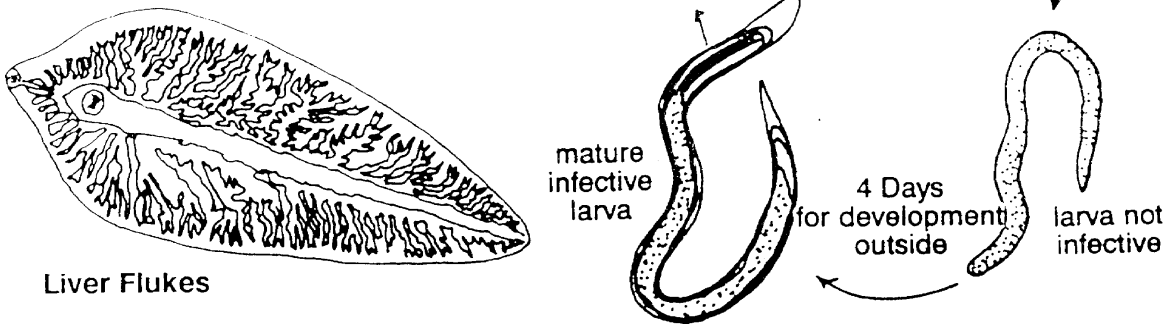
Prevent coccidiosis in your herd by making sure feedlot drinking water and feed cannot by contaminated with manure. Don't feed cattle on the ground. Keep the pens dry and well bedded and isolate infected animals.



Lungworms

Bovine parasitic bronchitis or lungworm disease is caused by another roundworm. Heavily infected calves will have difficulty breathing and may die. The irritation caused by the lungworms causes the lungs to produce large quantities of mucus. This mucus becomes foamy and blocks the air passages when the calf tries to breathe. The adult worms can actually block the air passages themselves. Other symptoms include coughing, rough hair coats and lower weight gains.

The adult worms are white, thread-like and about 10 cm long. They live in the trachea and bronchi, the air passages leading to the lungs. In heavily infected animals, there may be hundreds of worms. The adult females lay eggs which hatch in the lungs, releasing tiny worm-like larvae. These larvae are coughed up and swallowed, then carried through the intestine and out of the animal in the manure. In three to seven days, the larvae mature, passing through several stages until they can contaminate pasture, water and feed. Once swallowed, the larvae move through the wall of the intestine and are carried to the lungs in the blood. Once they reach the lungs, they leave the blood and develop into adults in approximately seven days. These adults can live in the lungs for 50 to 70 days.



Liver Flukes

Liver flukes are found in cattle inhabiting low lying areas where fresh water snails can be found. Cattle with liver flukes have lower weight gains, decreased milk production and poor feed efficiency. However, they are difficult to identify before the animal is slaughtered.

The adult liver fluke is about 2.5 cm long and 1 cm wide, and lives in the bile ducts of cattle livers. The female lays eggs which pass in the manure. The eggs hatch and the flukes move into the snail. Four to seven weeks later, larvae leave the snail and attach to the grass. Cattle eat the grass, taking in the larvae. The larvae burrow through the intestine and move to the liver. The life cycle takes four to six months, but flukes can live up to eleven years.

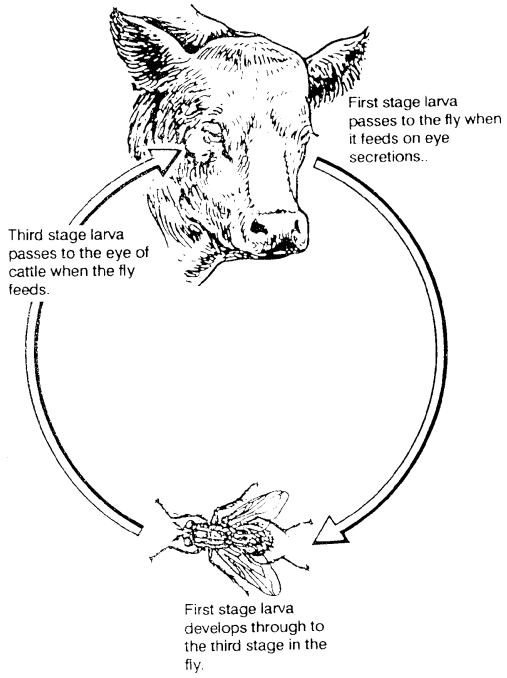
Eyeworms

Eyeworms are found most often in two to seven year old animals. Two hosts are needed to complete the life cycle - flies and the eyes of cattle.

Adult worms develop in the eyes and the lacrimal, or tear ducts, of cattle. Female worms produce eggs. These eggs hatch releasing first stage larvae which move into the tears. Face flies become infected with these larvae when they feed on the tears. These larvae enter the gut of the fly and develop into a second, then third stage larvae. This larvae moves to the cattle from the fly, when the fly feeds on the tears.

Disease of the eye may occur. It begins with a mild inflammation of the inner eye membrane. The cornea becomes cloudy and the animal produces lots of tears. When very severe, the infected eye may become swollen and covered with pus.

Infections are found most often in the summer months. Positive diagnosis is made by examining tears under the microscope and finding the first stage larvae.

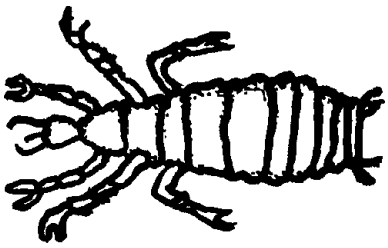


EXTERNAL PARASITES

Animals infected with external parasite may show some of these symptoms:

- uncomfortable;
- scratching or rubbing on fences or walls;
- greasy, dirty, rough hair coat;
- irritable; and
- difficult to handle.

Lice



There are two types of lice - sucking and biting.

Sucking lice are slate blue in colour and feed on the blood of the animal. There are two types of sucking lice: the short-nosed cattle louse and the long-nosed cattle louse. They are usually attached with their heads partly buried in the skin. The adult female is about 3 mm long. The eggs or nits are cream coloured and are attached to the hairs near the skin.

Biting lice feed on the hair, loose and dead skin and other debris on the skin of the animal. The biting louse is about 1.5 mm long and has a red head and light cream or yellowish body.

Eggs of the sucking lice hatch 11 to 20 days after they are laid. Young lice mature within seven to 14 days. Biting lice eggs hatch and mature more quickly. The total life cycle of biting lice is about 15 to 22 days, compared to 18 to 34 days for the sucking lice. Cattle lice must remain on the animal continuously to feed and can survive for only one to two days if removed from the animal.

Control of lice in your herd is economically important. Infested cattle have a poor appearance, and a reduced market value. Heavy uncontrolled infestations may lead to an increase in abortions, and reduce the birth weights and weaning weights of calves. In breeding bulls, heavy infestations can cause reduced success in breeding.

It is important to control lice. Your objective should be to keep a louse-free herd through regular inspection and quarantine practices. Follow these practices to reduce and eliminate lice in your herd:

1. Keep pens, stalls, feed lots and barn yards clean and dry.

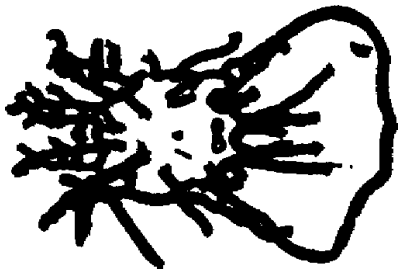
2. Thoroughly clean and disinfect areas which have been used for confining lousy cattle.

3. Inspect all cattle in late spring. Isolate, delouse and reinspect lousy animals before returning them to the herd.

4. Inspect cattle in early fall before they are moved to winter range or confined. In you find infections, treat all animals immediately to avoid later infections.

5. If possible keep animals new to your herd in isolation for four weeks to ensure you are not bringing new infestations into your herd.

Mange



Mange is caused by tiny mites which feed on the animals. There are three types of mange which affect cattle in Canada. **Demodectic mange** is the least serious type of mange. **Chorioptic mange** is most common. It is caused by mites which live on the surface of the

skin. **Sarcoptic mange** or barn itch can be very damaging to your cattle. It must be reported to Agriculture Canada when diagnosed in your herd.

Mange is confirmed only by examinations of skin scrapings by microscope. The mites are very tiny, as small as 250 micrometres in length. You should suspect mange if your cattle are uncomfortable and constantly rubbing on posts, fences or trees, and have scabs developing on rough hair coats. Contact your veterinarian if you suspect mange.

Infection of mange occurs by direct contact. Grooming tools and bedding can also transfer he mites. Make sure you disinfect your tools and clean and disinfect the housing area of animals infected with mange.

There are many products available to treat parasites such as those causing mange. Treat your infected animals only after consulting with your veterinarian.

LEVEL THREE

ROLL CALL

Name a parasite.

Topic 1:
WARBLE FLIES

Warble flies are a common pest of cattle. They create losses due to reduced weight gain and milk production caused by cattle gadding and grub movement through the animal's body. Meat and hides are also damaged by the grubs.

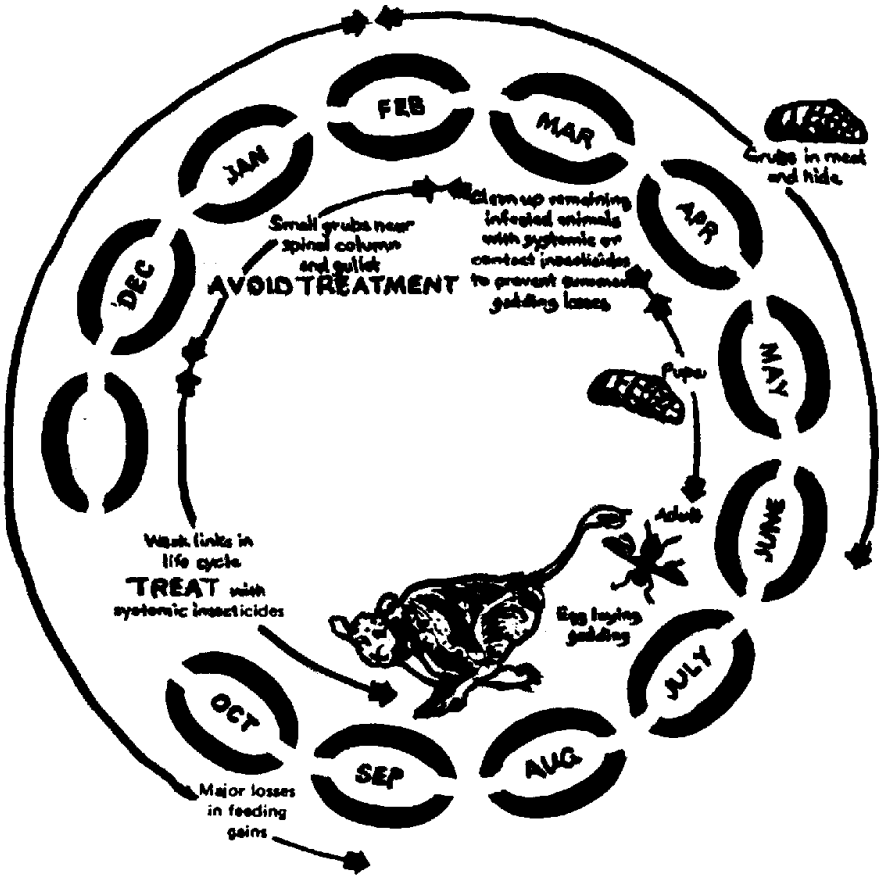
The Life Cycle

In the spring, the grubs drop from the cattle. The grubs develop into warble flies, which look like bumble bees. The flies are active on sunny days, and do not bite, sting or chase cattle in the shade or water. The female fly lays tiny eggs on the lower part of the animals' body. Cattle react to this egg laying by gadding or running with their tails in the air. Each female adult fly can lay as many as 400 to 800 eggs.

In two to seven days, tiny larvae hatch from the eggs. They crawl to the base of the hair where they burrow through the skin into the animal's system. The larvae move through the body tissue during the fall and the winter, reaching the back of the animal in the spring, March or April. They cut holes for breathing through the hide and remain there for four to ten weeks.

The grubs crawl out of the hole, fall to the ground and develop into a pupa during April, May or June. In one to three months, the adult flies come out of the pupa. They begin laying their eggs from late April through September.

There are two species of warble flies in Canada - the common and the northern. The common lays groups of eggs on the lower part of the animal's body. The northern cattle grub adults, also called heel or gad flies, dart at the animals, attaching single, tiny eggs on the legs above the hooves. While moving through the animals, the common grub moves into the oesophagus. The northern grub gathers around the spinal cord.



Controlling Warble Flies

Systemic and contact insecticides are available for grub control. Systemic insecticides are absorbed into the animal's bloodstream when applied to the skin, killing grubs wherever they are in the animal. Contact insecticides must come in direct contact with the grubs. They must be scrubbed or sprayed into the warble opening in the hide during the spring.

Fall is the best time to treat since grubs are killed before they cause major damage. Spring treatment is considered to be the clean up treatment.

It is the responsibility of every livestock producer to control warbles and their larvae. This is for his own benefit as well as the benefit of his neighbours and the livestock industry.

Topic 2:

HORN FLIES

The horn fly is a small, irritating, blood-sucking fly that reduces the productivity of cattle, particularly those in pastures. The horn fly usually rests on the withers, back or underline of cattle, those areas that cannot be reached by the tail or the head. It is attracted to dark colours.

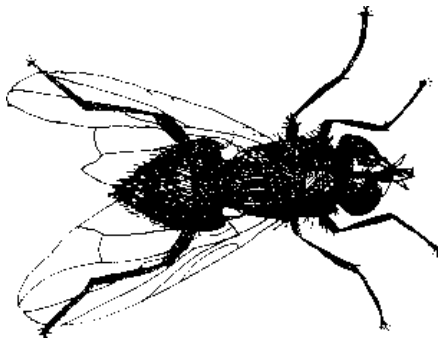
Horn flies feed on adult cattle and are not attracted to calves under four or five months of age. Both female and male flies bite and feed on cattle. Fly bites develop into sores as the flies feed around the edges of previous bites. Scabs develop.

The Life Cycle

The female lands for about 10 minutes at a time to lay eggs under the edges of fresh cattle droppings. Within 24 hours, the eggs hatch and larvae crawl under the droppings. Four to 10 days later pupae develop. Five to 13 days later new adults emerge.

As many as four generations of horn flies may be produced in a season with peak activity occurring in July and August. Mature larvae and pupae will overwinter in the manure.

Losses caused by horn flies include lower milk production, lower weaning weights and lower weight gains. Horn fly infestation is also associated with the incidence of pinkeye disease in cattle.



Topic 3:

METHODS OF PARASITE CONTROL

There are several general methods of controlling parasites on your farm. These involve management. Some of these are:

1. Keep your corral areas clean and dry.
2. Don't overcrowd your animals.
3. Feed in clean feeders. Avoid feeding on the ground.
4. Use well drained pastures.
5. Don't allow your animals to wander in low lying areas.
6. Isolate new animals to the herd for at least three weeks.
7. Rotate your pastures.
8. Keep your water supplies fresh and clean.
9. Know how to identify parasites and pests in your herd.
10. Learn how to control and eliminate parasites and pests.

BEEF HERD HEALTH

LEVEL ONE

ROLL CALL

Name one sign a beef animal shows when it is not healthy.

THE HEALTHY CALF

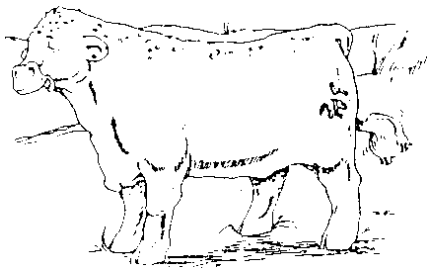
As you get to know your calf and the animals in your herd, you will know what kind of behaviour is normal. A normal, healthy calf has these characteristics:

- bright, clear eyes;
- eats regularly;
- drinks water provided;
- is active;
- has a shiny hair coat; and
- has pleasant breath.

KEEPING YOUR ANIMALS HEALTHY

Help to keep your animals healthy by giving them:

1. A dry, clean home.
2. Clean, fresh water.
3. Well balanced diets containing the right amounts of all the nutrients.



THE UNHEALTHY CALF

If an animal starts behaving differently, or you notice anything that is not normal, your calf might be ill. Look for some of these signs that something is wrong:

Appearance	- depressed; and/or - dull.
Posture	- standing differently from normal; and/or - favouring some part of the body.
Gait	- walks faster or slower than normal; - walks around more or less than normal; - stands in one spot; and/or - wanders aimlessly.
Condition	- too fat or too thin.
Appetite	- eating more or less than normal; - growing too fast or too slow; - refusing to eat certain foods; and/or - drinking more or less water than normal.
Behaviour	- bawling; and/or - nervous.
Breath	- smells sour.
Urine	- not yellow and clear.
Manure	- softer or harder than normal; and/or - colour different than normal.

WORKING WITH YOUR VET

Once you have discovered an unhealthy animal and you cannot solve the problem yourself, you will need to get help. Call your local veterinarian. To make it easier for the vet to find out what is wrong with your animal(s):

- put the sick animal(s) in a separate area;
- make it comfortable;
- have plenty of warm water available;
- have a halter ready;
- be ready to discuss the symptoms: how long has the animal been ill; what are the symptoms; any recent changes in management or feed; and
- be ready to help.

LOOKING AT MEDICINE

Drugs can be given through the mouth (orally) or with a needle (by injection). Whichever way you give the medicine, be sure to read the directions on the box or bottle. Follow instructions carefully for the amounts and ways to give it.

The amount of medicine you give an animal often depends on how big the animal is. It is important to give your calf the right amount. Giving it more will not make it get better faster. It may make it sicker.

ORAL MEDICATIONS

Medicines given through the mouth work more slowly than those which are injected. That's because the medicines must go through the digestive tract before they can be absorbed into the bloodstream, where they go to work.

IN THE FEED - powder

Mix the drug well into the feed. These drugs must taste good or the animal won't eat. The animal won't get the medicine and may become sicker.

BALLING GUN - capsule
- tablet
- bolus

Put the balling gun in the animal's mouth at the back near the throat. Press the plunger to force the capsule, tablet or bolus down the animal's throat.

DRENCHING BOTTLE - liquid

Put the bottle in the animal's mouth at the back near thethroat. Give the liquid slowly to make sure the animal swallows and the liquid goes downthe oesophagus andnot into the lungs.

FLEXIBLE TUBE OR HOSE - liquid

Slide the tube or hose into the animal's mouth and down- liquid the throat to the stomach. This can be used to put medicine directly into the rumen. It can also be used to relieve pressure in animal's with bloat.

INJECTIONS

Drugs may also be injected or given with a needle.

SUBCUTANEOUS - injected beneath the skin

The best place to inject is just in front of the shoulder where the skin is loose. If the dosage is large, split it in half and give it in two locations.

Some drugs cannot be injected subcutaneously because they will bother the animal.

INTRAMUSCULAR - injected directly into the muscle

Inject directly into the muscle to get drugs into the animal quickly. The two recommended sites are the hind leg and the neck and the front shoulders. This is to prevent muscle damage to the prime cuts of beef. Do not inject into a large blood vessel. It could kill the animal. If the dosage is large, split it in half and give it in two locations.

INTRAVENOUS - injected into the vein

An intravenous injection should be done by a veterinarian or someone with experience. Use it if:

- the dosage if very large;
- drug must get into the bloodstream immediately; and/or
- drug is too irritating to be given to animal any other way

When giving injections, always:

- use sterile equipment;
- make sure the injection area is clean;
- read the label and follow the directions;
- restrain your animal in a squeeze chute with a head gate; and
- consult your veterinarian if you are not sure.

LEVEL TWO

ROLL CALL

Name one sign a beef animal shows when it is not healthy.

TAKING YOUR ANIMAL'S TEMPERATURE

When an animal looks like it is not feeling well, you may want to take its temperature. Thermometers can be purchased at most livestock supply outlets. The most common thermometer is a blunt-nosed mercury loaded type.

Follow these steps when taking the temperature of your beef animal:

1. Tie a piece of string around the end of the thermometer so you can easily pull it out.

2. Moisten the thermometer with mineral oil or vaseline. This will make it easier to insert into the rectum of the animal.

3. Shake the thermometer so that the mercury falls below the lowest level likely to be recorded.

4. Lift the tail and insert about 3/4 the length of the thermometer into the rectum. Leave the thermometer in the animal for at least two minutes.

5. Remove the thermometer and find the top of the mercury line. This will be the temperature of your animal. The normal, healthy animal has a temperature of 38^0 C.

Variations from the normal temperature are not always caused by sickness. Higher temperatures may also be caused by:

- age - young animals usually have higher temperatures than older animals;
- excitement;
- digestion after a heavy feeding;
- high environmental temperatures;
- time of the day - an animal's temperature is usually higher in the evening than in the

morning;
- exercise; and
- pregnancy.

SCOURS

Scours is the second leading cause of calf deaths. You will recognize scours by the thin, watery manure, and the manure stained hind quarters of the animal. Calf scours usually occur in the first month of life.

Causes:

- bacteria;
- virus; or
- protozoa

Calf becomes more susceptible when stressed:
- sudden changes in diet;
- nutritional deficiencies;
- wet or environment;
- overcrowding; and/or
- poor weather.

Symptoms:

- diarrhea;
- dehydration;
- fever;
- weak and depressed; and/or
- no appetite.

Calves with scours can die quickly. If you find scours in your herd:

1. Isolate the sick calves.

2. Avoid carrying infection from sick to healthy calves. Wash pails and equipment. Change your coveralls and wash your boots.

3. Feed electrolytes. These will help to rehydrate your calf and replace the fluids and minerals lost.

4. Consult your veterinarian as soon as possible.

Good management is the first step to preventing calf scours.

1. Start your scours prevention before the calf is born. Make sure your pregnant cows get proper treatment.

2. Crowding causes stress on cows and calves and increases the contamination on the ground. Provide 65 sq m of calving space per cow.

3. Disease resistance of heifers is not as good as that of cows. Winter your cows and heifers separately to avoid exposing heifers.

4. Avoid overfeeding or underfeeding calves. Make your changes to the diet gradually.

BLOAT

Bloat occurs when gas is produced in the rumen faster than the animal can get rid of it.

There are two types of bloat:

1. FREE GAS BLOAT - gas collects in the upper part of the rumen.
2. FROTHY BLOAT - gas is trapped in foam in the rumen.

Causes of Free Gas Bloat:

- some functional defect prevents the animal from burping to get rid of gas; and/or

- hardware, liver abscesses, tumours or obstructions.

Causes of Frothy Bloat:

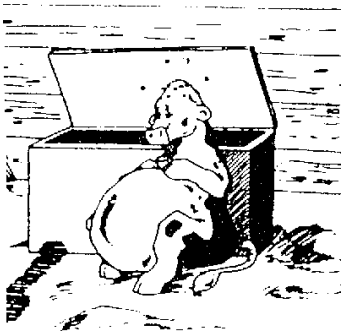
- caused by the diet;
- fermentation occurs too quickly causing
- gas to be trapped as foam; and/or grazing legume forages, finely chopped
- roughages or finely ground grain.

Symptoms of Bloat:

- swelling on left side of abdomen;
- uneasy and anxious;
- shallow grunting;
- uncomfortable;
- rapid breathing;
- urinates often; and/or
- passes manure.

An animal with bloat may die very quickly. It is important to relieve the pressure as soon as possible. You can do this by:

- walking the animal;
- drenching with mineral oil;
- using a stomach tube to allow gas to escape; and/or
- puncture the rumen.



You can prevent bloat:

1. Change feeds very slowly.

2. Don't feed finely ground grains. Fine particles ferment more quickly than larger particle.

3. Rotate your pasture for better feed used and feed quality. Avoid pastures with young legumes.

4. When you first put your cattle out on pasture, feed them hay first. They will be less hungry and less likely to graze too much.

NAVEL ILL

Immediately after birth, the navel of the calf is an open wound. It is tender and susceptible to disease and bacteria.

Cause:

- bacteria entering the calf through the navel.

Symptoms:

- navel will be hot and swollen;
- fever;
- depressed; and/or
- may quit nursing.

Once the bacteria enters the body, the infection may spread quickly, causing painful, swollen joints. The calf may not want to stand up.

PNEUMONIA

Several viruses may be involved in an outbreak of viral pneumonia in calves. Complications caused by the bacteria are common.

Causes:

- bacteria or virus;

Your calf becomes susceptible when stressed:

- cold or wet bedding;
- overcrowding;
- changes in feed;
- castration;
- dehorning;
- branding;
- parasites; and/or
- rapid weather changes.

Symptoms:

- fever;
- rapid breathing;
- cough;
- runny eyes and/or nose;
- no appetite;
- droopy ears; and/or
- listless.

Good management is important in controlling viral pneumonia. Avoid overcrowding, provide adequate shelter and good nutrition. Make sure that newborn calves receive enough colostrum. They should have at least two litres in the first two hours of life and two more litres in the next six to eight hours.

LEVEL THREE

ROLL CALL

Name one sign a beef animal shows when it is not healthy.

Topic 1:

DISEASES OF FEEDLOT CATTLE

Cattle placed in feedlots are susceptible to many diseases. Let's look at some of the common problems.

Foot Rot

Cause:

- bacteria in the soil invade cuts, scratches or injuries in the foot; and
- most common in wet areas.

Symptoms:

- infection and/or swelling in soft tissues of the foot;
- foul-smelling discharge from the foot; and/or
- sudden severe lameness.

Treatment:

- examine foot to make sure there is no other problem such as an injury; and
- antibiotics.

Prevention:

- provide good drainage of feedlots;
- provide solid, dry footage around feeders and waterers; and
- use footbaths.

Grain Overload

Cause:

- consuming large amounts of grain before rumen has adjusted with bacteria;
- rapid fermentation; and/or
- acid is absorbed into the blood and can kill animal.

Symptoms:

- develop in 12-18 hours;
- mild-off feed, stands alone, watery diarrhea;
- moderate-weak, dehydrated staggering; and/or
- if severe-down, shock, cold, coma, death may be rapid.

Treatment:

- mild-alkalizer;
- moderate-empty the rumen, give fluids; or
- if severe-slaughter.

Prevention:

- start cattle slowly on grain;
- at least 10% of diet should always be roughage; and
- mix feed properly.

Enterotoxemia, Sudden Death or Feedlot Disease

Cause:

- bacteria, which is always present in the intestine, multiplies, producing a toxin which can kill animal.

Symptoms:

- temperature is lower than normal;
- diarrhea; and
- death.

Treatment:

- isolate sick calves; and
- ask advice from your veterinarian.

Prevention:

- vaccinate cattle before they begin on full feed; and
- follow with a booster injection 90 days later.

Pink Eye

Cause:

- bacteria;

Susceptible if stressed:

- dust wind;
- irritation by flies;
- vitamin A deficiency;
- eye injuries; and/or
- stress due to sunlight.

Symptoms:

- tearing, discharge from eye;
- lining of eye is swollen;
- cloudiness or whitening of cornea or eye surface; and/or
- severe - eyeball may rupture.

Treatment:

- very contagious;
- mastitis ointment in the eye;
- severe-injections in the eye; and
- recovered animals may remain disease carriers.

Prevention:

- control face flies;
- make sure rations supply adequate vitamin A; and
- isolate infected animals in a dust free, dark area.

Shipping Fever

Cause:

- bacteria;

Susceptible if stressed:

- changes in weather;
- inadequate feed intake;
- mixing of animals;
- different feed and water; and/or
- dehorning, castration, etc.

Symptoms:

- fever;
- depressed, doesn't move;
- no appetite;
- runny nose and eyes, coughing;
- rapid breathing;
- diarrhea; and/or
- high temperature.

Treatment:

- antibiotics; and
- keep sick animals away from healthy ones.

Prevention:

- avoid stress;
- isolate new animals;
- purchase healthy animals; and

- preconditioning.

Hardware Disease

Cause:

- metal objects such as nails or wire are swallowed and lodge in the reticulum, often puncturing the wall; and
- object may also puncture the diaphragm and/or heart.

Symptoms:

- uncomfortable;
- stands humped up;
- moves slowly;
- grunts;
- uncomfortable passing manure or urinating;
- fever; and/or
- off feed.

Treatment:

- put a magnet in the stomach to hold the object; and
- call your veterinarian to see if anything more can be done.

Prevention:

- keep your yards free from nails, wire, and sharp objects which the animal may eat; and
- use a heavy magnet in the intake of grinders, rollers or hammer mills to attract foreign objects.

Topic 2:

VACCINATIONS

When we vaccinate, we deliberately introduce infectious organisms into the body of the animal. By doing this, we hope that the animal will produce antibodies. Antibodies help the animal fight the disease and become immune to it. If the animal ever comes into contact with the disease, it will be protected against it.

There are two types of vaccines:

1. **Live**

   Live vaccines contain live disease causing organisms. These organisms have usually been modified in some way so they cannot actually produce the disease.

2. **Killed**

   These vaccines contain dead organisms, such as bacteria, which have been added to a liquid carrier.

Always follow the directions for vaccinating. Before using any vaccine, read the label carefully. Check for:

- dosage or amount to give;
- way to give the vaccine (subcutaneous or intramuscular); and
- expiration date.

Handle vaccines with care. Store them under refrigeration, but not frozen. Keep them out of the sunlight.

Sometimes cattle are allergic to the vaccines we give them. Signs of allergies will usually appear within an hour of vaccination. Watch for some or all of these symptoms of an allergic reaction:

- difficulty breathing;
- staggering;
- swollen eyes;
- bloat; and/or
- swelling of the vulva.

If you see any of these signs, call your veterinarian.

Topic 3:

HERD HEALTH AND MANAGEMENT CALENDAR

A complete herd health program can make your cattle healthier, more efficient and more productive. A preventative herd health program, such as the one below, that focuses on disease and management problems which can cause economic losses would be effective.

PRECALVING AND CALVING SEASON (Early Spring):

- Identify cows with vaginal prolapses for culling.
- Watch for abortions and send aborted fetuses for examination.
- Check for lice and treat infestations.
- With your veterinarian, discuss vaccinating the cow herd for scours.
- Keep calving areas clean, dry and well bedded.
- Prepare for calving and calving problems.
- Have electrolytes and antibiotics ready for treating scours.
- Inject calves with vitamin E and selenium and/or vitamins A, D and E if necessary.
- Watch for calf scours and pneumonia.
- Identify calves and record birth dates and calf weights immediately.
- Re-assess nutrient requirements and performance of heifers and cows and make necessary changes.

BREEDING SEASON (Late Spring And Early Summer):

- Check daily for scours and pneumonia in calves.
- Evaluate fertility of all breeding bulls:
  - semen quality;
  - physical examination; and
  - libido.
- Have all breeding females with previous problems examined by your veterinarian.
- Make sure you have an adequate bull to female ratio.
- Prepare teaser animals if practising AI.
- 30 days before breeding, vaccinate all replacement heifers for IBR, BVD and vibriosis if necessary.
- Two weeks before breeding, vaccinate cows for vibriosis if necessary.
- Vaccinate all calves over two months of age for blackleg, and other clostridial diseases.
- Castrate, dehorn and implant calves.

PREWEANING AND WEANING (Fall):

- Prepare calves for weaning and preconditioning.
- Pregnancy test all cows and cull nonpregnant and unhealthy cows.
- Treat for warbles and external parasites.
- Wean calves with as little stress as possible.
- Watch calves for pneumonia and treat immediately.
- Weigh calves and record weaning weights.
- Make your initial heifer and bull replacement selections.
- Evaluate performance of the breeding herd by calculating:

  - percentage calf crop;
  - weaning weights;
  - death loss percentage; and
  - cost per pound of calf marketed.
- Vaccinate replacement heifer for BVD about three weeks after weaning.

WINTERING PERIOD:

- Take inventory of feeds available and have feeds analyzed.
- Work out rations for different classes:
  - pregnant heifers;
  - pregnant cows;
  - heifer replacements;
  - bull replacements;
  - breeding bulls; and
  - feeder calves.
- Initial vaccinations for calf scours may be give in the fall instead of midwinter.
- Check cows daily for signs of heat and external parasites.
- Watch for abortions and send fetuses for examination.
- Increase your knowledge of the beef business through:
  - research and extension publications;
  - extension meetings;
  - farm press;
  - commercial firms and consultants; and
  - nutrition and managements programs.

MANAGING YOUR MARKET STEER

LEVEL ONE

ROLL CALL

What is the most important part of managing your market steer?

Welcome to the level one unit of Managing Your Market Steer. In this unit, we will cover a few topics which you will need to be familiar with in raising your market steer.

DEHORNING

Horns on cattle can cause problems for the producer. Some of these problems are:

1. Damage to other cattle by bruising during transportation and stockyard handling.
2. Aggressive animals use their horns to push others around.
3. They need more space at the feeder.
4. Horned animals may injure people.
5. There is more damage to buildings and fences by horned animals.

The younger your beef animals are dehorned, the better. Dehorning is easier, safer and less painful to younger animals because their is very little blood flow to the horns.

The method you choose for dehorning will depend on the age of the animal. For animals less than five months, chemical and electric dehorning work best.

CASTRATION

What?

Castration is the removal of the testicles in a male animal.

When?

It is best to castrate bull calves when they are between one and three months of age. A young calf recovers from the stress more quickly than an older calf.

It is more risky to castrate a calf over three months of age. As the calf gets older, more blood flows to the testicles. There will be a greater more blood loss when castrating older calves. If castrated when too old, the steer will look "staggy". He will show some of the signs of a bull, including muscling through the neck and shoulder.

Why?

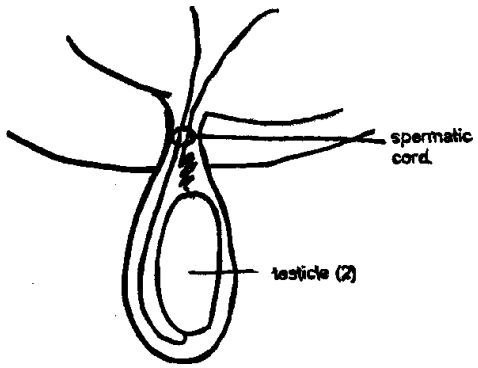
Steers are unable to reproduce. They don't show secondary sex characteristics such as masculinity about the head and shoulders. There is less struggle for position in a group of steers than with bulls. Steers produce a more desirable carcass.

How?

Before you begin castrating, make sure all your equipment is clean. Boil it in water for 30 minutes. If you are castrating more than one animal, rinse the equipment with disinfectant between each animal. Use fresh disinfectant after every fifteen animals. This will help to

reduce transfer of disease and infection.

A bull calf has two testicles. When castrating, you must remove both of the testicles. If not completely removed, the steer will have some of the characteristics of the bull. By feeling, or palpating the scrotum, you can tell if both testicles are down in the scrotum.



In a normal calf, castration is very simple. In some calves, one testicle stays inside the body cavity and does not move down into the scrotum. This animal is called a cryptorchid or ridgling. Special surgery is needed to castrate these animals.

It is important to properly control your calf during castration so you will not be injured. Small calves can be thrown or hobbled. A tilting calf table or chute works very well. For larger animals, you will have to use a squeeze chute or head gate.

The method you use will depend on the size of the animal and the number of animals you must castrate. Castration can be surgical or non-surgical.

SURGICAL CASTRATION

With these methods of castration the scrotum is opened and the testicles and cords are removed. Castrate when the weather is cool. Early spring or late fall are the best times.

The Knife Method

To remove the testicles, either split the side or remove the bottom third of the scrotum. There is less pain when the cut is made below the testicles.

Remove the testicle by pulling or squeezing it through the opening. Pull downward on it to show the spermatic cord. Slide your thumb up and down the cord to separate it from the connective tissue. A slow, steady pull will break the muscle that controls the position of the testicle.

Use a dull knife. If you cut yourself, you know that a scratch or scrape heals faster than a cut. The dull knife makes a rough wound which will heal faster than a clean cut. Remove the testicle by scraping the cord with a dull knife inside the scrotum until it is cut free. Repeat for the other testicle.

Make sure the calf has room to move around. The cut will drain as the calf moves. Keep the calves on clean bedding or pasture. Treat infections with antibiotics.

The Emasculator

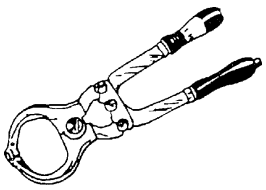
The emasculator is both a clamp and a knife. Do not use the emasculator on calves over 220 kgs or 500 lbs, because there is too much blood flowing to the testicles.

Place the emasculator over the cord with the crushing part toward the body. Hold the masculator as close to the body as possible. Squeeze the handle to crush the cord and cut off the testicle. Keep the pressure on the cord for at least 10 seconds after you cut so there will be less bleeding. Repeat for the other testicle.

NON-SURGICAL CASTRATION

Non-surgical castration does not leave an open wound and can be done at any time of the year.

The Burdizzo

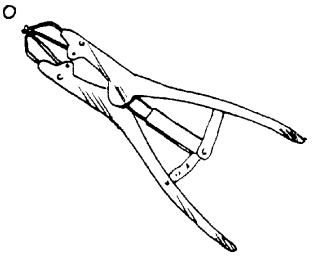


The burdizzo is a blunt jaw pincher used to crush the spermatic cord and blood vessels which lead to the testicles.

Find the testicle and the cord in the scrotum. Pull the cord to the side of the scrotum with your thumb and index finger. Clamp the cord with the burdizzo. Hold for five seconds. Repeat for the other cord and testicle.

Make sure you crush the cord. If not, the calf will still develop some of the characteristics of the bull. Be careful not to crush both cords at the same time.

The Elastrator



Use the elastrator only on calves one month of age or younger.

Place the rubber band on the elastrator. Open wide and slide the band up over the testicles, near the body. Release the band. Palpate the scrotum to make sure that both of the testicles are below the band. Give your calf a tetanus shot.

LEVEL TWO

ROLL CALL

What are the most important elements of managing your market steer?

MORE ABOUT DEHORNING

Chemical Dehorning

A caustic potash stick or paste is used. Be careful when working with this as it is very corrosive to the skin. Use only on calves less than two weeks old.

Method:

1. Clip the hair around the base of the horn.

2. Smear vaseline or grease on the clipped area. This will make sure the caustic does not run and burn the skin.

3. Rub the caustic paste on the horn. Make sure the paste goes all the way around the horn. This area should be no bigger than the size of a quarter.

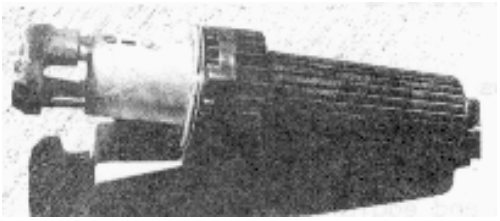
4. Keep the calf away from its mother until the paste is dry so her udder is not burned.

If you see burning on the side of the head during the next few days, wash the area with a mixture of one part vinegar and three parts water.

If there is risk of rain, do not dehorn using the

paste. The paste will run when it gets wet, causing burns on the face and possible damage to the eye.

Electric Dehorning



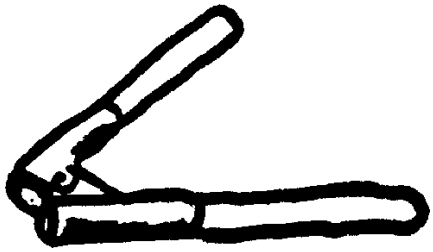
An electric dehorning iron is similar to an electric branding iron. The hot iron kills the horn producing cells at the base of the horn.

Use the electric dehorner on calves under five months of age.

Apply the iron to the horn for 15 to 20 seconds. Make sure that the circle completely surrounds the base of the horn. Don't burn too deeply. If properly done, the burnt area and horn bud will peel off in four to six weeks.

A cordless dehorner designed for use on calves under three weeks of age is now available at farm supply stores. This dehorner is more expensive and more convenient than the electric one. You can use it to dehorn about 15 calves before it needs recharging.

Gougers or Scoopers



Spoons, tubes, or knifes can be used to gouge or scoop the horn bud from the head of the calf. This is not painful to calves with horns less than 3.5 cm or 1.5 inches in length. The gouge should include 3 mm, 1 cm deep around the horn.

Wire

A special cutting wire may be used to cut through the horns. This method takes longer than some of the others, but the cut can be made closer to the skull.

Saw

The saw can be used when the base of the horn is too wide for clippers, or the horn is growing abnormally. Use a local anesthetic before dehorning. This method causes more bleeding than others.

Clippers

Using clippers is a fast way to dehorn. It is dangerous because the horn may be crushed and splintered rather than cut.

GROWTH STIMULANTS

Improved genetics has changed the feed efficiency and growth rate of the beef animal. However, the potential of the beef animal is still limited by several factors:

1. Not all animals grow at the same rate.
2. Feed efficiency varies between animals.
3. Steers and heifers grow at different rates.
4. Animals grow according to their genetic makeup.

Beef producers are always looking for ways to

increase the profitability of their animals. Growth stimulants, in the form of implants or feed additives, are available.

Implants

Implants are inserted under the skin of the animal. They slowly release substances which affect the feed efficiency and growth rate. There are several types available: Compudose, Steeroid, Ralgro and Synovex.

Most implants change the levels of the hormones in the body and affect the internal organs. Feed efficiency increases because the body keeps more nitrogen and calcium. By feeding the same way as before, your animals can get 6-8% more out of the feed. This means you can save 40 to 55 kgs of feed for every 100 kgs of body weight gain. Because the animal is gaining at a faster rate, it will be ready for market earlier.

Feed Additives

Growth stimulants, such as Rumensin and MGA, can be fed to the steer in the ration. Rumensin affects the organisms in the rumen, slightly increasing feed efficiency.

NOTE:
When using growth stimulants, you MUST follow the instructions. Because substances are released into the animal, most of these products have withdrawal periods. This is the time period before slaughter when the stimulant must be removed. The body then has time to eliminate all the substance from its system before slaughter.

LEVEL THREE

ROLL CALL

Make up your own idea for this roll call dealing with Managing Your Market Steer.

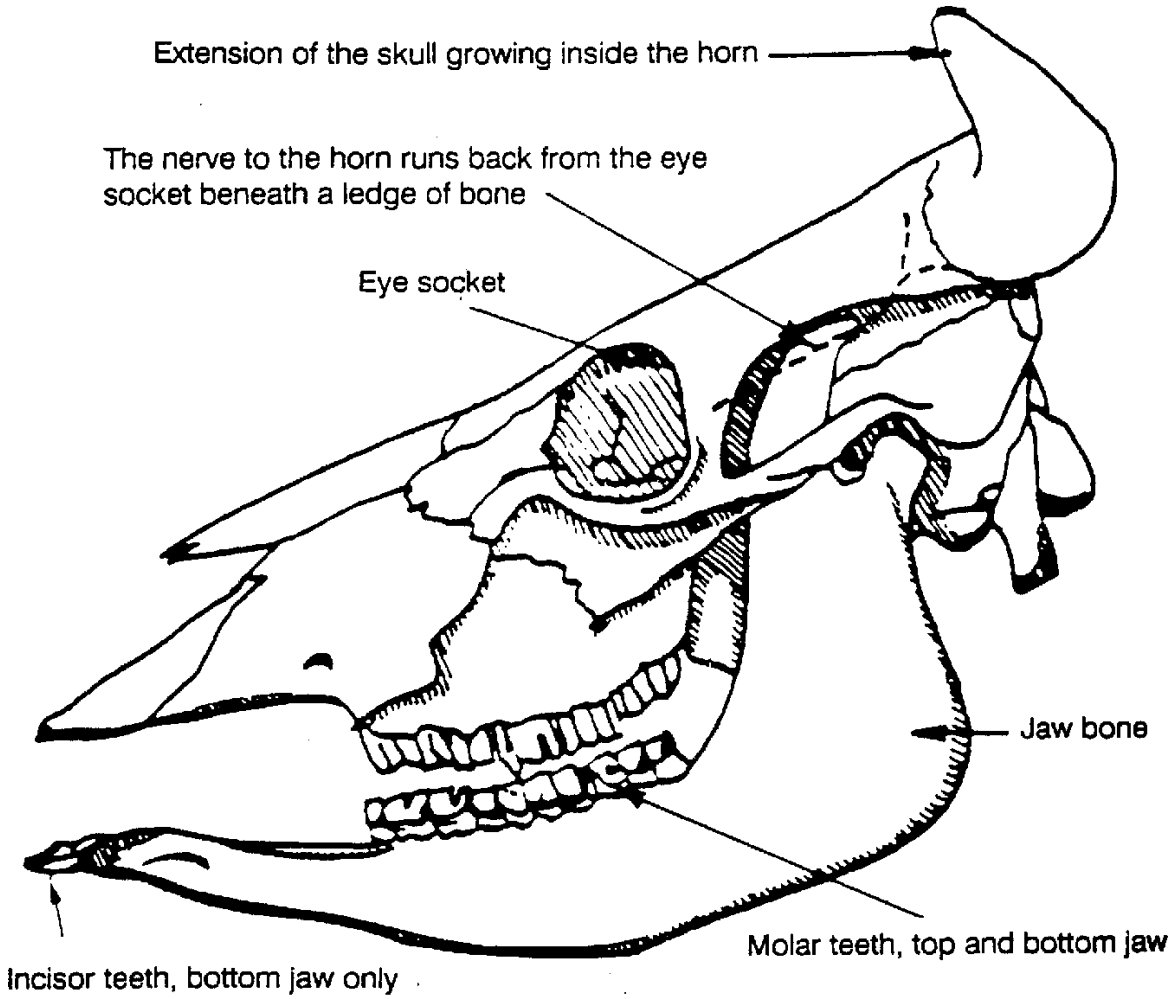
Topic 1:
MORE ABOUT THE HORNS

The cornual nerve runs from immediately behind the eye to supply sensation to the horn. It lies beside a vein and artery behind an overhanging ledge of bone, which is part of the skull. You can feel this ledge if you press your fingers lightly on the skull in front and to the side of the horn.

Anaesthesia may be used when dehorning. It creates a loss of sensation, similar to when the dentist freezes a tooth before working on it. Anaesthesia is most commonly used by a veterinarian when dehorning older cattle. The procedure followed is:

1. Restrain the calf.
2. Using your fingers, palpate to find the nerve. You will be able to feel the vein and artery beside it. This is the injection site and is about 1 to 1.5 inches from the base of the horn.
3. Disinfect the area with rubbing alcohol on a cotton swab.
4. Use a 20-gauge needle which is 1 to 1.5 inches long and a 6 cc syringe containing 3 to 5 ml of 2% lidocaine or a similar anesthetic.
5. Insert the needle just through the skin. If blood appears in the syringe, you have punctured a blood vessel. Remove the needle and insert again in a slightly different location.

6. Deposit 1 cc of the solution.
7. Insert the needle to about half of its length below the bony ridge.
8. Deposit the remaining solution.
9. Wait 5 to 10 minutes for anaesthesia to take place. The loss of sensation will last for about one hour.



The Skull of The Beef Animal

BEEF COW AND HEIFER MANAGEMENT

LEVEL ONE

ROLL CALL

Tell me one thing you must remember when looking after your beef cows and heifers.

MANAGING FOR HEALTHY COWS

In order to have healthy calves, you must first have healthy cows and heifers. To have healthy cows and heifers, you must do a good job of managing them all year round.

Keep your cows healthy and fertile:

1. Feed properly.
2. Keep your animals free from disease and injury.
3. Practice good breeding management.

1. FEEDING

The greatest costs in a cow-calf operation are the feed costs. Proper feeding means you are giving your cattle the amounts and kinds of nutrients they need. There are five main nutrients which cattle need. Can you name them?

Many factors affect the amount of these nutrients which your cows and heifers will need.

Let's look at some of these:

AGE

Heifers and young cows need more nutrients than mature cows. This is because they are still growing. Growth, together with producing a calf puts great demands on the young cow's body.

EXERCISE

Cattle grazing on pasture or range land use energy as they move about. They need more nutrients than cattle in pens with limited movement.

CLIMATE

Cold temperatures, strong winds and high humidity (more moisture in the air) increase the amount of nutrients your cattle need.

GESTATION

Gestation is the period of time that the cow is pregnant, from the time she is bred and conceives to the time the calf is born. As the calf grows inside the cow, the cow needs more nutrients to take care of both of them.

LACTATION

Lactation is the period of time when the cow is producing milk. A cow in lactation has a very high need for nutrients.

2. KEEP YOUR ANIMALS FREE FROM DISEASE AND INJURY

Unhealthy cattle cost a producer money in the form of veterinary bills, antibiotics and lost production. Nutritious feeding programs, clean

and dry facilities, accurate record keeping and disease prevention programs are all needed to keep your cattle healthy.

3. GOOD BREEDING MANAGEMENT

Practice good breeding management on your farm:

1. Check your cows early in the morning and in the evening for signs of heat.
2. Breed your cows when they are in standing heat.
3. Make sure you have enough fertile bulls to breed all of your cows during the breeding season.
4. Pregnancy check all of your cows at the end of the breeding season. Cull all nonpregnant cows.
5. Keep accurate records to help you identify poor producers.
6. Keep your cows healthy year round so they will be able to produce a healthy calf for you every year.

BREEDING

- feeding level must be adjusted for condition of cows
- keep your cows in good condition
- pasture is often all that is needed

PREGNANCY

- good hay, salt and minerals are needed
- check for abortions or signs of heat
- check and treat for parasites
- increase feed in the last 6 to 8 weeks before calving
- make sure your cattle do not become too thin or too fat

WEANING

- check condition of cows
- increase feed to thin cows
- prepare for breeding
- treat for warbles and external parasites
- prepare your winter feeding program

CALVING

- prepare for calving
- feed top quality feeds
- be aware that the cow's needs for all nutrients increases after calving
- treat for lice if needed

The Breeding Animal Checklist

FEET AND LEGS:

- legs straight, square, and placed wide apart; and
- no swellings, cracks, or lesions in the legs or hooves.

GENERAL APPEARANCE:

- appears healthy and alert;
- blended, smooth body;
- widest in the stifle;
- bull thick and massive;
- female refined with udder development; and
- evidence of lost of muscle; little waste in the neck and brisket.

FERTILITY - REPRODUCTIVE CAPACITY:

- bull - rugged, massive with a high headset, crest development, superior muscling, large straight scrotum, compact sheath; and
- female - refined and smooth, pins slightly below hooks, width between pins shows capacity and depth, udder development.

CONDITION:

- less finish than a steer; and
- evidence of superior muscling.

STRUCTURE:

- long over the top, long straight legs; and
- lots of capacity and depth, large, wide hind moves straight and with ease.

About Beef Breeds ...

In the beef cattle industry there are many different breeds. In B.C. alone, there are over 20 breeds. There are important differences between these breeds which you must take into account when judging cattle.

Some breeds have been bred with the emphasis on carcass and growth characteristics while some have been bred for their hardiness and maternal qualities. They all look different in size, shape and colour. It is important to learn about the popular breeds and be able to take their individual features into consideration when judging. You can learn more about the breeds by looking at cattle magazines, breed books, promotional material printed by the Breed Association and by attending cattle events.

Familiarity with the breeds is the key to solving the dilemma of comparing different breeds to each other. Know the characteristics of the different breeds.

A Few Final Hints:

Now you know what to look for in the market steer and the breeding animal. The problem is actually picking out these things in the showring, the field or the judging class. As a 4-H member, you are taught how to groom and fit your animals to show them to their best advantage. You are trying to highlight the superior characteristics of your animal, and downplay the other characteristics.

Now the tables are tuned and you must look beyond the wrapping and see the real animal underneath. It takes a lot of practice to do this successfully, but it sure can be fun to try!

Good luck judging beef cattle. What you learned for the showring will help you when you go to the auction mart to buy a heifer, the neighbour's pasture to pick next years' calf, or the feedlot to pick the steers which are ready for market.

Judging will never be an exact science, but with a lot of practice and a little luck, you can become much more successful at selecting the most desirable animals!

LEVEL TWO

ROLL CALL

Tell me one thing you must remember when looking after your beef cows and heifers.

NUTRIENTS FOR BEEF COWS AND HEIFERS

Nutrients are those parts of the feeds which animals use in their body to produce and grow. Our beef cattle need nutrients for:

MAINTENANCE

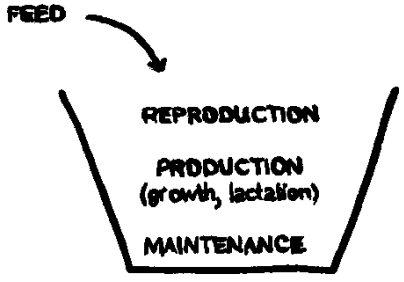
Beef cattle use feed nutrients to maintain or keep their body functioning. They use nutrients to stay warm, regulate heart activity and breathing, to replace worn out body tissues, to move about and to eat.

PRODUCTION

Beef cattle use feed nutrients to produce milk and to produce body muscle or meat. Producing or lactating animals need more nutrients to meet their body's demands.

REPRODUCTION

Beef cattle use feed nutrients to grow and develop the unborn calf and to keep their own body in good reproductive condition.



Picture the beef cow as a barrel into which we are pouring feed. Look at the relationship between maintenance, production and (growth, lactation) reproduction.

The bottom of the barrel must be filled first. This means that you must provide the nutrients the animal needs for maintenance, before your animal can begin to produce or reproduce.

The amount of nutrients the cow or heifer requires depends on her reproductive status. The cow or heifer can be:

- pregnant;
- lactating;
- lactating and pregnant; or
- not pregnant and not lactating.

Minimum Daily Nutrient Requirements of the Beef Cow
(Source - The Alberta 4-H Beef Cow Calf Manual, 1989)

Cow (500 kg)	Protein (kg/day)	Energy (Mcal/day)	Calcium (g/day)
Early Pregnancy	0.59	19.2	20
Late Pregnancy	0.68	22.1	25
Lactating	1.27	32.2	46

The most important information in the above chart is the difference between the requirements for animals at different stages. From the information in the chart, tell me as much as you can about the nutrient requirements of the cow.

REPLACEMENT HEIFERS

Selecting

The most common method of replacing cows in your herd is to select replacement heifers from your heifer crop. When selecting replacement heifers:

1. Select heifers from cows which consistently calve without difficulty and produce healthy, strong calves.

2. Select the largest heifers at weaning. These will be from the cows producing the most milk and having the best mothering ability.

3. Select heifers with good conformation and which come from mothers with good conformation. The feet and legs should be structurally correct and sound.

Managing

Once you have selected your replacement heifers, you need to plan your breeding program. You must feed them to bring them to your desired weight and to puberty. The onset of puberty is affected by these factors:

AGE

Puberty can occur when a heifer is from 7 to 14 months old.

BREED

The British breeds (Angus, Hereford and Shorthorn) mature early. They tend to reach puberty before the exotic breeds (Charolais, Limousin, Salers, etc.).

WEIGHT

The weight at puberty depends on the breed. Replacement heifers need to gain anywhere from 0.57 to 0.68 kg/day from weaning until breeding. British breed heifers should weigh between 295 and 318 kgs at the beginning of the breeding season. Larger breeds, such as Charolais, should weigh 340 to 352 kg.

If you can breed your heifers early to allow them to calve at the beginning of the calving season, you will be able to pay extra attention to them.

Heifers should continue to grow following breeding, gaining weight throughout their pregnancy. Heifers should weigh 80 to 85% of their mature weight at the time of their first calving.

By managing heifers to reach puberty at a young age, you can take advantage of these facts:

1. Heifers reaching puberty early have been shown to be more productive than later maturing heifers.

2. Heifers bred early will calve early the following season.

3. For every 21 days earlier in the season a calf is born, it will be 13.6 to 18.1 kg heavier at weaning.

There is potential for increased production with good heifer management. The extra costs involved will be returned to you by the improved productivity.

DEVELOPING A SUCCESSFUL CULLING PROGRAM

One way to improve the reproductive performance of your herd is by developing a successful culling program. Culling is removing an animal from the herd because of poor performance.

Why might you cull a cow or heifer from your herd?

LEVEL THREE

ROLL CALL

Tell me one thing you must remember when looking after your beef cows and heifers.

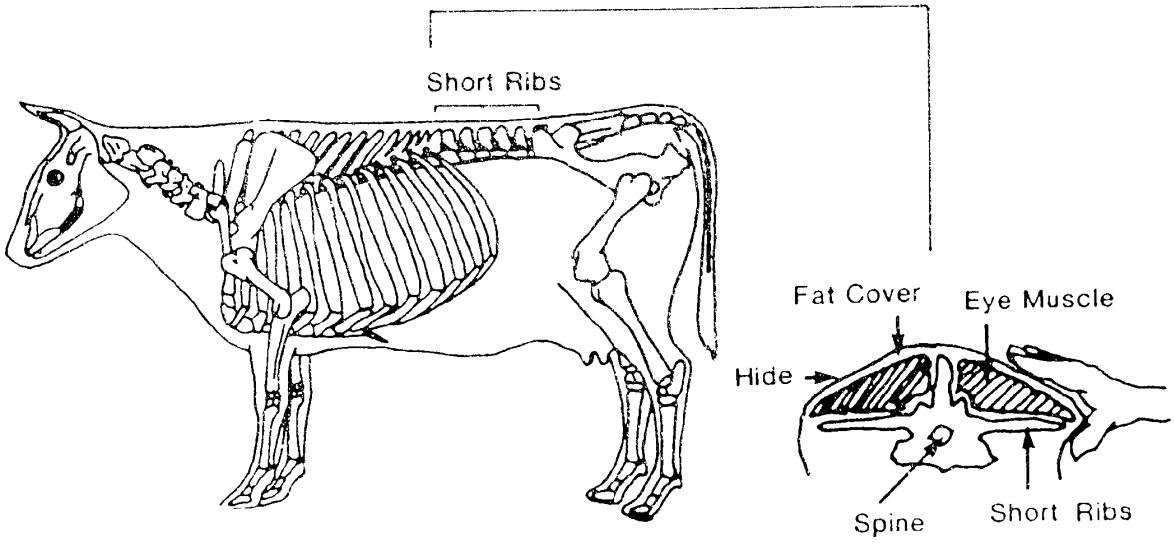
Topic 1:

CONDITION SCORING BEEF COWS

Condition scoring is a "hands-on" method of determining the amount of fat covering on an animal. Numbers are assigned based upon the feel of the cow or heifer. The numbers range from 1 (very thin) to 5 (very fat).

The fat cover over the loin area, between the hip bone and the last rib, is the major location used for condition scoring. Vertebrae in the loin area have two projections you can feel:

1. spinous processes or short ribs; and
2. transverse processes which extend from either side of the spine.

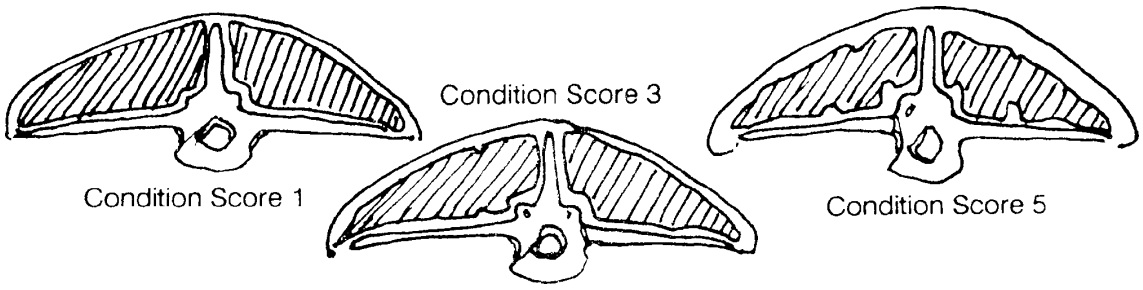


Condition Score	Characteristics	
1	• short ribs sharp to touch; • hip bones and ribs prominent; and • no fat around tail bone.	skinny
2	• can feel short ribs individually but they feel rounded; • some fat over tail head, hip bones and flank; and • individual ribs not obvious lean.	lean
3	• can feel short ribs only with firm pressure; and • can feel fat on either side of the tail head.	good condition
4	• can't feel short ribs; • folds of fat are beginning to develop over ribs and thighs; and • can feel "rounds" of fat around the tail head.	over-conditioned
5	• cow has blocky appearance; • tail head and hip bones are buried in fat; • can feel folds of fat over thighs and ribs; • mobility is impaired by fat.	fat

Note:

1. Condition scores cannot be determined visually because the hair coat can hide the actual condition of the animal. A condition score must be determined by feeling for the amount of fat cover.

2. An animal's score may fall between the values in the chart. If this happens, half numbers (2.5 or 3.5 etc.) may be used.



Because there is no muscle between the end of the short ribs and the skin, any padding felt by the thumb will be fat. In cows with a score above 3, the short ribs can no longer be felt, even with firm pressure. In fatter cattle, the fat cover around the tail head and over the ribs are also used in determining the score.

Follow these steps when condition scoring your cows and heifers:

1. Run your fingers down the backbone to determine the prominence of the spinous processes or short ribs.
2. Push your fingers along the backbone to determine the prominence of the transverse processes.
3. Place your hand on the loin area with your fingers pointing toward the opposite hip bone. With your thumb, feel the fat cover over the ends of the spinous processes or short ribs. Any pad you can feel with your thumb will be fat.
4. Refer to the chart to help you determine the number to assign for the condition score of the cow or heifer.
5. Record your scores. Now you can begin to make comparisons between animals and scores.

When to Condition Score

Cows should be condition scored three times in each production year:

TIME	OPTIMUM SCORE
• Fall pregnancy check at start of winter feeding program	• 3.0 for all females
• At calving	• 2.5 for mature females • 3.0 for first calf heifers
• Thirty days before the start of the breeding season	• 2.5 for all females

Using Condition Scoring as a Management Tool

COWS TOO THIN (2.0 or less)	COWS TOO FAT (3.5 or more)
CAUSE:	
• lack of sufficient feed	• did not wean a calf
• competition or too little room at the feed bunk	• produced very little milk
• internal/external parasites	• overfeeding
• disease or injury	
POTENTIAL PROBLEMS:	
• increased calving difficulty	• increased calving difficulty
• increased calf loss	• decreased calf health
• delayed breeding	• lower fertility
• more open cows	• low weaning weights
• fewer weaned calf pounds	
	• feed costs too high
PREVENT PROBLEMS:	
• feed thin cows separately	• cull less productive cows
• improve thin cow winter diet	• do not overfeed cows
• control and prevent parasites	• let fat cows lose condition
• vaccinate	
• wean calves 1 month earlier	

Topic 2:

DISEASES OF THE COW AND HEIFER

BRUCELLOSIS (Bang's Disease or Contagious Abortion)

The presence of this highly contagious disease in your herd must be reported to a veterinarian.

Upon confirmation, infected animals must be slaughtered and the rest of the herd quarantined. Disinfect your facilities to avoid spread of the bacteria.

Cattle become infected with the Brucellosis bacteria when they come into contact with contaminated aborted fetuses, placentas, uterine discharge, semen, urine, manure and milk often via feed or water.

Symptoms:

- abortion in 5th to 8th month of pregnancy;
- infertility;
- retained placentas;
- uterine infections;
- poor milk production;
- bulls may become infertile;
- bulls may develop swollen testicles; and
- young animals will show no symptoms.

There is no treatment, only prevention. Ensure that all new additions to your herd are confirmed to be Brucellosis-free before they arrive on your farm. The Brucellosis bacteria is contagious to humans, causing the disease called undulant fever.

VIBRIOSIS

Vibriosis diagnosis is difficult to make. The organism is transmitted on the reproductive organs of cattle at the time of breeding. A bull can spread the disease from an infected female to others without becoming infected himself. An infection in a bull may clear up on its own.

Symptoms:

- infertility;
- prolonged and irregular heat cycles;
- retained placentas;
- abortion in 5th to 7th month of pregnancy; and/or
- long breeding and calving seasons in your herd.

Vibriosis can be prevented by vaccinating your cows 30 to 120 days before the start of the breeding season. Using artificial insemination can also prevent vibriosis because semen is only drawn from bulls known to be negative.

LEPTOSPIROSIS

The Leptospirosis causing bacteria, which can affect animals and humans, enters the body through contact with contaminated feed, water, bedding, pastures and pens.

Symptoms:

- abortions in last third of pregnancy;
- failure to conceive;
- swollen joints; and/or
- poor kidney function as indicated by bloody urine.

This disease is often short lived, with most animals recovering within three months. If Leptospirosis infection is suspected, cultures can be made from blood, milk or urine and tested.

Antibiotics are often successful treatments in the early stages. Prevention should be done by vaccination.

PROLAPSES

When the cow is under stress, most often during pregnancy or calving, the vagina or uterus may prolapse or exit the body.

A vaginal prolapse occurs when the vagina, the hind part of the cow's genital system, is pushed from the body. This occurs most often about two weeks before calving.

Outside the body, the vagina becomes sore and can get very dirty. Your veterinarian can push

the vagina back into the body and sew it into place. You will need to watch this cow very closely before and during calving to make sure she does not develop an infection or prolapse again. Since this is likely to happen again in her future, you should cull this cow after weaning.

Uterine prolapse occurs when a cow continues to push after her calf is born, pushing the uterus out of her body. Keep your cow quiet and the uterus clean by wrapping in clean sheets moistened with warm disinfecting solution. Contact your veterinarian.

OBTURATOR PARALYSIS

Occasionally, when a young cow or heifer has a very difficult calving, produces a very large calf or traction is used during the delivery, the nerves of the hind legs may be temporarily damaged. She may be unable to get up and stand. Keep her quiet and rested in a well bedded stall, periodically rolling her to prevent sores from developing.

MILK FEVER

The cow uses the calcium in its blood when making milk, lowering the blood calcium level. Shortly before or immediately following calving, the blood calcium level may become too low and the cow may develop milk fever and become unable to function normally.

Symptoms:

- stiffness, staggering;
- no fever;
- temperature may drop below normal;
- unable to get up; and/or
- stomach stops working and gases accumulate; or,
- if serious, death.

The cow must be treated immediately. Calcium borogluconate injections will raise the blood calcium level so the cow will be able to function normally. Milk fever can be prevented by providing adequate nutrition, controlling stress and avoiding sudden changes in feed.

MASTITIS

The mastitis causing bacteria enters the udder through cuts or udder injuries. Infection develops rapidly. The udder becomes hard and painful and milk production decreases.

Mastitis should be treated immediately. Strip the udder frequently. Apply hot packs or liniment and inject the udder with antibiotic. It is a good practice to cull cows with history of mastitis because they will likely develop mastitis again.

AGALACTIA or LACK OF MILK

The cause of Agalactia is uncertain but it is suspected to be hereditary. It may be influenced by chronic mastitis, early calving, poor nutrition or an undetected infection. The only symptom is lack of milk. Treatment or prevention is unknown and culling of cows or heifers experiencing Agalactia is recommended.

DYSTOCIA

Dystocia is difficulty in calving. It may be caused by small mothers or large calves.
It is possible to prevent the incidence of Dystocia in your herd. Since calf birth weights are genetically determined, select the appropriate bull to breed to each individual cow to ensure easier calving. Good management, leading to strong, healthy, well grown heifers will also help to ensure easier calving.

MANAGING THE BEEF HERD SIRE

LEVEL ONE

ROLL CALL

Tell me one thing you must remember when looking after your beef bull(s).

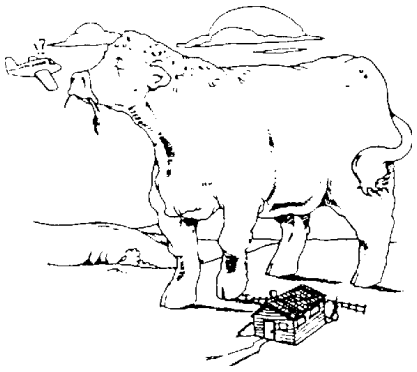
THE BULL

The bull is very important to the production in your herd. He has even more influence than the individual cows. A good bull can improve your herd performance. A poor bull can hurt your herd production and profits for several years.

The bull has an effect on the:

- number of calves born each year;
- length of your calving season;
- difficulty or ease of calving;
- growth rate of your calves; and
- genetic potential of your herd.

Obviously, the bull is a very important part of your breeding herd.



Managing For a Healthy Bull

If we expect our bull(s) to stay healthy and be successful breeders, we must manage them properly all year round. We must be sure to:

1. Provide Good Nutrition.
2. Control Disease, Parasites and Health Problems.
3. Practice Good Breeding Management.

1. PROVIDE GOOD NUTRITION

Nutrition has an effect on the reproductive performance of the bull. It is important to feed the bull properly all year round.

The BREEDING PERIOD lasts from about six weeks before the breeding season starts to the end of the breeding season. During this time, the bull must be in very good condition. He is more active than during the rest of the year because he is breeding your cows and heifers.

The MAINTENANCE PERIOD is the rest of the year before and after the breeding period. You should provide a well balanced diet for your bulls. This will give the bulls all of the right amounts and types of nutrients they need to stay healthy. A young, growing bull will need more nutrients than a mature bull.

If your bull is in poor condition at the beginning of the breeding season, you will need to increase his level of nutrition to bring him into good condition before breeding season starts. Feeding them extra grain at the beginning of the breeding period will help.

Bulls which keep themselves in good condition are often called "easy keepers". These are the bulls which respond well all year round to your feeding program.

Fat bulls and/or thin bulls are not desirable. Overfeeding can lead to overfat bulls. These bulls

may have:

- lower libido or desire to mate;
- less ability to mate; and/or
- more feet and leg problems caused by the extra weight they must carry around.

The lack of two nutrients, phosphorus and vitamin A, will cause a deficiency.

What does DEFICIENT mean?

PHOSPHORUS deficiencies in bulls can lead to infertility.

Grains, protein supplements and mineral mixtures are often good sources of phosphorus. Mature, dry forages are often low in phosphorus. By supplementing forages with grains, you can be sure that the bull is getting enough phosphorus. The mature bull (820 kg) needs at least 25 grams of phosphorus per day.

VITAMIN A deficiencies can cause the sperm to be abnormal or infertile. The bull may be infertile and have a lower libido.

Grains and dry forages are often low in vitamin A. Green feeds such as alfalfa or other immature forages are often high in vitamin A. A mature bull (820 kg) needs about 60,000 IU of vitamin A per day. The bull can get this from a salt-mineral mix, good quality forages or ADE injections. The liver of the beef animal can store vitamin A for as long as three or four months. Therefore, vitamin A deficiencies will appear only if it has been deficient for several months.

2. CONTROL DISEASE, PARASITES AND HEALTH PROBLEMS

Any disease or injury which affects the general health of the bull will also affect his breeding ability. You must be able to prevent and identify any problems with your bulls.

Before the beginning of each breeding season, examine your bull(s) closely. Look at the:

Skin - external parasites such as lice;
- evidence of internal parasites; and
- treat with insecticides if necessary.

Feet - abscesses, corn, cracks, lameness.

Brisket - sores or infections; and
- trim the feet.

Penis - infections or abnormalities.

Testicles - normal size and shape; and
- testis should be firm and have no swellings.

3. PRACTICE GOOD BREEDING MANAGEMENT

Even though your bulls may be in good condition and free from disease and injury, you can still get poor breeding results unless you practice good breeding management.

The ability of a bull to breed is limited. Poor breeding results can be expected with a bull that is:

- too young;
- too old;
- used too often; or
- expected to breed too many cows.

Under normal conditions, healthy bulls over three years of age can breed 30 to 40 cows per breeding season. A small yearling bull can be expected to breed only 10 cows. A well grown, well fed yearling bull can breed up to 20 cows.

The actual number of bulls you will need to breed all the cows and heifers in your herd depends on:

- size of pasture;
- topography of pasture (hills or flat land);
- amount of artificial insemination used;
- fertility level of the bull(s); and/or
- number of cows and heifers in the herd.

Heavy use of a bull can result in poor semen quality and unsuccessful breeding. To have a most successful bull, many breeders rest bulls during the breeding season.

One bull should be used on a group of cows confined in a small area. He should be able to breed these cows in five days. A rest period of 10 days between groups is recommended. During his rest period, another bull should replace him.

Let's think about it:

Why is the herd bull so important?

What can you do to keep your herd bull(s) healthy and fertile?

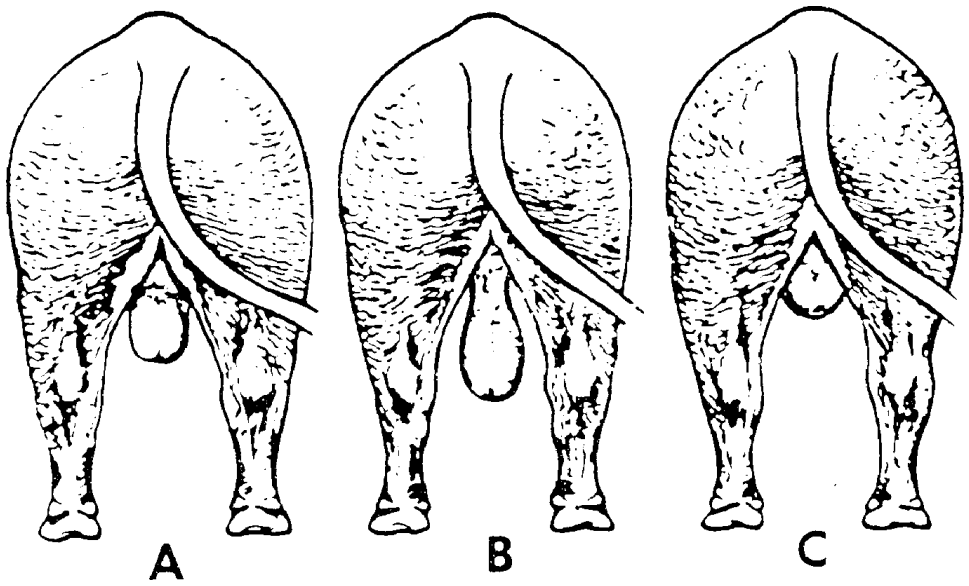
Looking at The Scrotum

The three most commonly found shapes of the male reproductive organ, the scrotum, are shown in the diagram below.

Testes, which produce the sperm are located in the scrotum. Sperm production needs a temperature several degrees cooler than the internal body temperature. Therefore, the scrotum hangs away from the body as in B, the normal scrotum shape.

Bulls with straight sided scrotums, as in A, often have smaller testicles. This straight sided neck of the scrotum usually contains fat deposits.

Wedge shaped scrotums, as in C, hold the testes closer to the body. Bulls with this shape of scrotum should be avoided because the testes are generally small and produce poor quality semen.



LEVEL TWO

ROLL CALL

Tell me one thing you must remember when looking after your beef bull(s).

SELECTING THE BULL

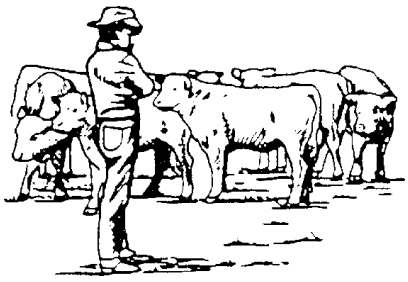
An important part of beef herd management is selecting a bull for your herd. A good bull is one which will have a positive affect on your herd today and in the future.

When evaluating potential herd sires, there are three areas you need to consider:

1. Genetic Potential

2. Physical Condition

3. Breeding Ability



1. GENETIC POTENTIAL

Cattle are different from one another in their size, their rate of growth, feed efficiency, colour and carcass characteristics. Some of these differences are determined by genes. Genes are inherited from the mother and father.

Some characteristics, such as fast growth rates, are desirable to the cattle producer. When you select a bull, you must look for one which has good genetic potential. That means that he has the potential to transfer beneficial characteristics to his offspring.

Genetic potential can be determined from:

- the bull's performance (growth rate and feed efficiency): and
- the performance of his offspring or progeny.

2. PHYSICAL CONDITION

When selecting your prospective herd sire, judge him as you would any other beef animal. Look at these characteristics:

Skeleton - height and body length; and
- look for long body, strong topline, lots of width and depth.

Muscling - above average muscling; and
- trim brisket and underline.

Legs - structurally correct, strong and sound.

Feet - free from injury and disease.

When buying or leasing a bull, select him from a reputable disease-free herd. It is a good idea to have your veterinarian inspect your bull before you bring him into contact with the rest of your herd.

3. BREEDING ABILITY

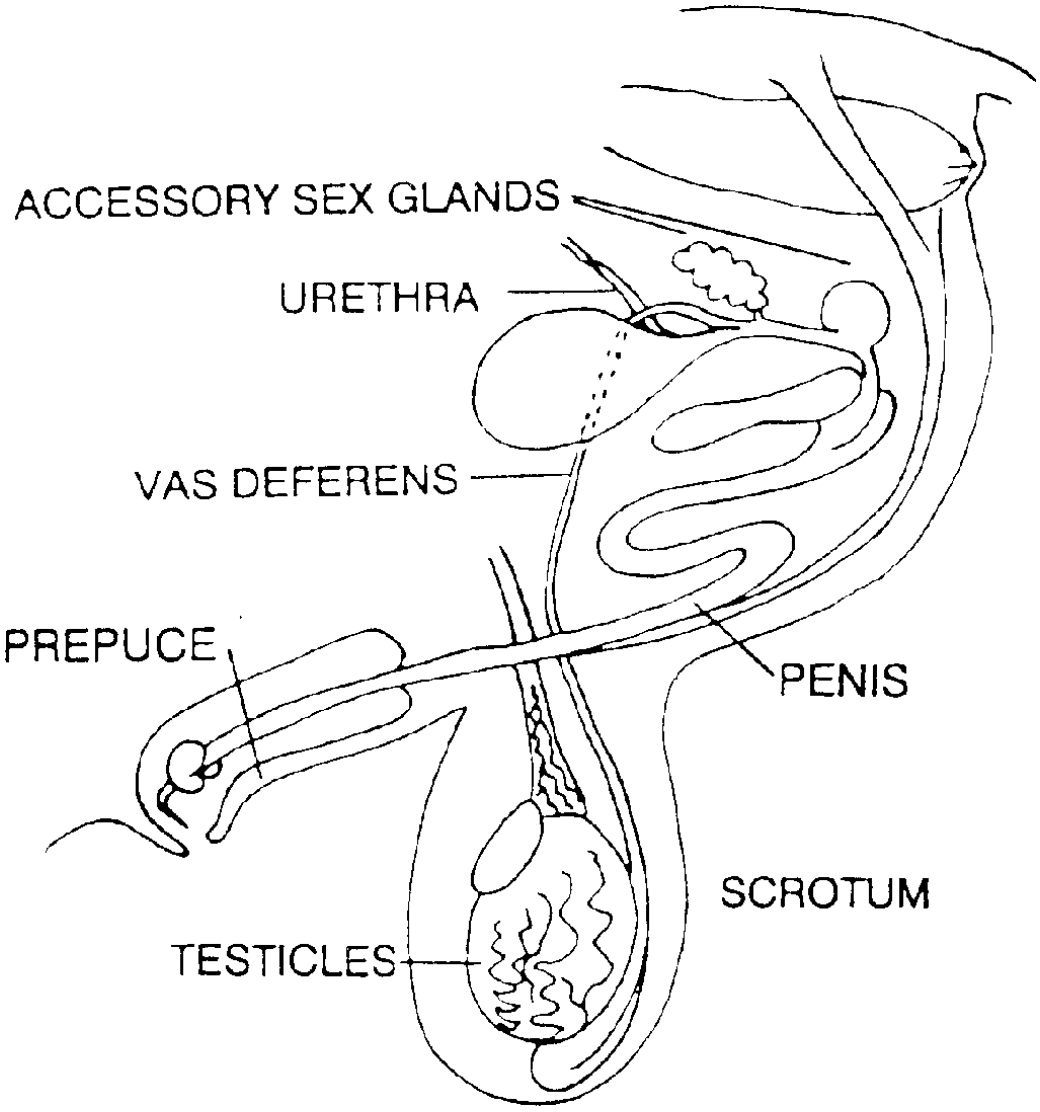
Beef bulls are often selected on the basis of performance, progeny tests, frame score and show ring results. Unfortunately, breeding ability and fertility, the most important aspects of a successful herd sire, are often forgotten.

At least eight weeks before the beginning of the

breeding season, examine all bulls for breeding soundness. Bulls which have unsatisfactory results can then be culled and replaced before your breeding season starts. Examining now will improve your chances of having an early, short calving season, resulting in more calves weaned at heavier weights.

An examination for breeding soundness should include examinations of:

- scrotal size;
- semen quality; and
- libido and serving capacity.



Reproductive Organs of the Bull

SCROTAL SIZE, as measured by the circumference of the scrotum, indicates the size of the testicles and is closely related to the sperm production. Research shows that bulls with larger testicles are usually more fertile than bulls with smaller testicles.

MEASURING SCROTAL CIRCUMFERENCE

1. Use a commercially available flexible cloth or metal tape.
2. Restrain the bull securely in a headgate.
3. Gently grasp the testicles at the neck of the scrotum.
4. Encircle the neck of the scrotum between your thumb and forefinger, then pull the testicles firmly down into the base of the scrotum.
5. Loop the tape over the scrotum and pull it snugly around the fullest part of the scrotum.
6. Read the measurement on the tape.

Breeders, breed associations, veterinarians and researchers have established minimums which bulls must meet for breeding soundness evaluations. Scrotal circumference should be 32-33 cm or greater. This does not guarantee of fertility, but is a guideline only. Yearlings and young bulls with scrotal circumferences of less than 30 cm are likely to be poor breeders and should be culled. Scrotal circumferences for breeds commonly found in Western Canada are listed in the following chart.

Scrotal Circumference of Yearling Bulls

Breed	Average Scrotal Circumference (cm)
Aberdeen Angus	35.9
Blonde D'Aquitane	33.9
Charolais	34.7
Hereford	34.8
Limousin	32.1
Maine Anjou	35.8
Shorthorn	34.5
Simmental	38.2

Source - Coulter, 1980

Until the bull matures, his weight and age will determine the development of his testicles. From 6 to 14 months of age, the growth of the testicles is very rapid. Feeding good levels of nutrition during this time will ensure proper testicle growth.

SEMEN QUALITY should be considered in your breeding soundness evaluation.

The firmness of the testicles provides a good indication of the quality of semen produced. Manually palpate the testicles to determine their firmness. Firm testicles generally produce good quality semen. If the testicles are very hard or soft you should conduct a semen evaluation to determine the fertility.

To complete an accurate evaluation, a semen sample must be obtained. Semen samples can be collected by a qualified veterinarian or technician using an electro-ejaculator or artificial vagina. The sample is evaluated for colour, volume, sperm concentration, sperm movement (motility) and overall quality. Injury or sickness can cause temporary infertility, so do not immediately cull the bull. Re-evaluate the bull in 6 to 8 weeks.

LIBIDO or desire to mate affects the breeding success of your bull(s). Having normal testicles

and good quality semen is of little value to a bull unless he has the desire to seek out cows in heat and has the ability to mate successfully.

Libido is not related to the breeding ability characteristics of semen quality or scrotal circumference. Bulls that grow the fastest or are the most masculine do not necessarily have the greatest libido. Libido is the willingness or eagerness to mount and impregnate cattle.

SERVING CAPACITY is the number of services a bull can complete under natural mating conditions over one oestrus cycle of 21 days.

Generally, a bull distributes his services equally among the cows in heat. The more times a bull can service, the greater will be the number of cows in calf.

To test a bull's serving capacity, expose a bull to a number of restrained cows or heifers for about 40 minutes. The number served in this time will give a good indication of the bull's serving capacity. This test will also give you an opportunity to detect those bulls with high or low libido as well as those with injuries or abnormalities which interfere with breeding.

LEVEL THREE

ROLL CALL

Tell me one thing you must remember when looking after your beef bull(s).

Topic 1:

USING THE YOUNG BULL

Properly managed, young bulls can be successfully used for breeding purposes. A young bull raised in your herd has the advantage of already adapting to the environment and your management practices.

PUBERTY occurs when the bull begins to develop his masculine characteristics. He develops the desire and ability to mate, and is able to fertilize. Young bulls can often be seen to mount and apparently show the desire to mate at several months of age. However, at this age, they are incapable of producing sperm.

Puberty develops gradually, usually occurring at about 9 or 10 months of age. Sexual maturity depends on body weight. The timing of the puberty is also affected by:

- breed;
- body weight and growth rate;
- nutrition; and/or
- management.

Most young bulls can be successfully used for breeding as early as 14 to 18 months of age. Follow the guidelines on the next page to ensure that your young bull is ready and able to reproduce successfully.

Guidelines for Using Young Bulls

1. Begin use at 14 months of age - preferably older.
2. Semen test before you begin to use him. Semen quality improves dramatically following puberty.
3. Palpate the testicles to determine the presence of abnormalities.
4. Group bulls of similar size and age in breeding pastures. Older bulls may be more dominant and aggressive, intimidating the younger bulls.
5. Rotate your yearling bulls at one or two week intervals during the breeding season. This will give each a rest period and increase your breeding efficiency.
6. Provide lots of opportunity for exercise. Exercise is important for keeping the bulls in good condition.
7. You may need to provide supplemental grain to the young bulls during the breeding season.
8. Limit a small yearling bull to 10 cows. A larger, older bull may be able to service up to 20 cows.
9. Check your bulls regularly to see if they are having breeding fertility problems. Bulls passing a breeding soundness examination may develop problems later. Changes in scrotal temperature caused by disease may reduce fertility.

Topic 2:

SEMEN COLLECTION AND EVALUATION

Semen Collection

The **ARTIFICIAL VAGINA** is most commonly used to collect semen. The artificial vagina simulates the pressure and temperature of the vagina of the cow or heifer. The bull mounts a female in oestrous or a teaser animal. When the bull mounts, his penis is directed into the artificial vagina and his semen accumulates in the collection tube.

Advantages:

- the libido of the bull can be evaluated while the semen is being collected.

Disadvantages:

- the bull must be trained to use the artificial vagina.

An **ELECTRO-EJACULATOR** can also be used in semen collection. A probe is inserted into the rectum of the bull. The bull is stimulated with electrical current and he ejaculates.

Advantages:

- this method is not dependent upon the libido of the bull;
- some bulls won't respond to the artificial vagina, but will respond to this method;
- you can collect from many bulls in a short period of time; and
- this method works well for older or incapacitated bulls.

Disadvantages:

- if the bull is not properly and securely restrained, it can become dangerous for the bull and the handler;
- the semen can easily become contaminated with urine;
- it causes some discomfort to the bull; and
- if this method is frequently used on a bull, the concentration of sperm in his ejaculate

will decrease.

Semen Evaluation

Following collection, each semen sample undergoes a gross examination and a microscopic examination. You must take care to avoid destruction of the quality of the semen. Keep it at a constant temperature between 37 and 40 C. Avoid contamination with urine, water or chemical disinfectants as they will decrease both the quality and the fertility level.

GROSS EXAMINATION: Examine the semen with the naked eye for:

Colour:

- should be milky white or pale cream; and
- if the semen has a pinkish or greenish colour, there is blood or pus in the semen and a reproductive tract infection is likely.

Volume:

- a normal ejaculation will provide from 4 to 7 ml of semen.

MICROSCOPIC EXAMINATION: Qualified veterinarians and technicians examine the semen with a microscope for:

Motility (motion of sperm):

- sperm move forward similar to a torpedo in water; and
- the higher the motility, the better the quality of the semen.

Morphology (structure of sperm):

- if more than 25% of the sperm in a sample are abnormal, fertility will be affected; and
- deformed or abnormal sperm may have no head, two heads, no tails or be unusually shaped.

Concentration (sperm cells per volume of semen):

- from 5 to 25 billion sperm may be present in the ejaculate from one bull.

Normal semen has these characteristics:

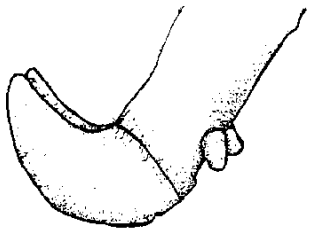
- milky white or pale cream in colour;
- volume of 6 ml per ejaculate (range from 2-12 ml); and
- 0.5 to 2.5 billion sperm cells per ml of semen.

Topic 2:

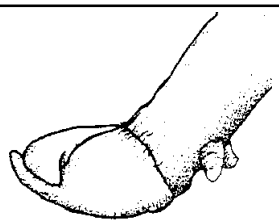
HOOF TRIMMING

Foot problems created by overgrown feet are often the cause for a poor breeding bull.

Breeding stock, particularly bulls, suffer from overgrowth of the horny hoof. This extra growth around the hoof makes it difficult for the bull to move around to pasture and find females in heat.



Overgrown Hoof



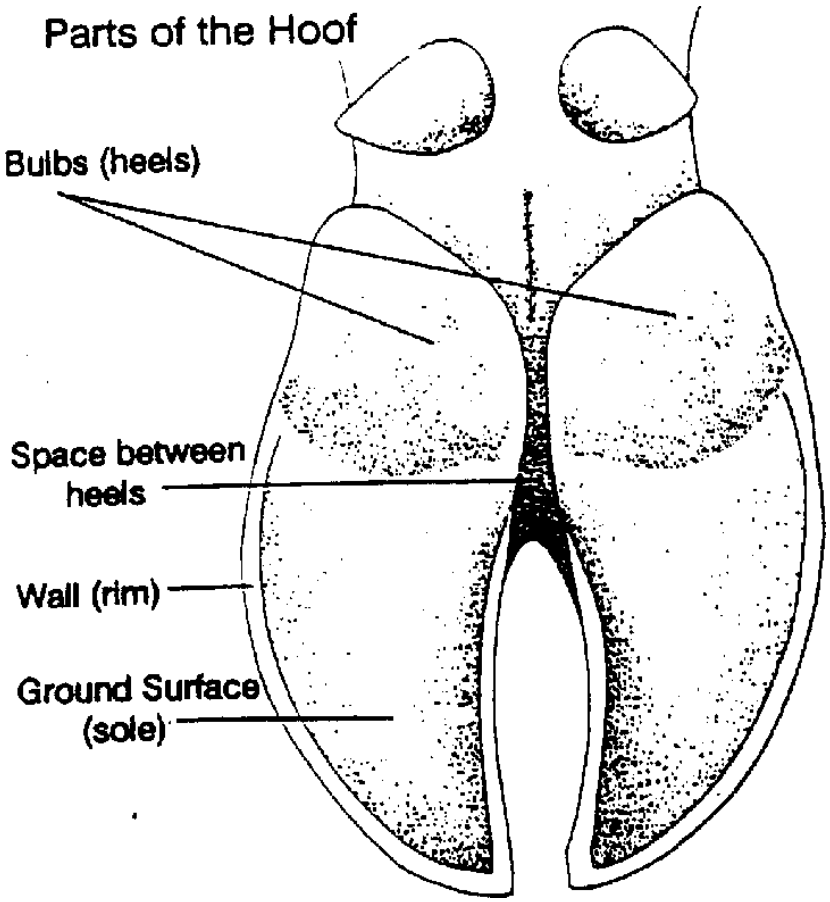
Scissor Hoof

It is most profitable to do your hoof trimming in the spring. The cattle will then be ready for breeding season and pasturing.

If you have the right facilities and equipment, you can trim the feet yourself. Most farmers hire custom hoof trimmers to do the job.

The sole of the hoof is normally concave. The outside rim of the hoof bears the weight of the animal. After hoof trimming, the outer rim of the hoof should be slightly longer than the edges next to the cleft between the toes. The trimmer should be careful not to cut the toes off.

The horn from under the toes should be trimmed. The horn under the heels is normally thicker than that under the toe. Be careful not to pare too much horn from the heel to avoid damaging the sensitive foot under the sole.



BEEF BREEDING

LEVEL ONE

ROLL CALL

Tell me one thing you know about breeding beef cattle.

THE REPRODUCTIVE CYCLE

The reproductive cycle of the beef female determines when and if she will become pregnant. Let's look at it more closely.

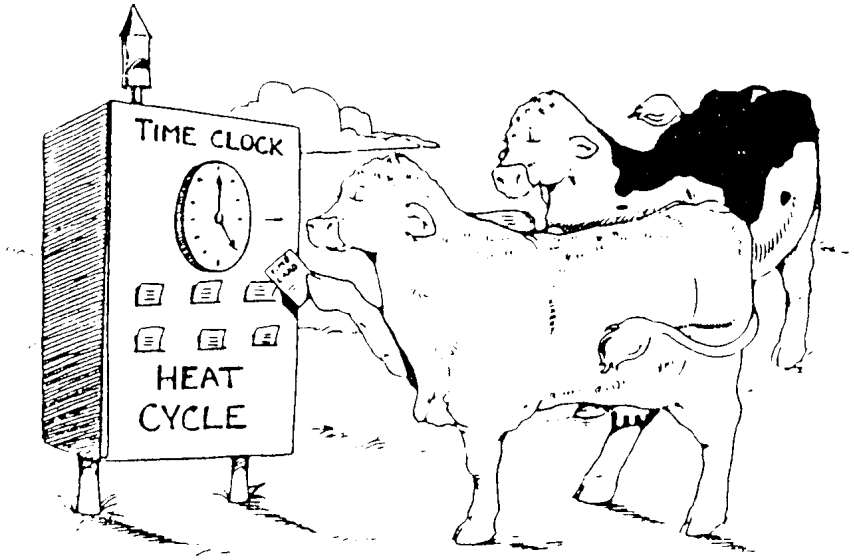
The ESTRUS CYCLE is a repeating period of time in which the cow becomes fertile, then non-fertile, then fertile again.

ESTRUS, or the heat period, is the fertile period of the cow or heifer. It is the only time when the cow or heifer will accept the bull.

Estrus occurs approximately every 21 days. This may vary from 18 to 24 days depending on the cow.

Between 16 and 30 hours after the cow begins to show signs of estrus, she will OVULATE. Ovulation occurs when she releases an egg from her ovary. If she has been impregnated by the bull, the bull's sperm will fertilize the egg and it will then develop into a fetus and eventually, a calf. If the cow does not conceive or does not become pregnant, she will repeat her estrus cycle in approximately 21 days.

Some cows come into heat without showing any signs. This is called SILENT HEAT. When a cow has a silent heat, most producers assume the cow is not cycling. Your veterinarian can examine the cow to determine if she is cycling.



The GESTATION PERIOD is the amount of time from when the cow becomes pregnant until she gives birth to a calf. The gestation period of the beef cow is approximately 283 days, or nine months and one week. The following chart shows the length of the gestation period of different animals.

Animal	Gestation Period (days)
Dairy Cow	280
Beef Cow	283
Sheep	148
Swine	114
Horse	340
Human	280

Heifers begin their reproductive cycle any time between 5 and 14 months of age. The age when a heifer first begins to show signs of female maturity is called PUBERTY.

Many factors influence when a heifer will reach puberty, including:

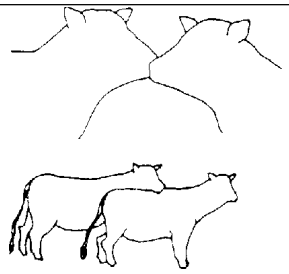
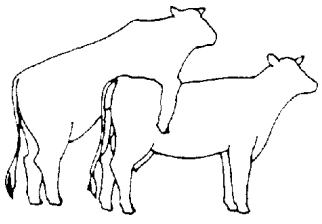
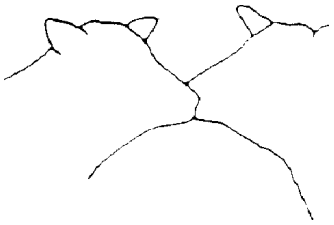
- age;
- weight;
- breed;
- growth rate; and
- nutrition she has received.

HEAT DETECTION IN BEEF CATTLE

Knowing when your animal is in heat is the key to successful breeding.

Cows and heifers should be checked two or three times per day, usually in the early morning and late evening, for signs of being in heat. About 70 per cent of mounting activity takes place between 6 p.m. and 6 a.m. As a general rule of thumb, if you see a cow in heat in the morning, she should be bred that afternoon or evening. If you see a cow in heat in the evening, she should be bred the next morning.

The Stages of Heat

COMING INTO HEAT 8 hours	STANDING HEAT 12 to 18 hours	GOING OUT OF HEAT
	 This cow is in heat	
- stands and bellows - smells other cows - attempts to ride other cows, but will not stand - vulva moist, red and slightly swollen vulva - may have clear mucous discharge from the vulva	- stands while other cows ride her - bellows frequently - nervous and excitable - rides other cows	- will not stand to be - ridden but attempts to mount others - smells other cows - may have clear mucus discharge from the

BREEDING YOUR COWS AND HEIFERS

Within each heat period, there is a best time to breed the cow. This is when she is in standing heat. Standing heat usually lasts from 12 to 18 hours.

You can breed your beef females either naturally or artificially. In NATURAL breeding, the bull does the breeding himself. In ARTIFICIAL INSEMINATION (AI), you place the semen, which has been collected from a bull, into the cow.

Most dairy cows are artificially inseminated. Artificial insemination is not used as often in beef cattle because:

- it is very expensive;
- more time and labour is required from the producer;
- must be able to recognize when your cattle are in heat;
- need a trained AI technician to breed the cattle; and
- good facilities are needed to restrain the cattle.

There are many advantages to using artificial insemination in the beef herd. Some of these are:

- safer for people and cattle not to have a bull on the pasture;
- easier to prevent and control disease;
- you can use top quality bulls without paying the very high price of purchasing them;
- you can make rapid genetic progress by using top quality bulls;
- you can breed more cows and heifers to one bull;
- you will have no problems with infertile bulls; and
- your breeding records, especially predicted calving dates, will be more accurate.

ANESTRUS

Some cows or heifers may not come into heat at all. This is called ANESTRUS. There are may reasons for this:

- age;
- not in the breeding phase of her cycle;
- infection in the reproductive tract;
- poor nutrition;
- no ovaries;
- cysts on the ovaries;
- the female is still nursing;
- seasonal anestrus; some cows do not ovulate in the winter; or
- your cow is already pregnant.

LEVEL TWO

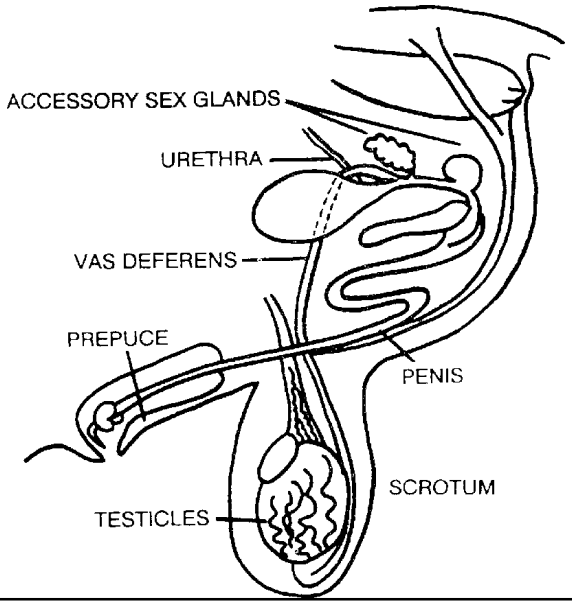
ROLL CALL

Tell me one thing you know about breeding beef cattle.

THE MALE REPRODUCTIVE SYSTEM

The male reproductive system is made up of two-bean shaped TESTICLES, the ACCESSORY SEX GLANDS and the PENIS. The diagram below shows all of the reproductive organs of the bull.

The Male Reproductive System



The SCROTUM holds the two TESTICLES. These testicles produce the SPERM or spermatozoa which fertilizes the egg in the female. The testicles also produce the male hormone, TESTOSTERONE. This hormone gives the bull his masculine characteristics and appearance.

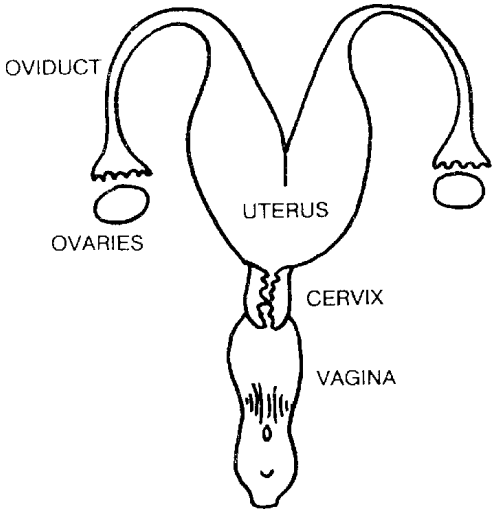
The scrotum helps to keep the testicles at an even temperature. For normal sperm production to occur, the testicles must be kept at a temperature several degrees cooler than body temperature. If they are too warm, or too cold, sperm fertility levels will be lower.

Each testicle is connected to the urethra by the VAS DEFERENS. The SEMEN, containing the sperm, is produced in the testicles, passes up the vas deferens and into the URETHRA. The urethra contains the ACCESSORY SEX GLANDS. These glands secrete fluids which add volume to the sperm, provide nutrition to the sperm and clean and lubricate the reproductive tract. This fluid or semen moves out of the body through the PENIS.

THE FEMALE REPRODUCTIVE SYSTEM

The following diagram shows the reproductive organs of the mature female.

The Female Reproductive System



The mature female has two almond shaped organs called OVARIES. The ovaries produce eggs and the female hormones. These hormones control the female reproductive cycle.

The ovaries are suspended by a coiled tube called the OVIDUCT. Fertilization, or the joining of the egg from the female and the sperm from the male, occurs in the oviduct.

The oviduct leads from the ovary to the UTERUS or womb. Once an egg is fertilized, it enters the uterus, implants in the wall of the uterus and begins to grow.

The lower opening from the uterus is the CERVIX. The cervix has many folds and interlocking rings. Its main function is to prevent intruders from entering the uterus. The cervix remains tightly closed except during estrus when it relaxes, allowing the sperm to enter. During pregnancy, the cervix remains tightly closed. It relaxes just before calving to allow the calf to exit the female's body.

The VAGINA is the tube which connects the cervix to the outer opening of the body. The bull deposits his semen in the vagina during mating. The vagina is the passage through which the calf exits during calving.

IS YOUR COW PREGNANT?

At the end of the breeding season, it is important for you to know if your cows and heifers are pregnant.

One way to find out if your females are pregnant is to pregnancy check all of them. Non-pregnant females can then be culled from the herd so they do not continue to cost you money. If you choose to keep and rebreed them, be aware that you will have an extended calving season.
What are some of the advantages of detecting pregnancy early?

The method of pregnancy detection most commonly used is palpation of the reproductive tract. To do this without harming the cow or the fetus and be correct in your detection, you must have a thorough understanding of the reproductive system and the changes which occur in the female body during pregnancy.

Wearing a lubricated protective rubber or plastic sleeve over the arm and hand, the palpator reaches into the rectum of the cow and feels the uterus. The cattle must be properly restrained in a chute to avoid injury to the palpator and the cow. With experience, a palpator can make pregnancy detections as early as 30 days after breeding. Most people prefer to do their pregnancy detection 45 days to three months after the end of breeding season because the signs of pregnancy are more obvious.

THE CALVING INTERVAL

The calving interval is the length of time between the birth of one calf and the birth of a calf in the following year. Breeders should attempt to have calving intervals of twelve months.

The gestation period for a cow is about 283 days. This means that there are only about 80 days left in the year to rebreed that cow so she can keep her calving interval at twelve months.

This does not allow very much time for the cow to recover from pregnancy and calving. Her reproductive tract must return to its normal size and shape. It takes from 30 to 45 days for the cow's reproductive tract to recover from calving. If it was a difficult pregnancy and calving, it will take even longer.

Most cows will not show signs of estrus until about 60 days after calving. The time from calving to first estrus varies greatly from one

animal to the next. Factors which can affect how long it takes for the cow to return to estrus after calving include:

AGE: Older cows return to estrus faster than heifers.

NUTRITION: Cows which are deficient in a nutrient can have poorer reproductive performance. A low level of nutrition before calving will increase the amount of time it takes a cow to return to heat.

CALVING PROBLEMS: If a cow has a difficult calving, it will take her longer to recover and return to estrus.

WEIGHT and BODY CONDITION: Cows in good condition before calving will return to estrus sooner than cows which were in thin or fat condition.

LEVEL THREE

ROLL CALL

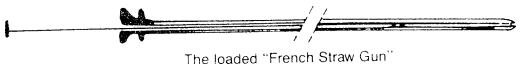
Tell me one thing you know about breeding beef cattle.

Topic 1:

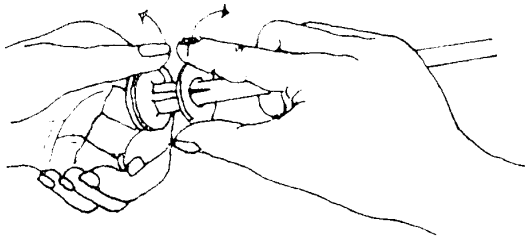
ARTIFICIAL INSEMINATION

Insemination is a skill that can be learned with training and practice. Experience and knowledge of the reproductive system and inseminating equipment will help you avoid accidental injury or infection of the reproductive tract. Semen must be handled properly to ensure pregnancy.

The artificial insemination technician uses an instrument called a French Straw gun. It is a stainless steel syringe and piston with a disposable sheath.



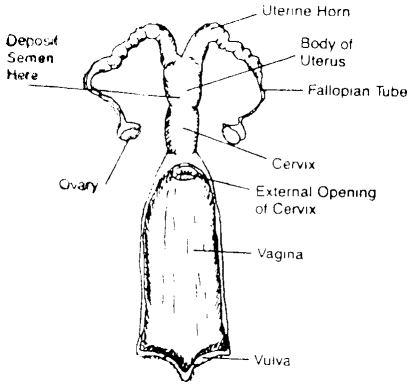
The loaded "French Straw Gun"

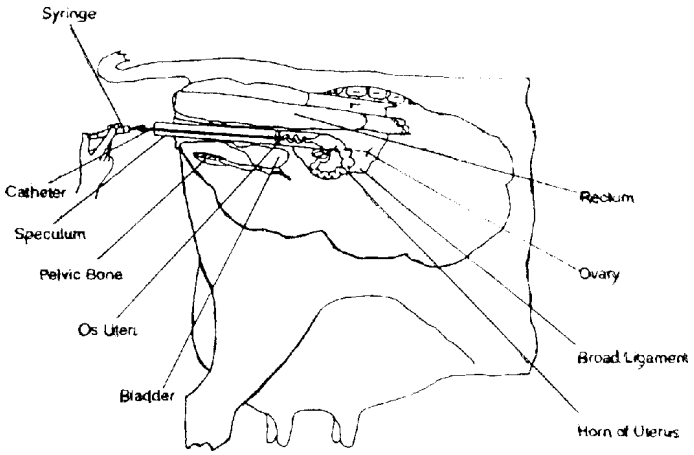


Locking the loaded gun with the O ring

The thawed and unsealed straw is placed in the chamber of the gun, with the piston of the plunger pulled out. A disposable sheath is slipped over the entire gun and sealed with an O-ring. The plunger is moved forward until the semen is almost emerging from the tip. The straw gun is then ready for insemination.

The insemination tube is passed through the cervix and the semen is deposited where the cervix ends at the uterus. To increase the possibility of pregnancy, it is very important to place the semen in this area.





Semen Packaging

Semen is packaged for easy identification and selection. Most semen in North America is now stored in french straws. The French straw is a long, thin tube, 13.5 cm long and 2 to 3 cm in diameter.

The bull information on the straw is easy to read and understand. Each straw has this information on it:

- bull stud code;
- breed code;
- bull code number; and
- freezing date.

The information is listed as an eight digit code:

BASIC CODE: AA BB CCCC
(Stud code) (Breed code) (Bull code)

EXAMPLE: 67 PZ MIKE
(AI Breeders) (Pinzgauer) (Bull name)

The date on which the straw was filled is also recorded on the straw. As a technician, you want to use the older semen first.

Topic 2:

SYNCHRONIZED BREEDING PROGRAMS

Synchronized breeding programs mean controlling the estrus cycles of your cows so that groups of females in a herd come into heat or estrus at the same time.

Prostaglandins are naturally occurring substances in the body of the beef female. These prostaglandins bring about the production of the hormone, progesterone, which stops the uterus from preparing for pregnancy. The cow will then return to her estrus cycle. Prostaglandins or synthetic products, such as estrumate, lutalyse and synchrocept, can be injected into the female to regulate her estrus cycle. Take caution not to inject pregnant cows because prostaglandins may cause an abortion.

In a normal herd, 50 to 60% of females will show standing heat on the third day following injection. The actual time will vary depending on whether they are heifers or cows and the stage of the estrus cycle they were at when injected.

Controlling the estrus cycle has these advantages:

- you will be able to artificially inseminate all

of your cows in a very short period of time;
- your breeding period and calving season will be shorter;
- calf crops will be more uniform;
- problem breeders will be more easily detected; and
- you will spend less time on heat detection.

For your synchronization program to be successful, you must:

- have a well planned breeding program;
- keep records current and accurate;
- have normally cycling cattle;
- have healthy animals, free from disease;
- provide adequate nutrition to keep animals in desired condition all year round;
- have competent artificial insemination technicians; and
- have adequate facilities for AI work including a crowding pen, holding area and restraining chutes.

Topic 3:

HEAT DETECTION AIDS

Knowing when your animal is in heat is the key to successful breeding. Since about 70% of mounting activity occurs between the hours of 6 p.m. and 6 a.m., the beef producer cannot always see all of the females in heat. Fortunately, there are heat detection aids available to assist the producer.

1. CHIN-BALL MARKER

A chin-ball marker has a paint reservoir attached to a leather harness. The paint reservoir has a ball bearing in it that makes it work similar to a ball point pen. This unit is strapped around the head of a detector animal. When the animal mounts a female in heat, the chin-ball marker rubs on the female's back or rump, releasing paint on the female. You can then identify the females which have been mounted by the paint marks on them.

2. GOMER OR TEASER BULLS

Gomer or teaser bulls are surgically altered so they are not physically capable of breeding, but still have the desire to mate. By putting chin-ball markers on these bulls and then pasturing them with your females, you will be able to identify females in heat.

3. HORMONALLY TREATED COWS OR STEERS

A cull cow or steer injected with male hormones can also be used to identify females in heat. Inject these animals before the breeding season and again during the breeding season so they maintain their sexual activity. Using these animals is less expensive than preparing a gomer bull. The cow or steer can be sold for slaughter after the breeding season is over. Make sure that you follow the requirements for the withdrawal period.

4. HEAT DETECTOR PATCHES

The heat detector patch is a patch of plastic filled with fluid. It is glued to the top of the female's back between the tailhead and the hook bones. This patch contains white fluid with an inner vial of coloured fluid. When the female is mounted, the pressure breaks the inner vial of fluid, colouring all of the fluid in the patch. The disadvantage of relying on these patches for heat detection is that they may be activated by cows in heat mounting those which are not. They may also be lost when cows rub on fences, trees or buildings.

CALVING

LEVEL ONE

ROLL CALL

How can you tell your cow will soon calve?

GETTING READY FOR CALVING

Calving is one of the most exciting times on the beef farm. It is the time of year when your hard work in feeding and caring for the cows and heifers shows you the results. Your goal as a beef producer is to gain a strong, healthy calf from each of your pregnant cows and heifers.

In this unit, we will look at how you can prepare for that special time. You will learn how to identify that calving time is near and the stages the cow goes through in delivering her calf.

SIGNS THAT CALVING IS NEAR

Before a cow calves, she may show some or all of these signs:

- the udder begins to fill with milk or "bags up";
- her belly "drops" or looks heavier;
- vulva relaxes; and
- ligaments on both sides of the tail head relax and sink.

Just before labour begins, the cow:

- becomes restless;
- isolates herself from other cattle;
- lies down and gets up often;
- raises her tail head;
- stops eating;
- tries to urinate often; and
- discharges a thick mucus from the vulva.

STAGES OF CALVING

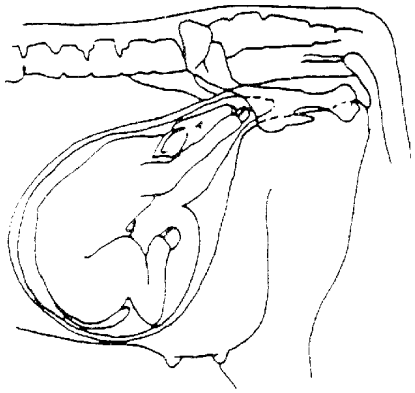
STAGE ONE (Relaxation)

This first stage of calving lasts from two to six hours. The calf changes position in the uterus. Hormone changes in the body of the cow cause the uterus to begin contracting. In early labour, these contractions are about 15 minutes apart. The contractions become stronger and more frequent as labour progresses. The contractions are a lot like clenching and unclenching your fist. They begin at the horn of the uterus, working towards the other end, eventually forcing the calf out.

At the end of this stage, the water sac is forced into the cervical canal and pelvic area. The pressure breaks the sac and the fluid lubricates the birth canal. You will often see the water sac hanging from the vulva at the end of stage one.

Watch your cow, but stay out of sight. The cow is uneasy and nervous and will calve more comfortably if she thinks she is alone.

This first stage lasts from 2 to 3 hours in a cow and from 4 to 6 hours in a heifer.



Normal Position of the Calf Before Birth

STAGE TWO (Active Labour)

The cow usually lies down just before or during this second stage. In a normal delivery:

1. The calf enters the birth canal.

2. The uterus contracts more often.

3. Contractions become stronger after the water has broken.

4. Powerful stomach muscles begin to contract too.

5. The calf's front legs and head are forced through the birth canal and can beseen.

6. The cow strains to push the calf's shoulders and chest out of the birth canal.

7. The calf's stomach muscles relax and the hips and hind legs straighten so the hips slide out of the cow more easily.

8. Once the hips pass out, the rest of the calf slides out easily.

The time to complete this stage is from 0.5 to 1 hour in a cow to 3 hours in a heifer.

STAGE THREE (Involution)

The uterus continues to contract after the calf has been delivered. The placenta or afterbirth usually is forced out of the cow within 12 hours of birth. Lochia, or birth fluids from the uterus, will exit the cow for up to 2 weeks after the birth. Complete involution (return to normal) of the uterus takes from 30 to 40 days, but may take longer after a difficult calving.

CALVING PROBLEMS

At any time during calving, something may go wrong. You must be prepared to help your cow if she has any problems.

The most common problem which happens with calving is dystocia or difficult calving. This may be caused by many things:

- small or immature cow or heifer;
- abnormalities of the pelvis in the cow;
- distortion of the uterus in the cow;
- very large calf;
- more than one calf (twins or triplets); and/or
- placement of the calf inside the cow.

AFTER THE DELIVERY

Once the calf is born, make sure there is no mucus or fluid in its nostrils and mouth. Make sure the calf is breathing normally. If the calf is having difficulty breathing, lift it by the rear legs and shake or swing it back and forth.

Newborn calves have an amazing ability to get up, move around and search out food from the mother. Watch the mother nudge the calf towards her udder to help it find the food.

LEVEL TWO

ROLL CALL

How can you tell your cow will soon calve?

DYSTOCIA

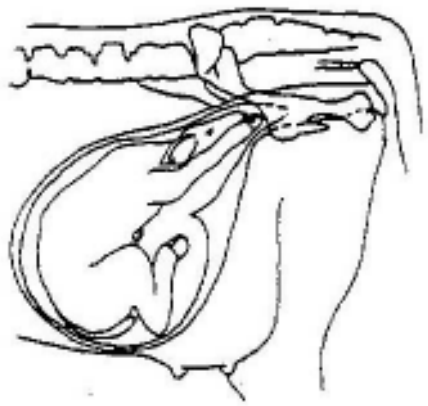
Dystocia, or difficulty in calving may occur at any stage of the calving. There are many possible causes for dystocia:

- incorrect position of the calf;
- small or immature cow or heifer;
- abnormalities of the pelvis in the cow;
- distortion of the uterus in the cow;
- very large calf; and/or
- more than one calf (twins or triplets).

Correcting the Position of the Calf

Dystocia is often caused by incorrect position of the calf. It is possible to return the calf to the normal position to allow birthing.

Remember that the normal birthing position of the calf is with the head and front feet towards the opening of the birth canal.



The Position of the Calf in a Normal Birth

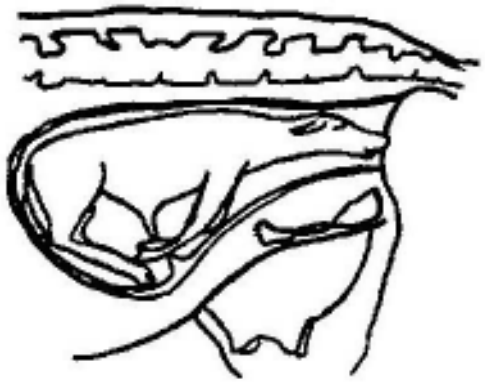
Your goal in helping with delivery is to correct the position of the calf so it can be successfully delivered. It is possible to deliver a calf when it is not in the normal position. If the calf is backwards, do not try to turn it around, but deliver it as quickly as possible.

When you try to correct the position of the calf before birth, follow these practices:

- Remove all your jewellery and restrictive clothing.
- Wash yourself and the cow's vaginal area with a mixture of soap, warm water and mild disinfectant.
- Take care not to puncture the cow's uterus with your fingers or the calf's hooves.
- When moving the legs, place the calf's hooves in the cup of your hand.
- Do the repositioning between contractions to avoid injury to yourself, the calf and the cow.

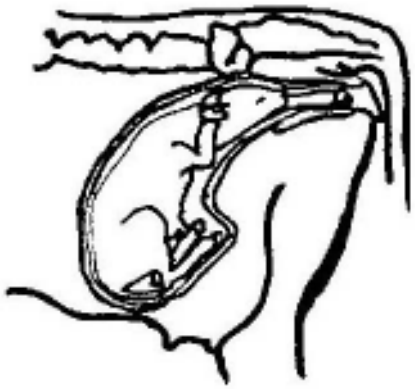
Let's look at some of the incorrect calf positions you may find. Beside each is the recommended way to correct it.

1. Head first with one or both legs bent back.



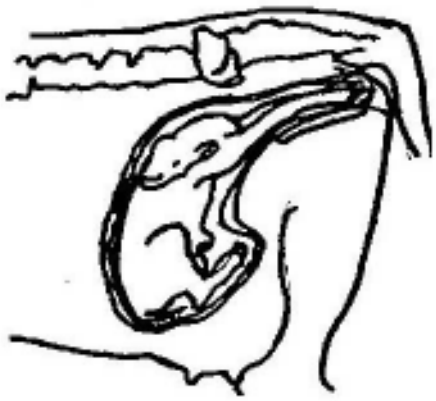
- Push calf back into the uterus.
- Pull the calf's hoof upward and toward the birth canal or grasp the cannon bone of the leg near the pastern if you can't reach the hoof.
- Move the front legs to the birth canal beside the head.

2. Head and one leg first with other leg crossed over the neck.



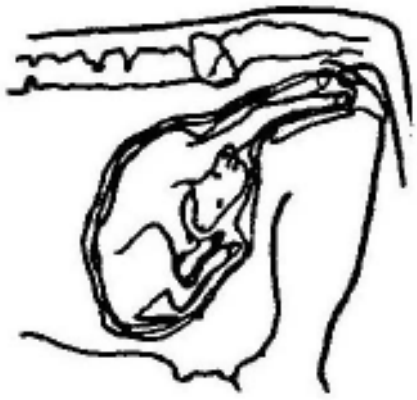
- Push calf back into the uterus.
- Grasp the leg which is over the neck at the cannon bone near the pastern.
- Raise the leg over the head and pull it into the birth canal.

3. Front feet first with the head twisted backwards (you will be able to feel the head along one side of the calf).



- Push calf back into the uterus and grasp calf's nose.
- Pull head downwards to the side and then toward birth canal.
- Be very careful not to break the neck of the calf.

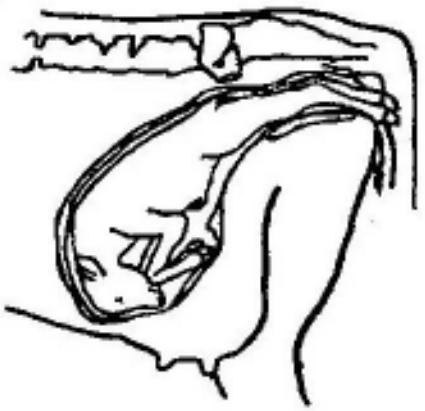
4. Front feet first with the head bent down between the legs.



- Attach the calving chains to the front legs so you will be able to pull them back into the birth canal after correcting the position of the head.
- Push calf back into the uterus.
- Raise one leg to make room to move the head.

- Grasp head of calf at the muzzle, pull upward toward birth canal.
- Return leg to correct position.

5. Breech calf - backwards with hind feet first.



- You will feel the hind feet and the tail first.
- You can tell these are hind feet - the front leg has one joint, the knee between the foot and the elbow; hind leg has no joint between the foot and hock.
- It is important to get labour moving quickly - the calf will suffocate in this position; the umbilical cord may rupture before the calf's nose is out of the reproductive tract and the calf will be unable to breathe.
- Take care that the calf's tail does not turn back over the thigh or it may tear the roof of the cow's vagina.

6. Breech calf - backwards with rear legs tucked under its body.

- Push calf back into the uterus.
- If you can reach the hooves, grasp them; if not, grasp the legs at the cannon bones just below the hock.
- Pull upward and toward the birth canal.
- Remember to grasp the hooves so the pastern bends and the hooves stay in your hand so they don't puncture or tear the uterus.
- Make sure the tail does not turn back over the thighs.

7. Hiplock - calf sticks at the hips.

- Lubricate the calf by rubbing grease (lard) around the hips.
- Rotate the calf so it is on its side.
- Have your helper press gently up and down on the calf's middle.
- If you cannot deliver the calf easily, call your veterinarian.

Multiple Births

Occasionally, twins or triplets cause difficult calving. If you are assisting in the delivery, make sure the two front feet you are pulling belong to the same calf.

Assisting the Delivery

Once you have placed the calf in the correct position, you will often have to help remove it from the cow. Follow these steps for using CALVING CHAINS.

1. Soak the chains and handles in disinfectant. Make a loop in the calving chain by passing one end through the large ring at the end of the chain.

2. Slip the loop over your lubricated hand. Form a cone with your fingers and thumb to make it easier and safer to enter the cow. Slip the loop over the leg of the calf and slide it up past the dew claws. Put slight pressure on the chain to make sure it does not slip off.

3. Make sure the chains come up from the underside of the leg (the dew claw side) so you can pull the legs straight.

   Make a half hitch in the chain between the dew claws and the hoof head. This will help to distribute the stress on the bones when the calf is pulled, reducing the possibility of breakage. Repeat this on the other leg. Attach the handles to the chains.

4. Pull first on one leg and then on the other. By pulling alternately, the calf will pass through the pelvis more easily because the shoulders and the hips will be on a slight angle.

5. To avoid damage to the reproductive tract, the calf should be pulled at the same angles which occur during natural birth.

   In a normal birth, the calf moves upward at an angle 30 degrees up from horizontal, horizontally through the birth canal then downward at an angle 30 degrees down from horizontal when the calf is leaving the birth canal.

6. Apply pressure. Work with the cow, pulling when she strains or pushes and relaxing slightly when she relaxes.

7. If you cannot help the cow quickly and easily, check the position of the calf again. Correct it if you can. Call your veterinarian for assistance.

HELPING A COW CALVE

When you are handling a cow with calving problems, there are six important rules to know:

1. KNOW WHEN TO HELP.

If you start helping a heifer too early, the heifer may be harmed. If you wait too long, the calf will have a lower chance of survival. Use this rule of thumb - if a heifer has been actively pushing for an hour, or a cow has been pushing for half an hour, and has made no progress, she probably needs help.

2. BE CLEAN.

Use clean chains or calving straps which have been boiled and stored in a clean place such as a polyethylene bag. Wash the outside of the cow around the vagina with a mixture of soap, water and a gentle disinfectant. Wash your hands and arms. If at any time you or the cow become dirty, stop and wash again.

3. BE GENTLE.

Force is sometimes needed to help deliver the calf. However, you must always understand that the calf must always adjust to the shape of the inside of the cow as it

moves out of the birth canal. Combine your force or strength with gentleness to help the cow calve.

4. DON'T PULL UNLESS YOU CAN SEE THREE THINGS IN THE BIRTH CANAL.

If the calf is being delivered normally (head first) you must be able to see two feet and the calf's nose. If the calf is being delivered backwards, you must be able to see two hind feet and the calf's tail before you start to pull. If any one of these three things are missing, it is likely that the calf is not positioned correctly. By pulling, you will cause more problems.

5. KNOW YOUR LIMITATIONS.

As you become more experienced, you will know better when to call your veterinarian. Too soon is better than too late.

6. LIMIT THE TIME YOU WORK ON AN ANIMAL.

If you can see you have made no obvious progress in 10 or 20 minutes, call your veterinarian. Working unsuccessfully with the cow can lead to these problems:

- loss of lubricating fluid needed to help the calf out of the birth canal;
- swelling of the vagina;
- exhaustion of the cow;
- less chance of the calf surviving; and/or
- more difficulty in the eventual calving.

LEVEL THREE

ROLL CALL

How can you tell your cow will soon calve?

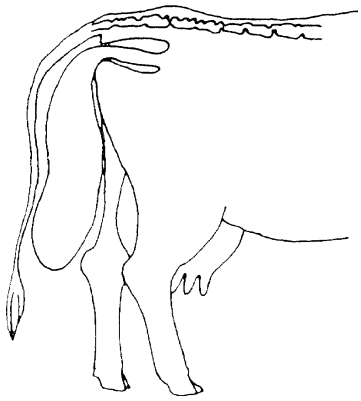
Topic 1:

AFTER-CALVING PROBLEMS IN THE COW

Infections And Tears

Tears or lacerations in the vagina are common after calving, especially in heifers. Unless the tears become infected, no special treatment is required. If the wall of the uterus has been torn, call your veterinarian immediately.

Prolapsed Uterus



A prolapsed uterus is one which turns itself inside out during stage II of delivery and comes out of the cow through the vulva. This happens if the pelvic muscles relax too much. This occurs more often with multiple births, poor physical condition of the cow and reproductive diseases.

If this happens, call your veterinarian immediately. If possible, wrap the uterus in sheets moistened with water and disinfectant.

Keep the cow quiet to prevent further damage to the uterus.

If your cow continues to strain and force after the calf has been deliver, make her stand and move around. This will help to prevent the uterus from prolapse.

Retained Placenta

Normally, the uterus contracts and the fetal membranes, or placenta, are pushed out of the body within 12 hours after birth. Retained placenta occurs when the cow does not expel the placenta.

There are many causes of retained placenta including dystocia, multiple births, abortion or premature birth and nutritional deficiencies. If the incidence of retained placenta in your herd is above 10%, consult your veterinarian and try to find the cause.

If an animal with a retained placenta loses her appetite or becomes dull and lethargic, take her temperature. She may be developing an infection. Consult your veterinarian. Have your veterinarian do a postpartum examination a month later to make sure the cow's uterus has returned to normal.

Obturator Paralysis

A cow, or more often a heifer, may be unable to get up on her hind legs after calving. A very large calf or difficult delivery may damage the nerves to the hind legs where they pass through the bones of the pelvis.

There is no specific treatment for obturator paralysis. Allow the cow to rest in a well bedded stall and roll her periodically to prevent bed sores and further damage to the hind legs. The paralysis is temporary and your cow should get up within the next few hours. If she doesn't, contact your veterinarian.

Be careful not to confuse obturator paralysis with milk fever which is caused by low blood calcium levels.

Topic 2:

MORE CALVING PROBLEMS

Uterine Inertia

Uterine inertia, or lack of activity of the uterus, will cause the cow to show some of the early signs of labour without attempting to deliver the calf. This can be caused by poor nutrition, overcondition or diseases such as mastitis. Contact your veterinarian if you suspect uterine inertia.

Prolonged efforts at calving can also lead to uterine inertia. If this happens, there is danger that the uterus will rupture. Contact your veterinarian immediately.

Nondilation Of The Cervix

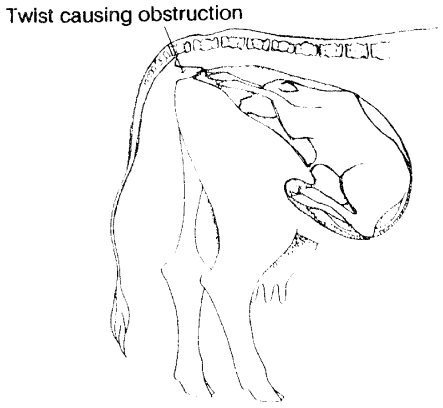
If the cervix is not dilating (relaxing to allow the calf to pass through), signs will be similar to uterine inertia. The cow will show some of the early signs of labour but will not attempt to deliver the calf.

During pregnancy, the cervix is about the size of an orange and has a very narrow undulating passage through the centre. At birthing time, the actions of hormones cause this passage to become larger to allow the calf to pass through.

If you insert your hand into the vagina and find that you can put only two or three fingers in the cervix, there is likely nondilation. Do not

attempt to force the calf out of the cow when the cervix is not ready. Contact your veterinarian. He/she may need to perform a caesarean operation.

Uterine Torsion



Occasionally, the uterus will rotate, causing a twist or torsion near the vagina. Symptoms are similar to nondilation of the cervix. The cow will not be able to deliver the calf. Contact your veterinarian.

Topic 3:

COPING WITH CALVING PROBLEMS

Some beef producers cope with calving problems better than others. Some have more time, desire, energy and/or expertise to use to ensure a high rate of calf survival in their herd. However, calving time can be stressful. Producers with large herds do not have the time to spend with individual cows and cannot tolerate calving problems.

Management

Understanding the process of giving birth and the problems which may be encountered will help you become a better manager of calving. Follow these suggestions:

Know the cow's nutrient requirements. Do not overfeed or underfeed the cow, as this will lead to calving problems.

First calf, two-year-old heifers have a significantly higher incidence of calving problems than older cows. Give these heifers extra attention during calving season.

Know how and when to give assistance to your cows during calving. Know when to call the veterinarian.

Genetics

Research shows that the birth weight of the calf is one of the most important factors associated with calving difficulties. Genetically, you can control the birth weight of your calves by selecting bulls which sire calves with your desired birth weight. Keep in mind that the birth weight of the calf is genetically correlated with weaning weight, yearling weight, weight gain and mature weight. Generally, as birth weight is reduced, so are these other characteristics.

Birth weights can vary significantly between sires and breeds. When selecting a bull to use for artificially inseminating your females, look at the information on his sire summary. When selecting a bull for natural service, look at his birth weight. If it is breed average or lower, he is likely to sire calves which deliver easily. Breed of sire and dam also affect the ease of calving.

THE NEWBORN CALF

LEVEL ONE

ROLL CALL

When was your project calf born?

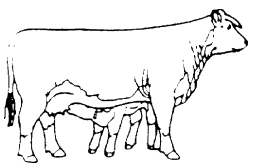
GETTING OFF TO A GOOD START

Healthy heifers, steers and cows grow from healthy baby calves. Give your calves a clean home and good care starting from their first hour.

The calf is born with a thick fluid or mucus in its nostrils. Clear this from the nostrils by holding the calf by its rear legs with its head upside down. Tickle the nostrils with clean fresh hay and the calf will clear its air passages by snorting and shaking its head.

As soon as possible after the calf is born, disinfect the navel using an iodine dip. This disinfectant will help to prevent disease by killing bacteria which might enter the calf's body through the navel. It is a good idea to keep a wide-mouthed jar of iodine solution handy near your calving area.

After the calf is breathing normally, allow the cow to lick it dry. The newborn calf should soon stand and try to nurse.



The mother should have licked the calf very soon after it is born. If she hasn't, check to make sure she is feeling all right and that the calf is healthy.

A newborn calf should have a bowel movement within two hours after birth. The bowel movement will be dark and look like tar. This is called meconium and it is made up of material that was in the intestines before birth.

Feeding The Newborn Calf

Feeding the newborn calf properly is very important to the future growth of the calf. You need to be sure that the calf receives enough of the right nutrients.

It is important to make sure the calf suckles as soon as possible after birth. By suckling early, the calf will receive the much needed COLOSTRUM from the mother's milk.

What is COLOSTRUM?

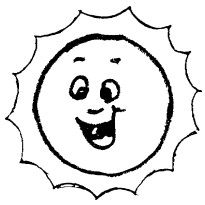
Colostrum is the thick, rich yellowish milk which the calf's mother produces.

Why does the newborn calf need colostrum, and need it fast?
The calf's stomach can only absorb the nutrients from the colostrum for the first 12 to 24 hours after birth. You must be sure the calf gets colostrum during this time so it gets these nutrients.

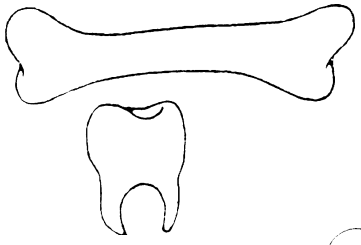
There are many things in the colostrum which are needed by the calf:

PROTEINS

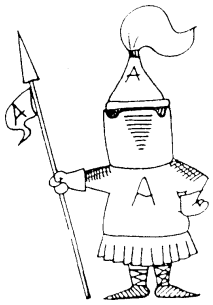
VITAMINS



MINERALS



and, most important,
ANTIBODIES



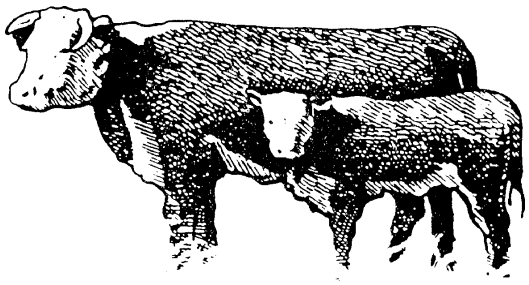
Antibodies are disease fighters. They are the tiny bodies in the blood which get together and attack the disease. The cow gives these to her calf in the milk so that the calf will be able to use them to fight disease until it is old enough to make its own antibodies. At three or four months of age, the calf begins to make its own antibodies.

Colostrum Vs. Whole Milk

	Colostrum	Whole milk
Total Solids	29%	13%
Protein	19%	3%
Milk Fat (energy)	6%	4%
Lactose (sugar)	3%	5%
Ash (minerals)	1%	7%

Colostrum contains 10 to 100 times more vitamin A than milk and three times more vitamin D. It also contains a laxative which helps the calf get rid of the sticky material which is in its intestines at birth.

If the calf is not able to get fresh colostrum from its mother, you can always give colostrum in a bottle. Many cattle producers will collect extra colostrum and freeze it so they will always have some on hand.



THE HEALTHY CALF

Temperature

The normal temperature is 38.1 degrees Celsius, plus or minus 0.5 degrees. To take your calf's temperature, gently insert a thermometer into the calf's rectum and hold it there for two minutes. Remove the thermometer, clear and read it. If you are taking the temperature because of a health problem, take it at the same time each day, since the temperature may vary with the calf's activity.

Breathing Rate Or Respiration

A normal calf breathes 10 to 30 times per minute. You can find the breathing rate by watching the calf's chest and counting the number of times the calf breathes in and out in one minute.

Appetite And Digestion

The young calf should eat 10 to 12% of its body weight in milk per day. Small calves in very cold weather may need up to 25% more milk to

meet their energy requirements.

Your calves should have a good appetite during feeding. If your calf isn't eating or drinking like it usually does, there is something wrong with the calf or the feed. Your calf's manure is usually semi-soft. If it is watery, with a strong odour, this is a sign of sickness.

Just like us, calves have to be protected, more from sickness when they are young than when they are adults. Two of the most serious sicknesses for young calves are diarrhea or scours and pneumonia.

It is important to always have a fresh, clean supply of water available for your calves of all ages.

LEVEL TWO

ROLL CALL

When was your project calf born?

FEEDING THE NEWBORN CALF

Lots of good quality colostrum is necessary for the good health of your calf. Remember that the newborn calf should get colostrum as soon as possible after birth. It will eat from 10 to 12% of its body weight in milk per day.

In some cases, the cow may be unable to nurse the calf or the calf is unable to nurse. This may happen if:

- the cow is sick;
- it was a difficult calving;
- the cow is a poor mother; and/or if
- the calf is sick or unable to get up.

In these cases, you will need to feed the calf colostrum. Using a bottle and nipple, feed the calf 5 to 6% of its body weight in milk in one feeding. If the calf will not or is unable to suck, use an oesophageal tube feeder to give it the needed colostrum.

KEEPING THE NEWBORN CALF HEALTHY

Just like us, calves have to be protected more from sickness when they are young than when they are adults. This is especially true for newborn calves. Two of the most serious sicknesses for young calves are diarrhea (scours) and pneumonia.

DIARRHEA (SCOURS)

Diarrhea or calf scours is the second leading cause of calf deaths. Calf scours usually occur during the first month of life. It is more likely to occur in calves born to first-calf heifers than to those born to cows because the colostrum from heifers contains fewer antibodies.

Signs that your calf has diarrhea include:

- thin, watery, smelly manure or scours;
- calf's hindquarters are stained with manure;
- calf is inactive;
- the calf's body is losing water or becoming dehydrated;
- temperature is lower than normal;
- calf is becoming weak; and
- if very serious, death.

There are two types of scours. NUTRITIONAL scours is usually caused by overfeeding. Other causes include poor quality milk replacer or

dirty pails, coarse feed, rapid changes in feed and dirty or crowded pens.

DISEASE scours are usually caused by bacteria and death is more common. The calf is most susceptible to the bacteria when it is under stress.

The types of bacteria scours are:

SEPTICEMIA

- bacteria enters bloodstream causing infection;
- most often found in calves less than ten days old that didn't receive enough colostrum;
- chills, fever and weakness; and
- infected calves die suddenly.

ENTEROTOXEMIA

- bacteria produces poisons in intestine;
- calf's temperature drops;
- no diarrhea may be noticed; and
- infected calves often die.

ENTERITIS

- common in young calves;
- body rapidly loses water or dehydrates;
- temperature increases; and
- calf becomes weak.

SALMONELLOSIS

- least common;
- usually affects older calves; and
- symptoms are similar to enteritis.

Scours can be treated by:

- isolating sick calves and washing feed and water pails, boots and clothing to prevent spread of disease;
- feeding the water mixed with minerals and salts (a mixture of electrolytes);
- calling your veterinarian if it becomes very serious.

You can help to prevent scours by:

- providing good management;
- making sure your cows get proper nutrition year round;
- making sure the calf gets colostrum as soon as possible after birth;
- seeing that your calf does not receive too much milk;
- making sure that pails are always sanitized; and
- keeping your facilities clean and dry.

PNEUMONIA

Signs that your calf has pneumonia include:

- panting;
- coughing, runny nose and eyes;
- not eating;
- poor growth;
- depressed; and
- temperature is higher than normal.

Pneumonia can cause death in three to four days. Pneumonia may be caused by:

- a virus breathed out into the air by cows; and
- the calf not having developed antibodies to fight disease. Development of antibodies occurs at about three to four months of age. Before that, the calf is susceptible to the pneumonia virus.

Pneumonia can be treated by:

- antibiotics on the advice of your veterinarian;
- keeping the calf warm and dry; and
- offering the calf colostrum or milk.

You can help to prevent pneumonia by:

- keeping your entire herd healthy and free from disease.

LEVEL THREE

ROLL CALL

When was your project calf born?

Topic 1:

CREEP FEEDING CALVES

Creep feeding is providing supplemental feed to calves before weaning. The feed is provided in a facility designed so that the adult animals cannot have access to the feed.

The creep ration should contain 2.9 to 3.1 Mcal/kg digestible energy, 13 to 16% crude protein, 0.7% calcium, 0.5% phosphorus, trace mineral salt and vitamin A, D and E. Where selenium content of feed is low, selenium should be added. When forages contain 10% or more protein, a creep feed with 13% protein should be used. Where pasture quality is very poor, use a creep feed with 16% protein.

Examples of Creep Feeds Using Either a 32% Commercial Protein Supplement or Canola Meal

	Crude Protein Content			
	13%		16%	
oats	27.0	27.0	23.0	23.0
barley	63.0	61.6	53.0	53.2
32% supplement	10.0	-	24.0	-
canola meal	-	9.1	-	22.0
2:1 mineral	-	0.6	-	-
limestone	-	1.2	-	1.3
trace mineral salt	-	0.4	-	0.4
vit. ADE premix	-	0.1	-	0.1

Oats is the preferred grain for creep rations because of its bulk and high level of energy. By using combinations of two or more grains, you can increase the palatability of the ration. Palatability can also be improved by protecting the ration from the weather and keeping the supply fresh.

Creep feeders can be very simple structures or more complicated ones. Plans are available from your local agricultural extension offices. Make sure your creep feeder will keep the feed dry, holds at least a one week supply of feed, is portable and allows the calves in while keeping the adult animals out. The feeders should be located near a water supply, in or near a shaded area in the summer and near mineral and salt feeders and back rubbers.

ADVANTAGES OF CREEP FEEDING

- calf weaning weights can be increased an average of 18 kg (40 lb); varies according to pasture quality and quantity, milk production of dams, length of creep feeding period, and time of birth, weigh and sex of calf;
- can increase your pasture stocking rate;
- will conserve pasture;

- will accustom calves to grain feeding so they will wean easier;
- calves will grow to a more uniform size;
- there will be less shrinkage at weaning time; and
- most successful for fall-born calves because pasture is not available and weather is more severe.

DISADVANTAGES OF CREEP FEEDING

- creep fed calves may utilize less pasture;
- the intake of creep feed may vary among calves;
- extra gain usually lost in feedlot; the non-creep fed calves show compensatory gain;
- may put extra unwanted finish on the calves; cattle buyers discriminate against extra fleshing;
- pasture close to creep feeder is overgrazed if feeder not frequently moved;
- distorts production records;
- may lower finished cattle prices if calves finish at smaller weights; and
- extra costs of feed, labour and facilities.

Creep feed in these situations:

- during drought, or when pastures are poor;
- two-year-old heifers and low producing cows can be separated from the rest of the herd;
- when you need to conserve pasture;
- when calves are born in the fall; and
- as part of your preconditioning program.

There is no need to creep feed if your cows are milking well, there is lots of good quality pasture and grain prices are high relative to calf prices.

Topic 2:

FREEZING COLOSTRUM

It is very important that all beef cow-calf producers have a supply of colostrum available for those times when the calf is unable to nurse its mother. One way you can do this is by freezing colostrum and keeping it in your freezer for future use.

Collect colostrum milk from dams having extra milk or from a dairy cow. Colostrum milk must be heat treated before freezing. It is difficult to heat treat. If it is heated too much, it will turn out looking just like an omelette! This is because of the extra fat and other ingredients in the colostrum. You must take care to heat treat the colostrum properly.

Put the colostrum in a heat proof container and place it in water in the top of a double boiler. Heat this gradually until the temperature of the milk is raised to 58^{0} C.

Have a thermos ready. Just before the colostrum is warm enough, rinse out the thermos with very hot tap water. When the colostrum is up to the right temperature, pour it into the thermos and immediately put the cap on tightly. Wrap the thermos in a towel and keep it in a warm place for one hour. If you wish, wrap the thermos in a heating pad instead of in a towel. After one hour, open the thermos and check the temperature of the milk. If you have heat treated successfully, the temperature of the milk will still be 58^{0} C.

Pour the colostrum into ice cube trays and freeze. Pop the frozen cubes into a plastic bag and store them in the freezer until you need them. When needed, put the cubes in a heat proof container sitting in hot tap water. Let them warm until the temperature reaches 38^{0}C.

Remember that the calf should receive colostrum as soon as possible after birth. It should receive

10-12% of its body weight in milk per day, or 5-6% per feeding (if feeding twice daily).

Topic 3:

STUDY THE NEWBORN CALF

The best way to learn about the postpartum (after birth) behaviour of the newborn calf and its mother is to observe. If you have the opportunity to view a calving, take the time to observe a newborn calf and its mother. If it is not calving time on your farm, talk to a neighbouring dairy farmer about watching a calving and/or postpartum behaviour on the dairy farm.

Keep a detailed record of the actions of both the mother and the newborn calf during the first 30 minutes after birth. How can you explain the actions of each? How soon did the calf nurse? Did the mother nudge the calf towards her udder? For how long did the mother continue to lick her calf?

You may want to work in pairs, with one of you studying the mother and the other the calf.

BEEF CATTLE HANDLING AND FACILITIES

LEVEL ONE

ROLL CALL

What is one thing to remember when you are working with beef cattle?

WORKING WITH CATTLE

When we are startled or scared, our first reaction is to protect ourselves. It is the same for cattle. Charging and kicking are the ways cattle defend themselves. This can cause serious injury to the handler.

When you are working with cattle, be safety wise. Follow these important tips:

- Stay alert.
- Move slowly when working with animals.
- Talk softly so they know where you are.
- Don't make loud noises or sudden movements.
- Never wrap the lead shank of a halter around your hand.
- Wear protective boots - steel toes and soles offer the most protection.
- Don't use an electric prod or whip on cattle.
- Keep your yard and working areas clean and dry.
- Be very cautious when working with bulls or a mother and calf. Never turn your back or become cornered.

UNDERSTANDING CATTLE BEHAVIOUR

Understanding cattle behaviour will make it easier for you to work with your cattle.

Cattle are social animals.

They like to live and move in groups. Therefore, it is always easier to move and work with cattle when they can be with or near others.

Cattle like to follow the leader.

If you can get the first animal to move through a gate or chute, others will follow. That is why most chutes are designed to hold at least three animals in a row. Animals will move much more easily when they can follow each other.

Cattle will stop if they seem to be approaching a dead end or a sharp turn.

That is why most chutes are curved rather than straight. Then the cattle can always see part of the animal ahead of them. Don't frustrate them by forcing them into a chute before they can see where they are going.

Cattle move at their own speed.

Pushing them too fast only excites them and makes them more difficult to handle. Always use patience when working with them.

Remember this Mexican saying:

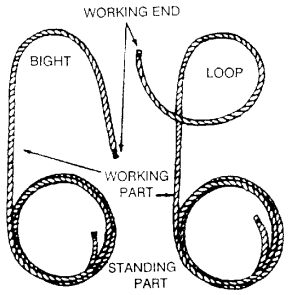
"Poco a poco se andan lejos."
"Little by little they travel far."

THE QUICK RELEASE KNOT

When tying your beef cattle, always use the quick release knot. It has this name because it can always be quickly released to free your animal.

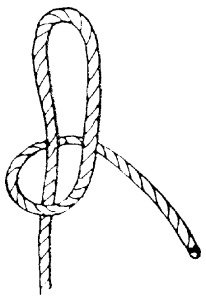
To make a quick release knot:

1. Hold the standing part (the end you are not using to make the knot) of the rope in your left hand and the working part (the end you are using to make the knot) in your right hand.

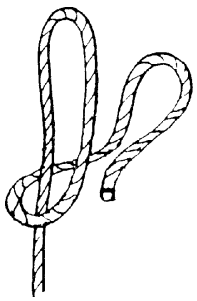


2. Leave 25 to 30 cm of the working part of the rope below your left hand. Form a bight (turn in the rope where it does not cross over itself).

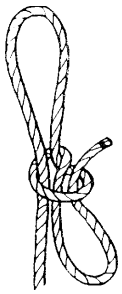
3. Wrap the working part of the rope over the top and around the back of your bight.



4. Make another bight in the working part of your rope and insert this into the loop (turn in the rope where it crosses over itself).



5. Grasp the standing part of the rope and pull to shape and secure the knot.

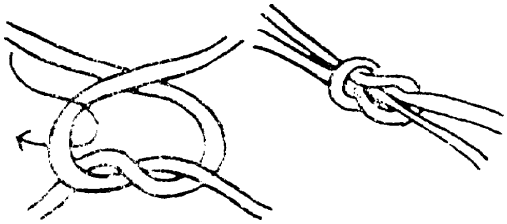


NOTE: Do not use the quick release knot around the neck or body of your animal. It should be used only to tie your animal to the fence post or corral.

MORE KNOTS

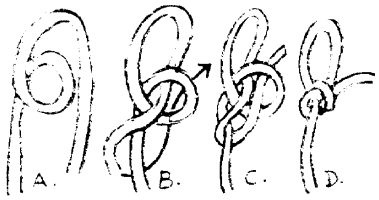
SQUARE

The square knot is used to join two pieces of rope together. It can be used to tie the ends of one rope together to form a loop.



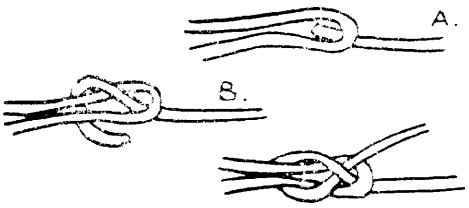
BOWLINE

The bowline knot is one of the most useful of all knots. It forms a loop which will not tighten.



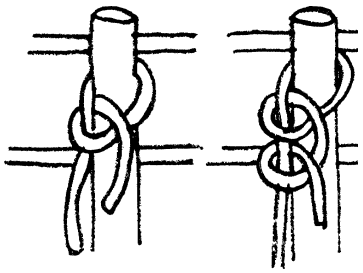
SHEET BEND

The sheet bend knot is used to join ropes which are different in thickness.



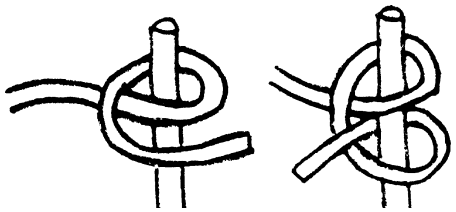
DOUBLE HALF HITCH

The double half hitch knot is quick to make, easy to tie and acts like a slip knot.



CLOVE HITCH

The clove hitch knot can be tied around a post or leg. It can be preformed and dropped around a post.



LEVEL TWO

ROLL CALL

What is one thing to remember when you are working with beef cattle?

FACILITIES FOR HANDLING BEEF CATTLE

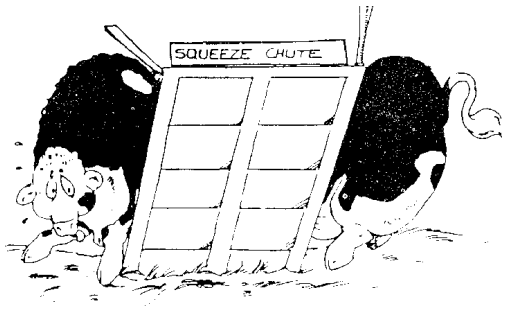
All beef farms need some type of cattle handling facilities. Good beef cattle handling facilities have these advantages:

1. They save the producer time and labour. The producer can handle more animals more easily and in less time with good facilities.

2. They increase the safety of the beef producer and the beef animal. Good facilities, with slip resistant flooring, will reduce the level of stress and help to prevent injury.

3. They give the producer the opportunity to use new technologies on their cattle - everything from tagging to implanting to embryo transfer.

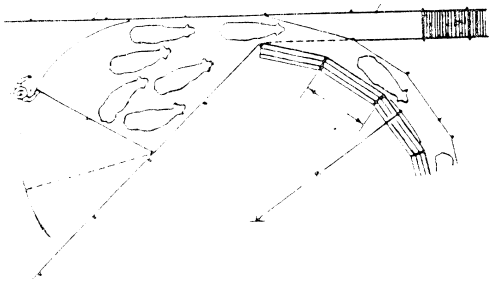
Good facilities for handling and housing beef cattle are simple, strong and durable.



There are three main parts of beef cattle handling facilities:

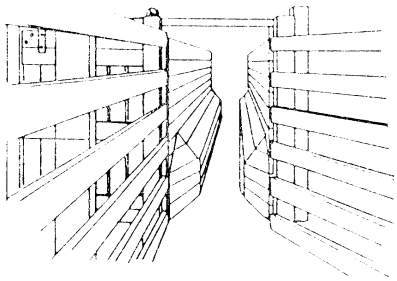
1. CROWDING PEN

The circular or angular crowding pen funnels cattle in single file into the working chute. The crowd gate is used to force the animals toward the chute. Cattle will be less distracted with solid sides and crowd gates.



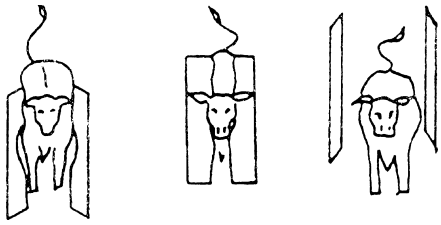
2. WORKING CHUTE

The working chute lines up and holds the cattle in single file ready to enter the headgate or squeeze. It should be long enough to line up and hold at least three animals, but narrow enough so they cannot turn around. Animals will move most easily through a curved chute.



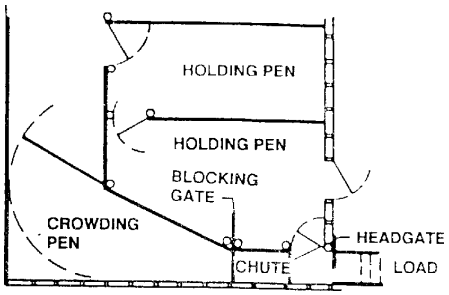
3. HEADGATE

The headgate is used to safely and securely restrain animals during treatment. It must be quick and easy to operate, and adjustable for different sizes of cattle. There are four types of headgates: self-catcher, scissor stanchion, positive and full-opening stanchion.

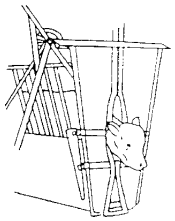


There are many optional parts of beef cattle handling facilities.

HOLDING PENS are used to hold cattle before they enter the working area. They allow for faster sorting of cattle and prevent mixing of worked groups with non worked groups.



The SQUEEZE holds the animal by its sides, giving you greater control. The animal struggles less and is under less stress. The squeeze is often fastened to the end of the chute and followed by the headgate.



CUTTING GATES are useful to allow an animal out of the group or to work with a downed

animal.

BLOCKING GATES can be used along the working chute to prevent an animal from moving forward or back. They can slide across the chute on a track or drop down with a rope and pulley similar to a guillotine.

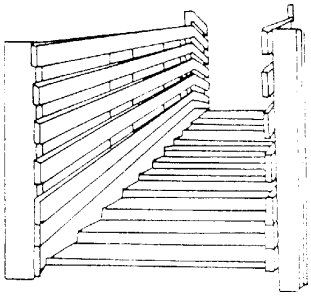
BACK STOPS work similarly to blocking gates except they only prevent animals from backing up.

KICK BARS prevent the animal from kicking the worker. The kick bar holes should be 30 to 35 cm above the floor of the squeeze and spaced 1.4, 1.5 and 1.7 metres back from the headgate.

SCALES, for weighing your animals, can be located in the main chute or close by where cattle can be easily diverted into them.

MAN GATES AND PASSES are safety and convenience features. A man gate behind the squeeze allows you to block off upcoming cattle, giving you room to work and allows you in behind the animal without having to crawl over the chute every time. Man passes should be 28 to 35 cm wide and placed in the crowd pen, along the chute or any place you could become trapped and need an escape route.

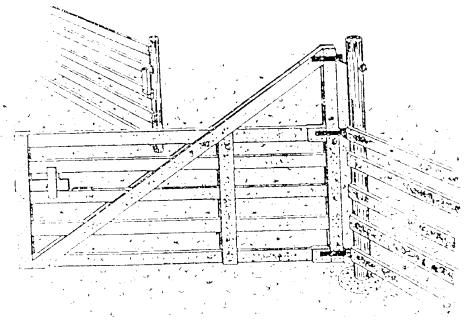
LOADING CHUTES AND RAMPS can be located coming off the working chute or out of the crowding or holding pens. Cattle don't like climbing, so a ramp should not be steeper than 30 degrees (20 degrees is ideal). It should have 5 cm cleats spaced 20 cm apart. Cattle will move much more easily up a stair step ramp with a 30 cm run and 10 cm rise for the steps. Loading is also much easier if the cattle are in single file and there is a flat platform at the top of the ramp for them to step on or off the truck from. The chute should have solid sides, be wide enough to accommodate the largest animals in your herd and should not face into the sun.



CATTLE GUARDS or TEXAS GATES are useful in cattle yards into which you must drive. These gates have pipes or bars laid horizontally over a shallow pit. Vehicles and people can pass over them, but the cattle cannot because their feet will slip between the bars.

A MUST FOR ALL BEEF CATTLE FACILITIES:

1. STRONG FENCES AND GATES are necessary on all beef farms. Posts should be treated so they remain strong and do not decay. They should be placed no more than 2.5 metres apart.



2. NON-SLIP CONCRETE FLOORS help to reduce animal injury and increase traction. They are most important around waterers, feeders and other areas which often become wet. Concrete floors can be grooved to give animals traction. Grooves are most effective when they are diagonal to the direction

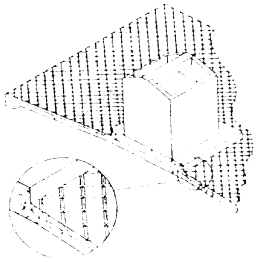
of animal traffic. If the grooves are perpendicular, the floor will be harder to scrape. Diamond shaped grooves work well in wet areas.

Beef cattle handling facilities should be located:

- in a well-drained area;
- close to the feedlot, pasture or barnyard containing the cattle;
- close to good roads with turning room for vehicles; and
- in keeping with plans for future expansion.

The facilities you need depend on:

- design of current and future facilities;
- size, weight and number of cattle;
- the type of work; and
- the labour you have available.



Diamond groove pattern concrete.

LEVEL THREE

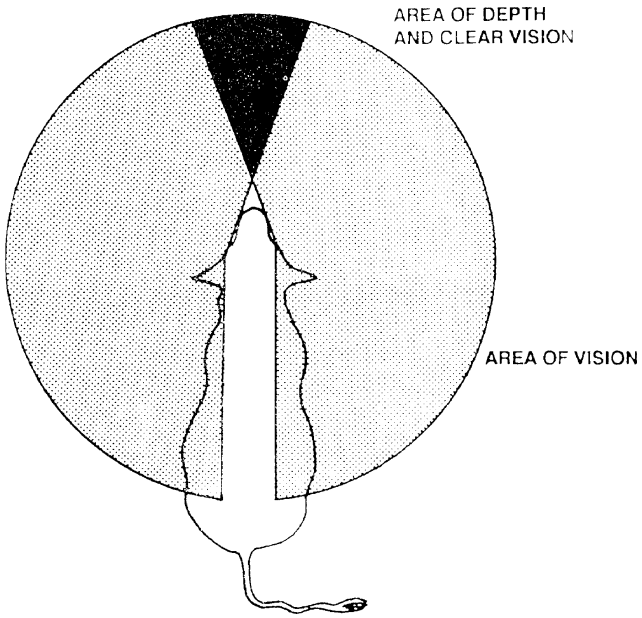
ROLL CALL

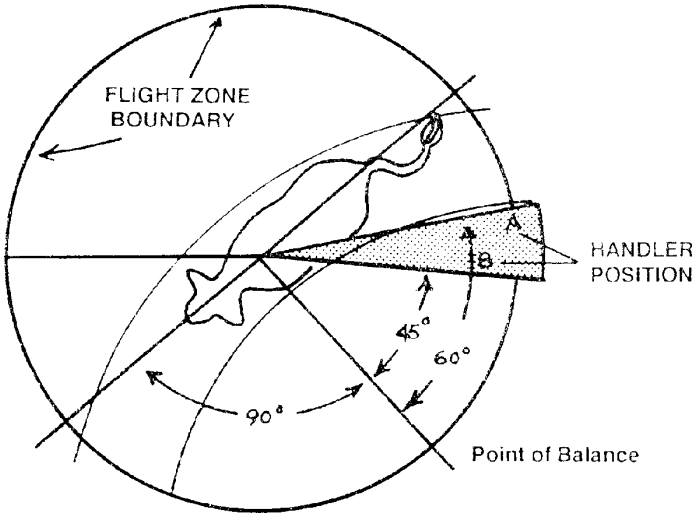
What is one thing to remember when you are working with beef cattle?

Topic 1:

UNDERSTANDING CATTLE BEHAVIOUR

Cattle see very differently than humans. Because their eyes are on the sides of their head, they have a greater area of vision than us.





However, they can see clearly and with good depth perception in only a small area directly in front of them. The only area where they cannot see is directly behind them. Don't try to handle cattle from directly behind. Because they cannot see you, they will be easily frightened by a noise or touch from behind.

Cattle move forward or back depending on the position of the handler. If you are in front of the point of balance (around the animal's shoulder) the animal will back away. If you are behind this point, the animal will move forward. The flight zone boundary is the point where the animal will move away from you as you advance.

Cattle move naturally in a circular manner. This way, they can keep an eye on whatever they are moving away from.

Understanding how and why cattle behave the way they do will help you to better work with them. Some cattle are very difficult to work with. The flight zone is different for all animals, but is always present. If you want the animal to move, enter its flight zone where it can see you. It will move away from you in a circular manner.

Topic 2:

ROPE HALTERS

Halters are the most commonly used method of controlling cattle. They are also one of the most humane and easiest to use methods. An adjustable rope halter is easy and inexpensive to make.

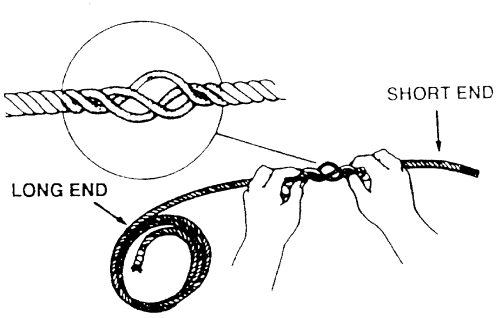
Rope is made by twisting three strands of material (nylon, manila or cotton) together. To prevent a rope from fraying, finish one end: burn or melt it, or dip it in enamel or varnish. Temporarily finish the other end with tape.

MAKING AN ADJUSTABLE ROPE HALTER:

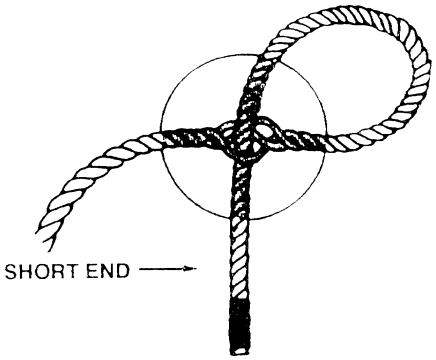
1. Using a 4.5 m length of 1.3 cm three-strand rope, mark a point about 30 cm from the finished end of the rope. This end of the rope is the SHORT end. The other end of

the rope is the LONG end.

2. Separating your hands by about 5 cm, grasp the rope with both hands at the 30 cm point. Turn the rope clockwise with one hand and counter- clockwise with the other hand. This will separate the strands of rope.



3. Take the finished end of the rope (short end) and insert it between the strands. This forms a loop called the EYE LOOP.

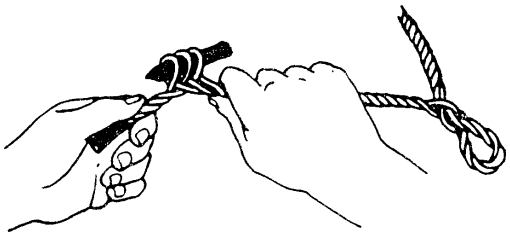


4. Hold the rope with the eye loop and the single strand of rope in your left hand. Hold with the short end of the rope pointing towards three o'clock and the long end towards six o'clock. With your right hand, grasp the short end of the rope near the eye loop.

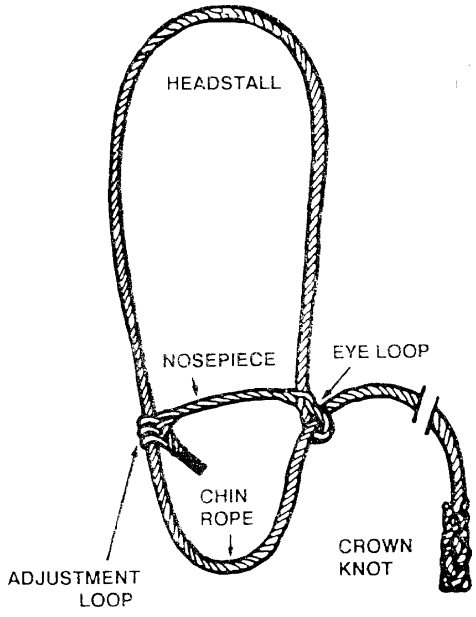
5. Pull the long end of the rope under and completely through the two strands. You will be able to see the three strands of the rope lying smoothly against one side of the loop. This is the part of the rope which will lie against the animal's face.

6. About 10 cm from the finished end, grasp the rope with both hands, separating your hands about 3 cm. Turn one hand clockwise and the other counterclockwise to separate the three strands. When the strands are open, push your hands together, making the strands buckle over and form three loops.

Insert a sharp stick or pencil through these three loops. Insert the long end of the rope through the strands, pushing out the stick or pencil as you go.



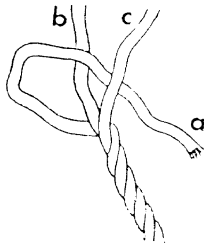
7. Insert the long end of the rope through the eye loop to complete your halter.



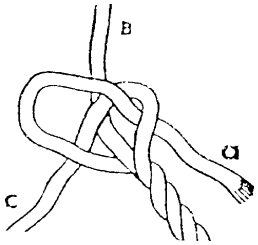
8. Make a crown note on the long end of the rope to finish.

a. Form a crown knot in end D by unravelling 15 to 20 cm. Bring strand A

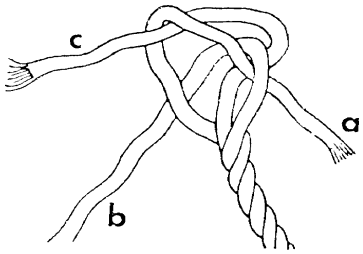
in front of strand B and behind strand C.



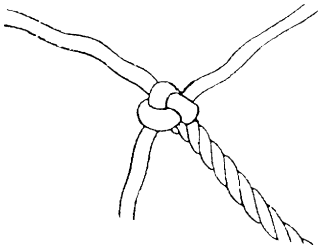
b. Bring strand C between the loop formed by strand A and strand B. Study the diagram below.



c. Now put strand B through the loop formed by strand A. Study the following diagram to see how each loop is formed.



d. Now pull all strands tight to form the crown knot and interlace loose strands back into strands of your rope.



Topic 3:

SIZE OF FACILITIES

The chart below gives you some guidelines to use when designing your own cattle handling facilities.

Animal Weight	**Under 270 kg**	**270-540 kg**	**Over 540 kg**
Holding area (sq m/head)			
• worked immediately	1.3	1.6	1.9
• held overnight	4.2	4.6	5.6
Working Chute - Vertical Sides(m)			
• width	0.45	0.55	0.70
• length	7.2	7.2	7.2
Working Chute - Sloping Sides(m)			
• width at bottom		0.55	
• width at 1.5 m height			0.80
• length			7.2
Loading Chute(m)			
• width	0.65	0.80	0.80
• length			3.6
Ramp Height (m)			
• Gooseneck trailer	0.38		
• Pickup truck	0.70		
• Van type truck	1.00		
• Tractor trailer	1.20		
• Double deck	2.50		

BEEF AND THE ENVIRONMENT

ALL LEVELS

ROLL CALL

What is sustainable development? What is sustainable agriculture? Give an example of a sustainable agriculture technique which relates to working with beef cattle.

The purpose of this section is to introduce you to the issues that affect the beef industry today, and will affect its future. This section will provide a brief overview of the following:

- Sustainable Development;
- Sustainable Agriculture;
- Beef and the Environment; and
- Other Resources.

Sustainable Development

One of the problems facing society today is the difficulty of ensuring available natural resources for future generations in the face of our ever-increasing population base. Development and industrialization, and the huge changes, including population growth, that accompany them, continue to negatively affect our natural environment. In some cases, this has led to the complete depletion of natural resources on which we all depend. The concept of sustainable development - first noted in 1987 by the World Commission on the Environment and Development (the Brundtland Commission) emerged in response to this situation.

Sustainable development means developing our natural resources without over-using them, or damaging. Humans cannot survive without these natural resources, and if we do not develop, use and manage them in a sustainable way, we compromise and threaten the survival of future generations.

One aspect of sustainable development is the importance of humans as stewards of the land. Humans who develop and use natural resources, and understand the cycles and relationships of these resources, are most able to effectively manage and conserve them. Many agriculture producers are already stewards. They have a unique relationship with nature - their livelihood depends on sustaining natural resources. Conserving and properly managing resources is already a way of life for them. They use resources wisely, and waste as little as possible.

For others, adopting the idea of sustainable development will require changes in the way they do things, including decision-making. Before starting new projects, people will need to gather more information, identify issues, set goals and priorities, and examine development options. These steps will involve more people in the decision-making process, and planning will be more comprehensive. Such planning will lead to a more responsible form of economic development.

Sustainable Agriculture

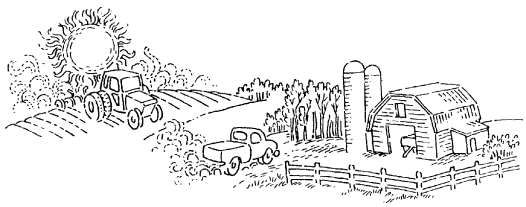
People in many industries, including agriculture, are thinking about how they will shift towards sustainable development. Sustainable agriculture can be defined as a way to meet food needs now and in the future, by taking into account economic, social, and environmental factors which affect food production. This will require more agriculture producers becoming good stewards of the land, and making appropriate production decisions.

Conserving and managing the environment is one important issue here. Agriculture impacts greatly on soil, land, and water resources. Individual producers can play an important role by using farming methods which conserve and sustain agriculture resources.

The sale of farm land for urban and industrial use is another issue directly affecting society. We need to produce food, but we also need space for the continued growth of our communities and industries. Better and more comprehensive land use planning is one solution to this concern.

To resolve agricultural issues, more information on sustainable agriculture techniques needs to be gathered and studied. Individuals and groups can then set goals and assess the choices available to them. The long term health of the land and our ability to produce food depend on comprehensive environmental and economic planning. The future success of farms as businesses, and the conservation of the environment must both be considered. The responsibility to resolve these issues is shared by all Canadians.

(Above adapted from "The Living Soil: Land Use and Society", Weigel Educational Publishers Limited, Regina, Saskatchewan, 1991)



Beef and the Environment

Beef production is the dominant agricultural activity in the central interior regions of the British Columbia. The beef industry's contribution to the provincial economy as represented by farm cash receipts is over $160 million annually. However, the industry has largely developed along surface water sources. Feeding facilities in close proximity to surface water sources are therefore a potential environmental concern. Contamination of the water sources could seriously harm the sustainability of this industry. So, too, could competing water and land users. Security of the water supply for livestock watering and irrigation is a major concern to agriculture producers. Without available water and land, a viable beef industry cannot be maintained. Beef producers must therefore work with the government, and other interest groups, to maintain the quality and availability of these resources.

Environmental Guidelines for Beef Producers:

The beef industry uses the land and water resources of the province in many different ways. However, the need for the beef producer to be sensitive to the environment makes operating in an environmentally sustainable manner a real challenge.

The purpose of this section is to describe options that are environmentally sound and comply with provincial environmental regulations. The guidelines describe generally acceptable farming and ranching practices that apply to all beef cattle operations in B.C. However, due to local differences, not all portions of the guidelines need apply to every producer.

These guidelines, along with the expertise of people in the beef cattle industry, should be used

to evaluate current beef cattle management practices. Producers, after evaluating their operation, may find they need to adopt changes to protect the environment.

Guidelines have been written with a strong awareness of the need to be sensitive about the environment. They are intended to ensure that not only a sustainable environment for agricultural production continues, but also a safe environment for others is achieved.

PASTURE:

Pasture is defined as a grazing area. Beef cattle may have access to the watercourse; however, developed accesses are encourage. Manure is applied to the ground and crop as cattle move about and no further spreading is required.

CALVING AREA:

A calving area is considered a seasonal feeding area. Access to the watercourse is allowed; however, stock waters are encourage. Feeding locations must be located at least 30 m from the creek and distributed around the area. Uphill clean water should be diverted around the area to enter the creek "clean." Berms may be required to stop contaminated runoff from entering the creek.

FEED STORAGE:

A bunker silo or feed storage can be a source of contaminates. Silage juice must not be allowed to enter surface or ground water.

CORRAL:

A corral is a confined livestock area. No access to the creek for water is allowed. Plan for manual removal and storage.

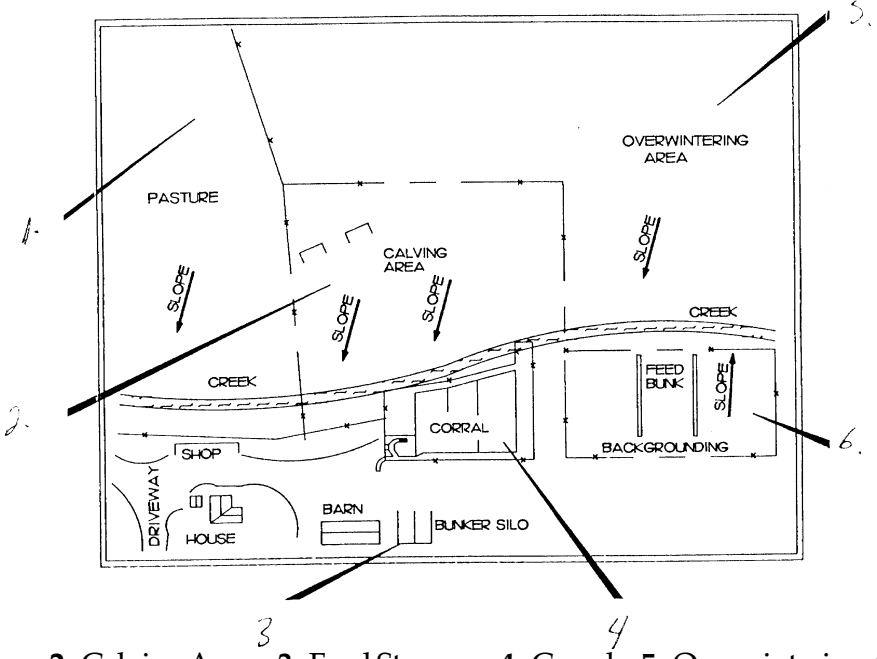
OVERWINTERING AREA:

An overwintering area is defined as a seasonal feeding area. Feeding areas must be at least 30 m from the creek. Feeding areas must be moved around the site to spread the manure. Access to the creek is allowed. Use of controlled access is preferred. Divert clean uphill water around the site. Use berms as required to keep dirty water from entering the creek. Use sufficient land area so the manure can be used as fertilizer.

FEEDLOT:

The backgrounding feedlot is a confined livestock area. Locate the feedlot at least 30 m from the creek. Divert clean water around the site. Collect manure accumulations for use as fertilizer. There can be no direct creek access for water. Provide stock waters. Apply manure to crop land as an organic fertilizer.

This fictional site plan contains environmental concerns that may not be common to all beef cattle operations. The example may be used with the guidelines to evaluate a farm or ranch.



1. Pasture **2.** Calving Area **3.** Feed Storage **4.** Corral **5.** Overwintering Area **6.** Feedlot

KNOW THE FACTS

Protecting and ensuring a sustainable environment should not be a minor consideration for cattle producers. It should be a way of life. Good resource management makes sense to cattle producers, who already serve as good stewards of the land. Farm and ranch families respect and appreciate the land, knowing that preserving it for future generations depends on today's care.

Cattle production has an important role in soil conservation. Producers are committed to sustainable production practices that maintain and improve the land.

Beef today is leaner, and lower in fat and cholesterol than 20 years ago. Beef provides all the essential amino acids needed by the human body - it is a complete protein.

Research shows that cattle are not significant contributors to global methane emissions. In fact, methane emitted by cattle doesn't contain new carbon but is just a recycling of existing carbon through the plants cattle eat.

Cattle producers in the province are committed to a wholesome and safe food supply.

Cattle producers make efficient use of land and feed resources to produce a safe and wholesome food.

Cattle producers take pride in their contribution towards maintaining and enhancing the rich variety of natural landscapes in the province.

Cattle care and management practices are among the most advanced and humane in the world.

OTHER RESOURCES

There are many resources and references available to you which relate to the sustainability of agriculture and the beef industry, and other environmental concerns. A partial list is provided at the end of this manual to assist you in obtaining additional information so that you may pursue relevant and specific areas of interest.

RANGE AND PASTURE MANAGEMENT

LEVEL ONE

ROLL CALL

What is one thing you might find on the land where you graze your cattle?

RANGE OR PASTURE?

Most beef farms have both range and pasture land. But, they are not the same.

PASTURE is...
land which grows plants put there by man. Pasture land is usually more productive than range land.

RANGE is...
land that is not suited for growing crops because it is too dry, rocky or rolling. Range land grows native plants; those which naturally grow in that area.

RANGE AND PASTURE MANAGEMENT

What is "managing your range or pasture"?

It is your plan for the care and use of your range and pasture land. This plan allows you to get the most product (meat, live animal, wool) per acre of land while keeping the land in reusable condition. You want to make sure you do not harm the plants, soil and water of the land.

Without such a plan, your range and pasture would not stay in good condition and you would be unable to get the same return from it in the future.

Range and pasture management is much more than turning your cattle out to graze. It is important.

1. By caring for the land, you make the best plants grow at the fastest rate. These plants are harvested by the animal, turning the plant into products which provide an income for the farm.

2. With good management, you will always have a reserve of feed. If the cattle are not controlled, they will graze and overgraze the land, eventually killing many of the popular plants. Those plants which are not liked by the animals and are usually the least valuable, will grow and take over the pasture, reducing its quality.

3. With good management, you can keep a good plant cover. The grasses and plants will have strong root systems. This plant cover will help to protect the soil from erosion.

GOOD RANGE AND PASTURE MANAGEMENT

To give your range and pasture land good management, follow these rules:

1. **Use the right season for grazing.**

   Some plants (native western wheatgrass and russian rye grass) are cool season grasses. They begin to grow early in the spring. Warm season plants (blue grama grass) do not begin to grow until the weather becomes warmer.

   In the spring, allow the plants to grow to a height of 15 cm before you put your cattle out to graze. If there are lots of legumes, such as alfalfa and clover, allow them to grow to a height of 25 cm.

2. **Use the right number of animals.**

   Do not let too many animals graze any area. Change the number of animals grazing your land so that half of the annual grass is left at the end of the grazing season.

   Remember that the green leaves make the food for the roots to grow. "It takes grass to make grass."

3. **Use the right amount of time for grazing.**

   Good grazing must include a rest period for the plants. Once the plants and grasses are down to 8 cm in height, move the cattle to another area for about four weeks.

4. **Know the range and pasture plants.**

   It is important to be able to recognize plants which are poisonous and can harm your livestock. You will need to get rid of them or fence them out. Three plants which can poison your cattle are:

larkspur

water hemlock

arrowgrass

RANGE AND PASTURE PLANTS

Many different types of plants grow on our land. These plants differ in their appearance and growth habits. There are four main plant groups:

1. GRASSES are the most important range plant group. They supply most of the feed for our cattle. They have hollow, jointed stems and the leaves are in two rows on the

stem. Veins on the leaves are parallel. Examples are rough fescue, quackgrass, smooth brome grass, orchard grass, and cheatgrass brome.

Western Wheatgrass

2. GRASSLIKE plants look like grass but they do not have a hollow stem and the stem is not jointed. Veins in the leaves are usually net like. They include SEDGES (triangular stems) and RUSHES (round stems)

Threadlike Sedge

Wire Rush

3. FORBS are non grassy plants with annual stems or tops. They include range weeds and flowers. Examples are gumweed, skelton, tapertip hawksbeard, bull thistle and tumbling mustard.

Western Yarrow

4. SHRUBS are woody plants with stems and buds which winter above the ground and stems which branch near the base of the plant. Examples are sagebrush, wolf willow, rabbitbrush and bitterbrush.

Big sagebrush

LEVEL TWO

ROLL CALL

What is one thing you might find on the land where you graze your cattle?

THE STOCKING RATE

One part of good range and pasture management is having the right stocking rate on the land. The STOCKING RATE is the number of animals which should graze on the land to make it most productive. If the stocking rate is too high, the animals will overgraze the plants and the land quality will be reduced. If it is too low, you are not making the best possible use of your resources.

Let's look at how we can determine the stocking rate for your range or pasture.

1. Measure the forage production on the land where you want to put your cattle.

a. Mark off a circle with a 56 cm radius using a 56 cm piece of string with a large nail on each end.

b. Inside this circle, clip all the forage at ground level.

c. Let the forage sample dry. Weigh it in grams.

d. Determine the amount of forage in kilograms per hectare (2.47 acres) by multiplying the weight in grams by 10.

Ex. If the forage you collected weighed 85 grams, there would be 85 x 10 = 850 kilograms of forage on one hectare of this land.

The number of acres needed to provide forage for one animal or an ANIMAL UNIT (AU). One animal unit is considered to be a mature cow. A bull, because of his larger size, is considered to be 1.3 AU. A weaned calf is considered to be only 0.5 AU.

2. Determine the AUM or ANIMAL UNIT MONTH or how much forage each animal unit will graze in one month.

A mature cow needs about 12 kg of forage each day. Multiply 12 kg by the number of days in the month, say 30.

12 x 30 = 360

Add in a factor of 25% to allow for trampling and waste.

360 x 25% =90
90 + 360 = 450

Therefore, we need 450 kilograms of forage per AUM or per animal per month.

Ex. In our example above, the pasture produced 850 kg of forage. Remember that it is good management to adjust the stocking rate so that half of the annual grass is left after grazing.

850 x 0.5 = 425

Therefore, there are 425 kilograms of forage available to be used by the cattle.

3. Determine how many days it would take one AU needing 12 kg of forage per day to graze one hectare. Remember to include an extra 25 percent to allow for trampling and wastage.

Ex. In our example, 425 kg of forage is available.

425 : (12 x 1.25) = 28 days

Therefore, it would take one AU about 28 days to graze 1 hectare of our land.

4. Determine the stocking rate for your area of land.

Ex. Suppose we have 20 hectares of land. We would be able to put 20 AU or beef cows out to graze this land for 28 days or 4 weeks. If we had 40 cows to pasture, we would have to move them to another area after 2 weeks.

The amount of forage produced and available to your cattle varies each year. It depends on the soil, topography, climate and condition of pasture. Because it can vary in land close by, it is important to determine the stocking rate for each pasture of your operation.

FACTORS AFFECTING HOW THE LAND IS GRAZED

Many factors affect how the animals will graze the land. Some of the most important factors are:

1. TYPE OF VEGETATION. Cattle naturally graze first the plants they like best. They

change their grazing preferences as nutritional value and palatability of plants change.

2. LOCATION OF WATER. The distance from the water supply to the grazing area will affect where the cattle will graze. They will overgraze the land closer to the water supply.

3. SIZE AND SHAPE OF THE PASTURE. A long, narrow pasture running north and south would be grazed in the most travelled area, and less grazed farthest from the entrance to the pasture.

4. CLIMATIC CONDITIONS. The direction of the prevailing winds will affect where the cattle graze. Land with little protection from the weather will be less grazed.

5. NUMBER OF ANIMALS. As we have already learned, the number of animals will affect how the pasture is grazed.

FORAGE VALUES

Range managers need to know whether their cattle like the plants growing on their land. They also need to know the nutritional value these plants can supply.

We classify plants according to their value to the cattle or their GRAZING VALUE. They can be GOOD, FAIR or POOR. The grazing value depends on:

- palatability (how well the cattle like them);
- nutrient content;
- volume of the forage; and
- whether or not the plants are dangerous.

Keep in mind that the value of any plant differs for each type of grazing animal (i.e.. cattle, horse, sheep, etc.).

A good range manager determines if a range site has been properly grazed. The following table describes the degrees of land use.

RANGE USE GUIDE

DEGREE OF USE	DESCRIPTION
1. Unused	- no evidence of any use by livestock.
2. Light	- only the most palatable plants are used and they are only slightly grazed.
3. Moderate	- about half of this season's growth of good and fair forages are grazed.
4. Heavy	- land has a clipped or mowed appearance; and more than half of the good and fair forages are eaten.
5. Destructive	- range appears to be stripped of vegetation; tramping is obvious; and even the poor forages have been grazed.

LEVEL THREE

ROLL CALL

What is one thing you might find on the land where you graze your cattle?

Topic 1:

GRAZING SYSTEMS

Grazing management involves creating a balance between the number of animals, their distribution over the range or pasture and the availability of forage.

The amount of forage produced and available to the livestock varies from year to year and among different land areas. Therefore, the timing, location and duration of grazing is an important part of your management program.

Livestock producers use a plan or schedule to determine where and when livestock graze. This plan is called a GRAZING SYSTEM. The purpose of a grazing system is to maintain or improve the condition of the range or pasture while at the same time, achieving a high level of livestock production.

There are many advantages for planning a grazing system:

1. Each pasture has an opportunity to set seed, replenish its food reserves and improve its condition.

2. Grazing is more uniform because the cattle are better distributed when on concentrated pastures.

3. Reserve grass is always available in case of drought.

4. Breeding efficiency and calving percentage usually improve when cattle are closely confined.

5. Improved range condition and more grass lead to increased weaning weights.

6. Cattle are easier to manage.

There are many different grazing systems which can be used. The two most popular are the continuous and the rotational grazing systems.

CONTINUOUS GRAZING SYSTEM

In the continuous grazing system, livestock are allowed to graze the land throughout the growing season. They are turned out in early May and removed in late October. The cattle graze and regraze favourite plants and areas of the range or pasture. This causes the best plants to be killed and an overall lower forage yield on the land. The area of pasture deterioration increases each year.

The continuous grazing system is designed for the livestock producer's convenience. It has these advantages:

- minimum handling and moving of cattle required
- cattle are allowed to select their forage early in the season when plants are most nutritious.

The continuous grazing system is not designed to meet the needs of the plants or the animals.

ROTATIONAL GRAZING SYSTEM

In the rotational grazing system, the range is separated into fields and the animals are moved or rotated among the fields.
Cattle are rotated so that all areas of the range receive at least one rest period during the year.

Rotational grazing systems allow the increased production of forages. The land is rested to allow forages to store food in their roots and/or make their seeds. Better forage utilization is achieved and the pasture supports more animals during a shorter grazing season.

Many livestock producers hesitate to use the rotational grazing system because:

- more labour is required to move cattle;
- there may be no water supply in some areas; and
- it can be costly to fence.

DEFERRED GRAZING SYSTEM

Deferred grazing is delayed grazing. The cattle are not allowed to graze until after the seeds have matured. The longer the beginning of grazing on a pasture can be delayed, the better the opportunity for new plants to become established. Producers often use a deferred system in combination with a rotational grazing system.

There is no formula to tell you which grazing system will work best for you, your cattle and your land. Each area must be looked at individually. Consider all of these:

- soil type;
- vegetation types;
- types and numbers of livestock; and
- needs and capabilities of the land.

Topic 2:

RANGE CONDITION

RANGE CONDITION is the present state of a range or pasture. It is determined by the:

- type of plants which grow there;
- numbers of plants; and
- strength and health of plants (size, stems, flowers, amounts of seeds produced).

Plants growing on grazing land can be grouped according to their response to grazing. The plant groups are:

DECREASERS

- plants which decrease in number if the land is overgrazed;
- most desirable plants; and
- usually the high quality plants.

INCREASERS

- plants which increase in number when the land is overgrazed; and
- usually the shorter, less productive plants.

INVADERS

- weeds which invade the land as it deteriorates or as the decreasers are destroyed by overgrazing.

By practising good grazing management, you will be able to:

- increase or maintain the number of decreasers;
- decrease or keep the number of increasers from going up; and
- as much as possible, eliminate the invaders.

Range condition may also be referred to as range health. It can be measured by how much the vegetation has changed from the original land cover (climax vegetation). The greater the proportion of forage provided by the original or climax vegetation, the better the range condition.

Range condition can be determined by the

percentage of forage yield coming from the climax vegetation and is classified as follows:

Excellent	75 - 100%
Good	50 - 75%
Fair	25 - 50%
Poor	0 - 25%

Topic 3:

POISONOUS PLANTS

Many different plants can be poisonous to your cattle. They can be found in most grazing areas.

Poisonous plants contain toxic or harmful substances that can cause abortion, birth defects, illness, sensitivity to light and/or death. Because each poisonous plant contains a different and specific poison, animals can be affected differently and symptoms of poisoning will vary. The symptoms vary depending on the poison and the amount eaten.

When poisoning by plants is suspected, you should have the animal(s) examined by a veterinarian for confirmation.

You can avoid losses caused by poisonous plants by:

- being able to recognize these plants;
- knowing the conditions or circumstances under which the plants can be most dangerous;
- not turning your cattle out too early on inadequate forage where poisonous plants are the only green feed;
- keeping your land in good condition;
- not allowing your cattle to become too hungry;
- providing adequate mineral and salt (cattle lacking salt may be attracted to the poisonous plant arrowgrass);
- eliminating the poisonous plants;
- fencing out the poisonous plants; and
- not moving cattle over land which contains poisonous plants.

RECORD KEEPING

LEVEL ONE

ROLL CALL

What is one record you keep on your (or a neighbour's) farm?

WHY KEEP RECORDS?

Records you keep on your farm might be for production, financial, or personal reasons. Some of these records might be:

- birth weights;
- vaccinations;
- weaning weights;
- date of birth;
- show winnings;
- date and age castrated; and
- health problems.

Good records help you to know many things about your farm and its animals including:

- good and poor mothers;
- identification of your animals;
- healthy cow families;
- income and expenses; and
- overall herd health.

Today, the agriculture industry is becoming very complex. There are many choices we producers have:

- Which breed do I choose?
- Which bull do I buy or use?
- Do I choose purebred or crossbred?
- Do I choose cow-calf, finishing? Custom feeding?
- Do I cull or keep, expand or cut back?

By keeping accurate records, you will have the information you need to make informed decisions about your operation and its future.

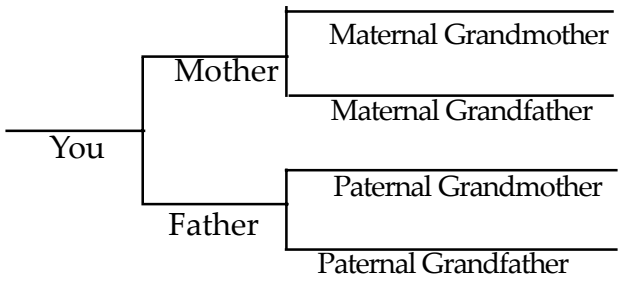
In 4-H, we require that you keep detailed records on your project animal(s). By doing this, we hope that you will realize how important records are.

PEDIGREES

All animals and people have a history. They have mothers, fathers, daughters, sisters, etc. These things are often written down, making a pedigree.

A PEDIGREE is a written ancestry or history.

Let's look at you - you have a pedigree too.



You can add to these pedigrees to make them into family trees. Family trees include brothers and sisters, aunts and uncles, and often go back for many generations.

People keep family histories for many reasons:

- interest;
- history;

- to know about your ancestors; and/or
- to help future generations know about you.

Talk to your parents and/or your grandparents. Find out if there are any family histories of your family.

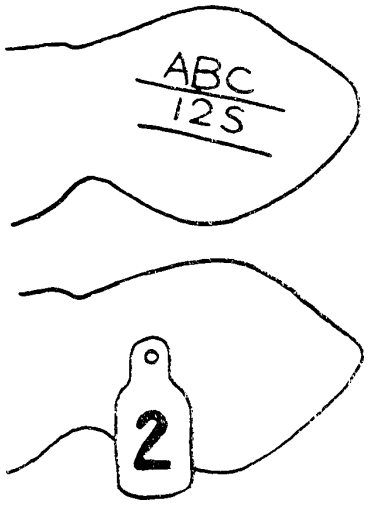
Note: Maternal means on the mother's side. Paternal means on the father's side.

PRODUCTION RECORDS

Production records are one of the most important you should keep in your beef operation.

IDENTIFICATION OF YOUR ANIMALS is the first step to good record keeping.

Identification of your cattle by tattooing, ear tagging and/or branding means you can always identify each of your animals.



Cattle are produced under conditions (housing, feed, labour) which often vary from farm to farm. Therefore, it is important that you be able to identify animals suitable for your operation. REGISTRATION is the official recording of purebred animals. Purebred animals have only one breed in their pedigree. You must officially identify each animal you want to register with a tattoo.

The Canadian Livestock Records Corporation in Ottawa looks after registration of some breeds of cattle, such as Angus, Shorthorn and Salers, in Canada. Other breeds, such as Charolais, Simmental and Hereford, are registered through their own breed associations. It is important that you find out where you register your own breed of cattle.

Registration forms must be filled out and sent to the registration office of your breed. On the registration form, you must put this information:

- your name;
- name you want to give the calf;
- sex and date of birth of calf;
- tattoo numbers, colour and other identification;
- registered names and numbers of sire and dam;
- breeder (person(s) who owned the dam when she was bred); and
- owner (person(s) who owned the dam when she calved).

Once the information is checked, you will be sent a registration certificate for each animal registered. If you sell a registered animal, this certificate must have the name of the owner changed. There is a fee for registering and transferring ownership of the animal.

PERFORMANCE TESTING involves keeping records on the traits that affect the profits on your farm. This means that you can then compare the animals to other animals of the same age and conditions in the herd.

Some of the performance traits you can record are:

- calving percentage (percentage of your cattle

who produce a live calf);
- calving interval (length of the time between birth of the calf and birth of its next calf);
- length of gestation (time from successful breeding to calving);
- cow defects or abnormalities;
- calving ease;
- calf condition at birth;
- birth weight;
- growth traits up to 18 months of age; and
- any other information you feel is important.

There are many different performance testing programs available across the country. You can use one of these designed for your local area, or design one which fits your own needs.

FINANCIAL RECORDS are an important part of any farm operation. They should include the costs of everything from computer and office expenses to feed, farm equipment, land rental and livestock purchases. Good farm records will make it easier for you to complete income tax returns. They can also help you make your decisions about future changes and/or improvements to the farm.
Now that you know a little about keeping records on the farm, list some things which might be recorded on a farm. List as many as you can.

LEVEL TWO

ROLL CALL

What is one record you keep on your (or a neighbour's) farm?

WHERE AND HOW DO YOU KEEP FARM RECORDS?

It is important to keep your farm records in a way which works for you and your operation. On a small operation, records can be accurately and completely kept by hand. Larger operations often find computer programs more useful. With computers, you must have someone with interest and knowledge in computers and the program to run it.

No matter how you keep your records, it is important for you to decide:

WHERE
you will keep your books and important farm information. It is important to keep your information organized and all together in a place where you can easily access it (office, desk, filing cabinet).

WHEN
you will update your records. One farmer routinely records all of his information in his computer every Sunday afternoon. During the week, he jots notes in a small book he carries in his pocket.

WHO
will record the information. If more than one person is recording, it is important that both or all of you do it the same way.

HOW
you will use your records. Will you use them to make farm decisions or just for income tax purposes?

WHAT
information you want to be able to get from your records. You can use your information and prices to find out profit per animal, how much you can afford to spend per calf purchased next season, or almost anything else you want to

know. Decide in advance how you want to use the information and store it in a form which you can use.

WHY
your records are valuable to you. A farm is a business and good farm records are one of your most valuable assets.

Tell me about your (or a neighbour's) farm. Answer the questions: where? when? who? how? what? and why?

PERFORMANCE RECORDS ON BEEF CATTLE

Performance records on an animal are most valuable when you use them to compare animals - animals which are the same age, have had performance measured at the same location and under the same management conditions (nutrition, health, etc.).

An animal's performance is determined by:

- its genetic composition - half of which is inherited from the dam and half from the sire; and
- the environment (health, climate, nutrition, care).

WEANING WEIGHT can be used to evaluate the differences in milk production between cows and the genetic potential for growth of the calves. Usually, calves in a group are all weaned and weighed the same day. Therefore, they will all have slightly different ages. To allow for this, weaning weights are adjusted to a 205 day weaning weight.

205 day weaning wt = [(actual weaning wt - birth wt)/age of calf in days] x 205 + birth wt

The age of the dam affects the milk production and also the weaning weight of the calf. Therefore, you may need to adjust the 205 day weaning weight to account for this. Adjust the 205 day weaning weight as follows:

If the dam is this old at the time of birth of the calf:		Add this weight to the 205 day weaning weight:	
		Male Calves	Female Calves
2 yrs	or 21-33 mths	27 kg	24 kg
3	34-46	18	16
4	47-59	9	8
5-10	0-128	0	0
+10	over 128	9	8

These adjusted 205 day weaning weights can now be used to compare calves within your groups. Calves with higher adjusted 205 day weaning weights will be those which have the genetic potential for optimum growth in your herd. The larger the group size, the more valuable your comparisons will be.

USING BEEF PERFORMANCE RECORDS

Productivity and profitability of beef production can be improved by using performance records. You can then identify and cull the lower producing animals, and concentrate on breeding using the top quality animals. There are many programs which offer performance programs to be producers. Your local agricultural offices can give you more information on the programs currently available.

Cattle are produced under conditions which

vary greatly from one farm to the next. Housing, feed, labour and marketing are determined by the individual producer. Because the conditions are so variable, each producer must determine which cattle perform best under his/her farm conditions.

Performance programs attempt to eliminate the environmental influences by comparing animals which raised under the same conditions. By doing this, genetically superior and inferior animals can be accurately identified.

Beef herd improvement programs often include this information:

- weaning index (index value is determined for each animal in the group; average is 100 and more desirable animals have higher indexes, less desirable have lower indexes);
- gain index;
- composite index;
- birth weight;
- calving ease;
- adjusted weaning and yearling weights; and
- calving interval.

These performance evaluation programs vary for bulls, heifers, steers and commercial producers. Each producer should use the system which is best suited to his/her individual needs.

LEVEL THREE

ROLL CALL

What is one record you keep on your (or a neighbour's) farm?

Topic 1:

CHOOSING YOUR FARM BUSINESS RECORD SYSTEM

Your farm business records have many potential uses:

- filing income tax returns;
- managing your tax position;
- information for negotiating loans;
- making farm arrangements; and
- improving family communications.

There are many different types of record keeping systems used today. Let's look at some of them.

SHOE BOX

This commonly used method of storing invoices and receipts is difficult to organize and audit.

SCRIBBLER

Many people use a simple three-ring book for recording their information.

RECORD BOOKS

Record books are available at farm supply shops, your local agricultural office or any stationary store. Simple ones can be adjusted to suit the way you want to keep your records. Complex record books allow you to include more management information.

COMPUTERIZED

Today, many farms are changing to computerized record keeping systems. A computer can easily accommodate and generate

more information than a manual bookkeeping system. However, a computer can be a costly system. You will also need someone familiar and comfortable with the computer to handle the records.

Topic 2:

COMPUTER RECORD KEEPING PROGRAMS

There are many different computer programs available today for keeping farm records. Some programs are designed specifically for beef farms. Others are general financial accounting packages or general farm record keeping systems which can be customized for your operation.

Sources of information on computer programs available are:

- your district agricultural office;
- your breed association;
- local producers;
- local farm and agriculture associations; and
- your bank.

Topic 3:

USING RECORDS TO DETERMINE BREEDING GOALS

Many traits have the potential to determine the profitability of a beef operation. Each producer must identify their own breeding goals. This is done by identifying traits with economic importance to his or her operation. Using profit equations can help you determine your breeding goals.

Ex 1: Michael's herd is made up of 40 crossbred cows and a purebred bull. Michael also operates a home-based business, so he is available to assist the cattle during calving season. He raises the calves to weaning and then sells them at the local auction mart. He purchases replacement heifers.

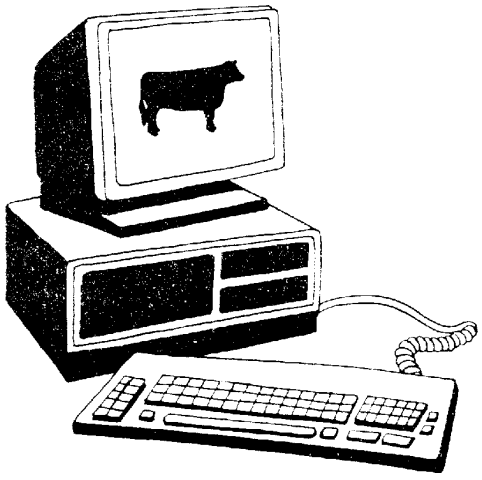
Profit = # of calves sold x weaning weight x price received per kg - cost of maintaining cow herd

By looking at the components of his profit equation, Michael can identify the traits which will affect each of the components.

Factors Affecting Profitability of Michael's Farm

Component:	Influential Traits:	Importance to Michael:
# of calves sold	- conception rate - calving ease	- high. - low; Michael is available to assist with calving.
Weaning weight	- milk yield	- high when selecting replacement heifers; not important when selecting a bull because he keeps no daughters for replacements.
	- pre-weaning growth rate	- high.
Price Received per kg	- muscling, weight or discounts	- high, only if there are premiums.
	- finishing ability on Michael's cattle	- high, if buyer can identify this.
Cost of Maintaining Cow Herd	- mature weight; and - milk yield	- high.

After looking at this table, we can see that Michael's breeding goals should include achieving a high conception rate, selecting replacement heifers with moderate size and high milk yield and selecting well muscled sires with high rates of gain.



Ex 2: Julie's farm comprises 1000 acres of cash crop and 35 beef cows. She feeds all calves to finish and raises all her own replacement heifers. Because she is so busy in the fields during calving season, she has little or no time to spend with the cattle. Julie sells all her market animals to a local butcher who prefers B1 carcasses at any weight.

Profit = # of calves sold x market weight x price received per kg - cost of maintaining cow herd + calves feed cost + calves overhead cost.

By looking at the components of her profit equation, Julie can identify the traits which will affect each of the components.

Factors Affecting Profitability of Julie's Farm

Component:	Influential Traits:	Importance to Julie:
# of calves sold	- conception rate - calving ease	- high. - high.
Market weight	- milk yield; and - weaning weight - post-weaning rate of growth - finishing ability	- high since she raises replacements. - moderate. - high.
Price Received per kg	- market weight - inishing ability - muscling	- low. - low. - low.
Cow Costs	- mature weight; and - milk yield	- high, if there are premiums or discounts.
Feed Costs	- feed efficiency	- high.
Overhead	- rate of gain - finishing ability	- high. - high.

After looking at this table, we can see that Julie's breeding goals should include raising cows with moderate size, achieving a high conception rate and selecting sires with high rates of gain, good muscling and ease of calving.

THE BEEF CARCASS

LEVEL ONE

ROLL CALL

Name a beef cut.

What did some of the other members name? There are more than 25 different cuts of beef.

Your club has some exciting things lined up to help you and your fellow members learn about the beef carcass. It's the most important thing in the cattle industry.

In this unit you will learn:

WHAT makes up a carcass.

WHERE the cuts come from on the carcass.

WHY and **HOW** we grade beef.

HOW to find the beef cuts on the live animal.

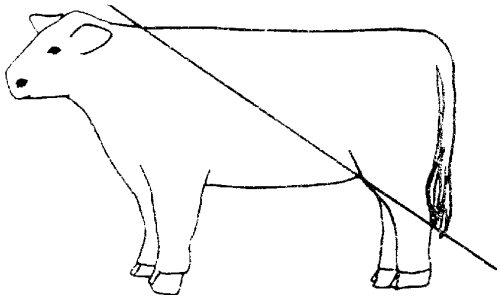
CARCASS TERMINOLOGY to help you talk about beef.

What makes up the carcass?

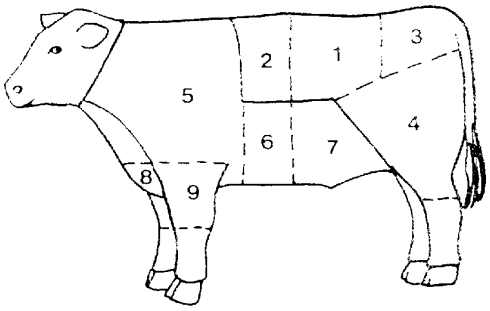
The carcass is the part of the animal that remains after the head, feet, hide and internal organs are removed. What's left?

Take a beef animal, and draw a diagonal line on the side from the shoulder to the hind foot. This line approximately divides the high and the low priced cuts. Everything in front of this line is considered a low priced cut. Everything behind this line is considered a high priced cut.

As a beef producer, you want to market animals with lots of the high priced cuts. Therefore, your animals should have plenty of meat in the hind quarters.



The wholesale cuts of meat are shown in the diagram below. You can learn to identify these by practising on a live animal.



Wholesale cuts of a beef carcass

High Priced

1. Loin
2. Rib
3. Rump
4. Round

Low Priced

5. Chuck
6. Plate
7. Flank
8. Brisket
9. Shank

All animals slaughtered in Canada and sold must be graded by federal government graders. The product that we sell, or the beef, must meet the standards set by the federal government. Therefore, it is important for all beef producers to understand the grading system.
Agriculture Canada regulations make sure that every beef carcass is graded and inspected to give the consumer a top quality, safe, wholesome

product.
Grading is categorizing the carcass according to different characteristics. It takes into account the maturity or age, colour, yield, fat and marbling.

Inspecting is the examination of the animals before and after slaughtering to ensure that the standards of sanitation, hygiene, product handling, packaging and labelling are met. Any carcass that does not meet these standards is condemned and destroyed.

Canada's beef grading system has been in place since 1972. The most recent changes were made in 1992. This grading system examines both the quality of the carcass and the quantity of meat.

Graders examine:

1. Maturity - As the animal gets older, bone and cartilage become hardened.
2. Quality - Determined by colour, texture, firmness, fat and marbling.
3. Meat Yield - Graders determine the amount of fat covering between the 12th and the 13th ribs to determine the overall meat yield.

Once the graders have examined a carcass, they assign it a grade.

THE GRADES OF BEEF

Canada Grade A

Meat from youthful animals. The muscle is bright red, firm and fine grained. The fat covering is firm and white.
There are three different Canada Grade A grades. The only difference between them is the amount of fat.

A1 Leanest
A2
A3 Fattest

Within each of these grades, the carcass is also graded as A, AA or AAA, depending on the amount of marbling. A having the smallest amount of marbling, or fat within the muscle, and AAA having the greatest amount.

Canada Grade B

Also from youthful animals. Carcass lacks adequate fat cover and may have yellow coloured fat and darker coloured meat.

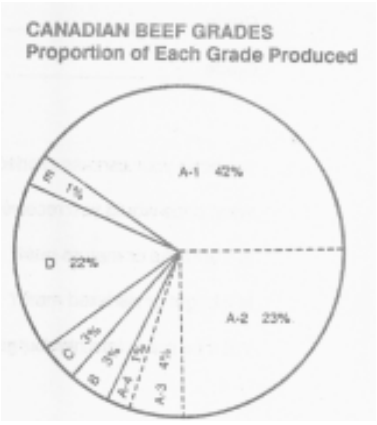
The B grades vary from B1 to B4 depending on fat colour and amount of muscling.

Canada Grade D

Mature cows which vary from D1 to D4 depending on the amount of muscling and fat cover on the carcass.

Canada Grade E

Mature bulls.



Note: Grade C was previously used for middle-aged animals.
Note that most of the beef produced in Canada

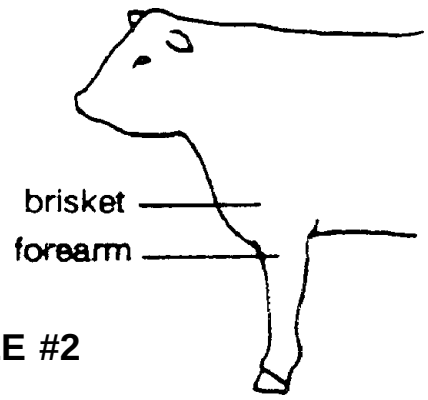
- approximately 70% -is Canada Grade A beef. Keep in mind that when we talk about beef grades, that the grade does not mean best or worst, or healthiest or most unhealthy. A grade only informs the consumer that the meat comes from a young, or old animal, is dark or light coloured, and how much fat is on the carcass. Remember that everyone has different tastes, and there are different uses for each cut and grade of beef.

MORE ABOUT BEEF

RULE #1

We cannot change the composition of cattle. Mother nature designed cattle to grow and develop in a genetically determined way. This is true for all cows, steers, heifers and breeds. Cattle deposit fat in the brisket area and not in the forearm area. There will never be any muscle development in the brisket and there will never be any fat on the forearm.

In any animal, there is a priority of nutrients. This means that as the animal takes in nutrients or feed, these will first be used in the most important areas - that is maintenance. The most important is for the nerves; the least important is for fat. Once all of the important have been met, then the animal will lay down fat.



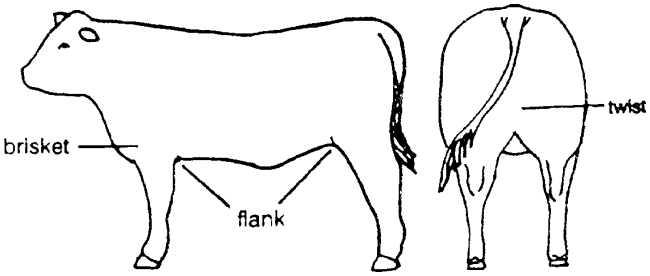
RULE #2

Muscle and fat are developed evenly in the beef animal. This means that muscle is laid down at the same rate all over the animal, regardless of where the muscle is located.

The proportion of one muscle type to the next are the same from one animal to the next. You know this because your beef animal should have symmetry and balance of all parts in order to function properly.

One steer could be bigger and show more muscle expression than another, but both would have exactly the same proportion of forearm muscle to round muscle. This is important for you to understand. When someone says "this steer showed more muscle expression in the areas of the high priced cuts", you know that if that steer is well muscled in the hind quarter, then he will be well muscled over his entire body.

This same principle applies to fat. Fat accumulates in certain places on the beef animal. It accumulates in these locations at the same rate. Look at the brisket, flank and twist. By determining the amount of fat your animal is carrying in any of these three places, you can predict the amount of total fat on your animal. A very fat cow will also have fat in the pin bone area. A very fat bull will also accumulate fat in the neck of the scrotum.



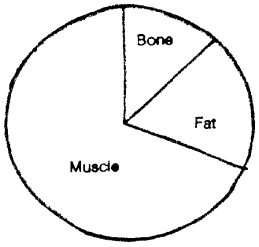
RULE #3

Of the three components of cutability (bone, muscle, and fat), bone changes the least from one animal to the next. The amount of bone or size of skeleton as a percentage of the total weight varies very little between cattle of similar height or weight.

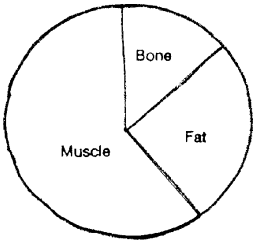
You can tell if animals have a similar skeletal structure by looking at the areas where there is only bone. Look at the cannon bone. If two animals have the same length of cannon bone, they have a similar size of skeleton because the length of the cannon bone is always a constant percentage of the whole skeletal size.

This will help you if you see two steers - one that looks taller and heavier and another that appears smaller and lighter. When you look at their cannon bones, you find that he cannon bones are the same length. This tells you that they have the same size of skeleton. What could account for the difference you see in their size and weight? It must be either muscle or fat.

AN IDEAL STEER



AN OVERFAT STEER

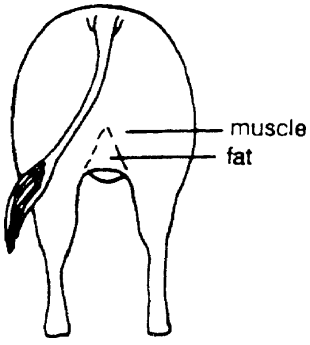


RULE #4

Muscles are always located in the same place on each animal. These muscles always have a similar size and shape in proportion to the animal. They do not increase in number or size or change location as the steer grows or gains weight. Double muscled steers are an exception to this.

This is an important point to remember because looking for the amount of red meat on an animal while the animal is still alive can be very difficult. If you know that the muscles covering the rump of the beef animal are long and tapered, you know that a square, flat hind end cannot be composed of entirely muscle because these muscles are rounded and tapered, not flat and square. The hind end must have an appreciable amount of fat on it to make it look square. Remember, muscle is round; fat is square.

The same goes for the twist area. All beef animals are cut up in the twist. The muscle located in the twist is long and flat and cuts up high into the hip. If your live steer is full in the twist most of the way down to the hock, you know that this area must be filled with fat as muscles do not and never will develop in that fashion.

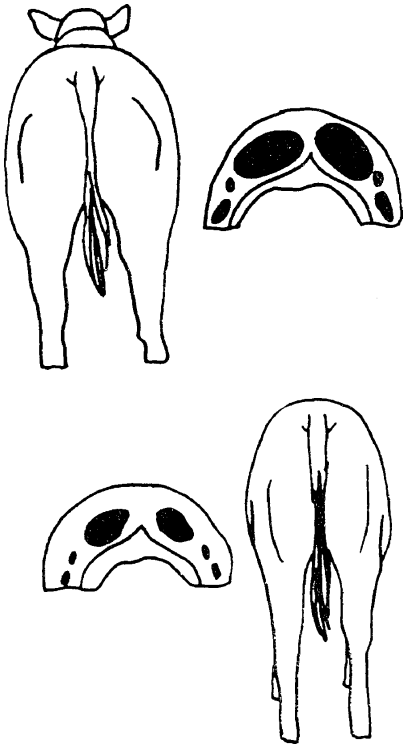


RULE #5

Animals grow and develop in a set way. They always lay down muscle before they lay down any significant amount of fat. So you know that

if you find much fat on a market ready steer, his muscles are not going to grow any more. He will just keep getting fatter.

Never think that a fat steer is going to develop more muscle - he has already developed all the muscle he is going to.



Both of these steers have finished developing muscle. If you continue to feel them they will lay down more fat, but no more muscle or meat.

Carcass Terminology

In addition to the terms already defined, there are many other terms you will encounter when working with carcasses.

Because, in the beef industry, our product is meat, we need to understand the importance of these characteristics whether we are judging live animals or carcasses.

Connective tissue

includes tendons, ligaments and cartilage. These all help to hold the body and organs together.

Gristle

refers to the heavy deposits of connective tissue found in the muscle. Meat with lots of connective tissue will be tough to cut and chew. Connective tissue looks like white or colourless ribbons and threads through the meat.

Cartilage

connective tissue which may be replaced by bone as the animal matures and develops. In the mature animal, cartilage is only found in places where there needs to be elasticity and flex such as the ears and the joints.

Maturity

the age of the animal or carcass. Affects the eating quality of the meat. Is determined by the degree of bone ossification or hardening of cartilage into bone.

Colour

when grading a carcass, colour is important the meat must be bright red and the fat must be white to receive Canada Grade A.

Marbling

amount of fat within the meat. This does not include the outside covering found on many cuts nor any large fat deposits within the muscle. Looks like little white flecks in the meat. Marbling gives the meat flavour and tenderness.

Did you know that all meat would taste exactly the same if it were not for fat? Lamb, pork and beef would all taste the same. But, because of the type and amount of fat, we have three very different tasting meats.

LEVEL TWO

ROLL CALL

Name a beef cut.

What do you think of when you hear the word "carcass"?

The carcass is the end product you market. The purchaser is most interested not in your live animal, but in the carcass which results.

A 450 kg (100 lb) animal will yield about 197 kg (435 lb) of beef. This beef includes the steaks, roasts, ground beef, stewing meat and other cuts of beef.

What happens to the rest of the animal which is not considered to be part of the carcass? This includes the feet, horns, internal organs, etc.

About Consumers

Consumers are those people who buy your product. Circle those below which may be beef consumers.

a) you;
b) your school cafeteria;
c) drug companies;
d) a Japanese restaurant;
e) the local grocery store;
f) feedlot; or
g) all of the above.

Consumers are a complex lot. There are so many of them out there and they differ in many ways. They have different requirements, tastes, preferences and perceptions.

Consumers perceive many things to be true about beef. Sometimes marketers use consumer perceptions to their advantage when designing their marketing strategies. For instance:

The "Natural Beef" label claims that this beef is more wholesome, healthy and environmentally friendly than the beef which is not "natural". In fact both these beefs must pass exactly the same tests and standards for quality.

Understanding the consumer is very important for your success as a beef producer. You must know what he/she wants in beef. This is reflected in the grading system which rewards the producer for producing a product which is Canada Grade A. Theoretically, this is the lean, quality product the consumer wants.

How can you, as a producer, make sure you produce Canada Grade A beef?

Keep in mind, that in order to produce the ideal market animal, you must feed it with the aim of finishing it as Canada Grade A1 - the highest priced grade. Your steer must be adequately finished, without excess fat through the brisket and twist, and a thin layer of fat covering the ribs. He should be widest through the stifle, and have superior muscling throughout.

MAKING THE GRADE: The Factors Involved

Beef is graded and federally inspected to protect consumers and to give producers guidelines which they can follow to maximize productivity. Many factors affect the quality of a grade. Name some of these:

Following are some interesting scientific findings about factors which can affect the quality of grade.

Genetics:

When the effects of breed on the carcass quality were studied, researchers found that:

1. If fed to the same age, heifers will have more marbling than steers.
2. The type of breed affects the quality of the grade.

Heritability is the portion of a trait which is carried on from ancestors. Carcass characteristics vary in their heritability.

Characteristic	**Heritability**	**(%)**
Rib eye area (per carcass weight)	medium	25 - 40
Fat thickness (per carcass weight)	medium	25 - 40
Marbling score	high	40 - 60
Quality grade	medium high	35 - 45
Yield grade or lean yield	medium high	25 - 50
Lean tenderness or palatability	high	40 - 70

Age or Weight at Castration:

Calves castrated at nine months have been shown to have less marbling than calves castrated at either two or seven months of age.

Health and Nutrition:

1. The time of year in which the animal is slaughtered can affect the quality of the grade.

   Animals slaughtered in the winter months were found to have lower marbling and lower quality grades than those slaughtered in the summer. This is likely due to the stressful weather conditions which can be experienced in the fall and winter.

2. Grade quality can be improved by increasing the energy in the diets of the animals at equal carcass weights.

   Think about this: It is said that grain fed cattle are more tender than grass fed cattle. Have you ever noticed a difference?

3. There is no proof that any of the growth enhancing substances currently on the market affect the quality of the grades.

4. Implants help the animal reach market weight at a younger age and reach physiological maturity at a later age.

5. There is no evidence to suggest that implants increase the chances of dark cutting.

   Dark cutting is caused by increased stress levels created by stressful handling of the animal prior to slaughter. More dark cutters are found in the fall and winter months, likely because of the extreme temperatures.

You can avoid higher stress levels, and therefore dark cutting:

1. Don't mix animals before slaughter.

2. Avoid excessive noise, overcrowding and use of prods or whips when handling cattle.

3. Protect the animals from extreme weather conditions.

4. Don't hold the animals off feed and water for more than 24 hours before slaughter.

5. Avoid dietary changes prior to shipment.

Post mortem handling:

Proper handling of the carcass after slaughter can also improve the grade. The carcass should be properly chilled to allow full development of the marbling. Wait 15 to 20 minutes between ribbing and grading for the freshly cut muscle to bloom or pick up oxygen and optimize the grading characteristics. This supply of oxygen to the muscle gives the meat its desirable red colour.

LEVEL THREE

ROLL CALL

Name a beef cut.

There are more than 25 different cuts of beef. Try to come up with an obscure one. Leave the more obvious cuts for the younger members.

Welcome to one of the most interesting topics in beef production. By this point in your 4-H career, you will have acquired a great deal of knowledge about the beef animal. We challenge you to put these ideas together as you find out more about the beef carcass.

Topic 2:

MORE ISSUES AFFECTING BEEF PRODUCERS

Think about the following statements. Decide whether you agree or disagree with each of them.

1. Growth enhancing hormones used in beef production affect the quality and safety of the meat.

2. Cattle are harming our environment through their production of methane gas.

3. Canadian and North American cattle are partly responsible for destroying the rain forests of the world.

4. New provincial grazing and range management regulations will be beneficial to B.C. beef producers.

Topic 3:

CHANGES TO CANADA'S BEEF GRADING SYSTEM

Beef carcass grading in Canada is performed by a federally employed beef grader. Before assigning the carcass a grade, he/she evaluates the maturity, muscling, meat colour and fat thickness, colour and distribution.

The Canada Agricultural Products Act is responsible for establishing national standards and grades for agricultural products. A committee made up of government and industry representatives works together to develop the Beef Carcass Grading Regulations which establish the characteristics of each grade of beef.

Recent changes to the beef grading system were implemented in April 1992. These changes were made in an attempt to improve the ability of the grading system to predict the eating quality or palatability of beef.

The grades Canada Grade A1, A2 and A3 will now be further identified according to the amount of marbling.

Marbling, the presence of small fat deposits within the muscle or meat, improves the eating quality of that meat. A will have trace amounts of marbling, AA will have slight amounts, and AAA will have more marbling.

In order to provide necessary information to producers, the precise lean yield content of all Canada Grade A carcasses will also be calculated. Those carcasses with 59% or more determined yield will be assessed Canada Grade A1. Carcasses with 54% to 58% yield will be A2 and carcasses with 53% or less will be A3.

The Canada B grades are used for youthful carcasses which do not meet the requirements to become Grade A. There will now be four B grades.

B1 - lacks sufficient marbling or external fat to qualify for Grade A.
B2 - has yellow fat.
B3 - lacks adequate muscling.
B4 - has a dark meat colour.

Canada Grade C will no longer be used. The four D grades will continue to be used for mature cows. Canada Grade D1 will be limited to those carcasses having excellent muscling. Canada Grade E will continue to be used for carcasses of bulls or stags.

It is anticipated that making these changes to the grading system will result in an increase in customer satisfaction which will lead to an increased demand for beef.

BEEF MARKETING

LEVEL ONE

ROLL CALL

What do you think of when you hear the word "marketing"?

WHAT IS MARKETING?

If you ask five people to tell you what marketing is, you are likely to get five different answers. That is because marketing involves a wide variety of activities.

Marketing is...

planning and putting into action the development, pricing, promotion and distribution of ideas, goods or services to create an exchange which satisfies both the buyer and seller.

In the beef industry, it is producing and presenting your beef product to the satisfied buyer. It is more than just selling, it is also making your product attractive to your potential buyers.

Marketing has 4 P's:

- Product;
- Price;
- Promotion; and
- Place.

Lets look closely at what is involved in each of these 4 P's of beef marketing:

Product

- carcass;
- live steer;
- replacement heifer;
- bull; and
- individual meat cuts.

Promotion

- B.C. and Canadian Cattlemen's Associations;
- Beef Information Centre;
- you the producer;
- butcher, supermarket, restaurant; and
- B.C. Ministry of Agriculture, Fisheries and Food.

Place

- the farm;
- auction mart;
- packing house; and
- supermarket, restaurant.

Price

- determined by the market.

As you can see, beef marketing has many components. Marketing can be affected by any of these things.

THE CANADIAN BEEF INDUSTRY

The beef industry in Canada has these characteristics:

1. Most producers are small. Approximately 96% of all herds have less than 100 animals. The average herd size is approximately 27 cows.

2. Cattle can graze land which is not suited to crop production. This may include ar

eas with poor soil, or land which is too rocky or hilly for farm machinery.

3. Most feed used for the cattle is grown on that farm. The number of cattle the producer keeps depends on the feed available and the current feed prices.

4. Most beef herds use only family labour. This reduces the labour costs and limits the herd size.

5. Beef cattle are often only one part of the farm operation. Most farms also produce and sell grain. This makes it possible for the producers to spread their financial risks over several commodities.

6. Fixed costs, those costs which do not change if you expand or decrease your herd, are low. They include rent or mortgage, taxes, electricity and water, etc.

7. Beef producers are able to expand or reduce the size of their herd very quickly. Because of this, a beef cycle is created. The prices tend to rise and then fall as producers react to the market conditions.

Beef is sold on an open market. Supply and demand determine the price. When supply is high and few people are buying, prices will be low; when supply is low and lots of people want to buy, prices will be high.

Some things which affect the supply and demand of beef are:

- price and supply of meat in the stores;
- consumer attitudes;
- imports from other countries;
- money people have to spend;
- time of year; and
- weather.

LEVEL TWO

ROLL CALL

What do you think of when you hear the word "marketing"?

-

OPTIONS FOR MARKETING BEEF CATTLE

There are many different methods for marketing beef cattle in Canada. The one which is best for you will depend on your individual operation, the local market, your available time and your knowledge of the markets.

PUBLIC AUCTION

Traditionally, most feeder cattle are marketed at the public auction. Slaughter cattle may also be sold this way.

Before you ship your cattle to market, you should know:

- costs of selling (transportation, commission, handling);
- conditions of sale;
- your expected return; and
- characteristics of the auction mart (days most buyers buy, when large producers sell, etc.).

You should deliver the cattle the evening before the sale. You can learn more and do some public relations work if you watch your cattle sell the next day.

Selling this way exposes your cattle to many potential buyers. The market is often local and your transportation costs will be low.

However, you are at the mercy of the market. Your price is not guaranteed and will be determined by the buyers bidding at the time your cattle are sold.

Terminal markets, such as the public stockyards, also auction cattle. The cattle are usually sold through commission firms, while the stockyards provide the services. These markets are not as popular as they have been in the past. Today, smaller producers prefer to market their cattle locally and larger producers are making marketing arrangements involving less risk.

DIRECT TO PACKING PLANTS

If you market large lots of cattle, selling direct to the packers may work well for you. It requires that you know the markets and current prices so you can negotiate a fair price. It is important you understand the conditions of the bid:

- live weight or railgrade;
- hot or cold weight;
- freight included or extra; and
- time limits.

Selling cattle direct to the packers avoids the price risk of the auction mart. The disadvantage is that your cattle are viewed by only a limited number of potential buyers.

RAILGRADE is becoming more popular. It provides incentives for producers to raise and market high yielding cattle. Producers are paid for exactly the amount and value of meat based on hot dressed weight and grade.

ORDER BUYERS may be commissioned by firms to buy large lots of cattle. The buyer specifies the type of cattle, price, frequency of purchase, time of delivery, etc. The buyer then purchases cattle to fill the orders.

PRIVATE SALE

Many small producers arrange the sale of cattle themselves. Word of mouth or local newspaper advertisements make potential buyers aware of the livestock for sale. Local butchers or slaughter houses accept and prepare the animals for the buyers.

MARKETING AIDS

The use of marketing aids in western Canada is limited, but is expanding. Using video auctions and computers to move cattle through auctions and packing plants means that cattle can be seen by more potential buyers.

TAKING A LOOK

How do you sell the slaughter cattle on your (or a neighbour's) farm?

What other options are there? Would they work?

RAIL or LIVE

As a beef producer, your goal is to receive the most overall profit for your beef product.

Your decision to sell your market ready animal live or on the rail depends your knowledge of the market, your preferences, local conditions and price.

To make your decision, you need to look at

the costs involved. Keep in mind that these will change with time. The situation best for today may not be the best next month.

Let's look at how we can compare live and rail. In this case, it is to our advantage to sell on the rail.

	LIVE	**RAIL**
Weight Live	500 kg	
Weight Carcass		290 kg
Price Live	$1.78/kg	
Price Rail		$3.18/kg
Gross value	$890.00	$922.20
Less: (per head)		
Additional Trucking		$ 6.00
Phone and Misc.		$ 2.00
Shrink (at 2%)	$ 17.80	
Final Return	$872.20	$914.20

Railgrade markets are based on stable characteristics of the carcass including weight, fat cover, meat characteristics and sex. The visual characteristics such as colour, breed and appearance do no affect the railgrade.

Shrink, or the loss of weight from feedlot to market, can cause a live animal to lose 2 to 4 percent in weight, and even more with longer hauls. Generally, the carcass yield will not be affected until the animal is severely stressed, such as being without water for over 18 hours.

Dressing percentage is the ratio of carcass weight to live weight. A typical dressing percentage is 58%. An animal with a higher dressing percentage will be worth more on the rail than one with a low dressing percentage.

A formula to use for estimating rail price or live price is:

Rail price = live price : dressing % (approx)

Over time, the rail price may be above or below the estimated value produced by the formula. If the rail price is lower than what you would expect using the formula, then selling via the live market would be more profitable.

FINDING OUT THE PRICES

Where might you find out the current prices being paid for beef animals - live or on the rail?

Sell live or on the rail - which would be a better choice for you today? (Hint - do calculations similar to above).

LEVEL THREE

ROLL CALL

Topic 1:

THE BEEF CYCLE

The beef industry is dynamic. Things are constantly changing, including the market. Let us consider the beef cattle cycle and how it affects cattle numbers and prices.

Beef prices will go from low to high and then back to low every nine or ten years. This cycle is caused by many factors, including how beef producers react to predictable market signals.

Year 1

Let's assume that the cattle prices are very low or have bottomed out. Producers are sellingtheir steers and cull heifers as well as

replacement heifers in order to reduce the size of their breeding herds. Producers are also holding their animals longer before selling, hoping that the prices will improve. Therefore, heavier cattle are put onto the market, increasing the average carcass weights.

As breeders continue to sell out for two or three years, breeding cattle numbers decrease. Fewer calves are expected next spring leading to a low supply of beef in about three years.

Because of the decreased cattle numbers, the price of feeder cattle starts to increase. Producers are caught by surprise, often with small cow herds and insufficient numbers of replacement heifers.

Year 2

Beef supplies are falling, but prices have strengthened slightly. Fewer cows are culled because of increasing demands for feeder cattle.

Year 3

Beef supplies continue to fall. The calf crop is increasing and producers are keeping more replacement heifers.

Year 4

With fewer heifers and calves being slaughtered, the beef supply is still low, but the calf crop is larger.

The beef herd is now expanding rapidly and beef supplies are beginning to increase. Looking back to the problems from year 1, you can guess that an oversupply of beef will exist in three to four years.

Years 5 & 6

Producers will continue to increase the size of their cow herds as long as it is profitable. The length of the expansion period will depend on one or more of:

- cow-calf production costs;
- hay shortages which may force local producers to reduce cattle numbers;
- competition from other products - chicken, pork, turkey;
- surplus beef held in storage;
- imported beef; and
- government programs.

Year 7

In a normal cycle, beef supplies will be greater than the demand, causing prices to fall slightly. Smaller profits for feedlot operators will reduce the demand for feedlot cattle. Because the true signals to beef producers occur after the changes in market conditions, more cows and heifers will be bred. The sale of these cows and heifers will begin as market changes become obvious.

Year 8

The largest calf crop in the cycle usually occurs this year. Because of falling prices, more heifersare sold as feeders, more cows are culled and feeder prices are low.

Year 9

A strong slaughter market for heifers and cows, and shrinking herd size occurs this year. The beef supply to the consumer is the greatest and retail prices are low.

Year 10

Beef supplies are slightly lower than in year 9. Cow and heifer slaughter is still high, but prices are beginning to show some recovery.

Year 11

The cycle begins again.

As a beef producer with the knowledge of the beef cycle, you have many options, including the following:

1. Follow the beef cycle. When prices are low you will have many animals to sell; when prices are high you will have fewer animals to sell. Over the course of the cycle, your income will remain fairly constant.

2. Make your own predictions about when floor and ceiling prices will occur. Use this information to predict price trends two or three years into the future. Plan your herd sizes accordingly. You will be able to have more animals when the prices are high and fewer when the prices are low.

3. Do the opposite to what the market tells you to do. When prices are low, expand your herd size. Cut back your herd size when it appears that prices will soon peak. By using this method, you will be able to maximize your potential profits.

This cycle occurs world wide and is an obvious indicator of the market conditions to follow.

Your challenge is to know what is going to effects on the beef producers.

Topic 2:

LIMERICK LINGO

Here's your chance to have some fun with beef information. The following is a sample of a limerick which sums up some of the opportunities 4-H can provide to youth - and includes beef marketing.

There was a young man named John Know,
and off to 4-H he did go.
There he learned about beef;
when to sell, which to keep,
and how fast they really could grow.

Topic 3:

THE MARKETING GAME

This topic of beef marketing can be a lot of fun for everyone involved. At the very least, it gets the mind working and the blood boiling.

Your task is to plan an activity for members of your entire club or group. The following are some ideas. Use one of these or create your own. Work in teams or small groups and have fun!

- board game;
- jeopardy game;
- game of snakes and ladders;
- maze of marketing problems to solve;
- case studies or situations to solve; or

THE BEEF INDUSTRY TODAY

LEVELS ONE AND TWO

ROLL CALL

Name a person who is involved in the beef industry.

What are some of the answers other members gave?

In this unit, we will look at the beef industry and some of the many things which can affect it. Please see the Leader Manual for all the beef industry activities in these units.

LEVEL THREE

Welcome to the level three section of The Beef Industry Today. Your task in this unit will be to learn as much as possible about the factors affecting the beef industry today. You will do this through discussion, thought, asking questions, research and working together.

You will likely come across some topics on which you and other members will disagree. Listen to the other side of the story, weigh the facts, and make your own decision. But remember - even though you do not agree with what the other person is saying, that does not mean he or she is wrong. It is okay to have differing opinions. Please see the Leader Manual for the beef industry activities you

BEEF GROOMING AND SHOWING

ALL LEVELS

ROLL CALL

Share one of your experiences in beef grooming and showing with the other members of your club. If you haven't yet groomed or shown your animal, share your plans for doing so in the future.

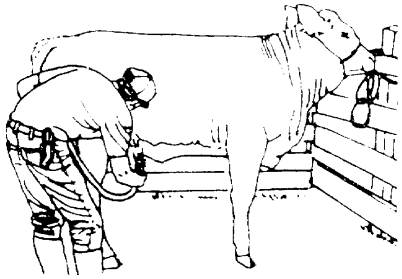
BEEF GROOMING

WASHING

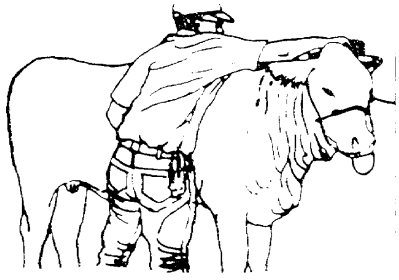
Collect everything you will need for washing and drying your animal(s): halter, rope, hose, bucket, brushes, combs, soap, blow dryer. Put on your rubber boots and suit to keep yourself dry. Using a special cattle wash soap available at your farm supply store, prepare your soap solution in a pail with warm water.

Securely tie your animal to a fence or post using a nylon or non-sisal rope halter which will not swell when it becomes wet. Use a quick release knot which holds firmly but can be quickly and easily released when necessary. Brush or blow the surface dirt, old hair and straw from the hair of your animal.

Get your animal used to the water by wetting slowly, starting at the bottom and working your way up the body. Start with the legs, topline and finish with the head. At all times, take care to avoid getting water in the ears. Use a wet cloth to wipe out the ears.



Using a rubber curry comb or brush and your soap solution, soap your animal well, producing a good lather. Work from the tailhead across the top of the animal to the head. By working this way, the soap and water will run down over the unworked areas. Your animal is less likely to be frightened and will be used to the treatment by the time you reach the head.

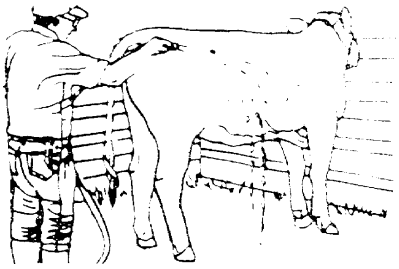


Wash all areas of your animal carefully and completely. Take care that your animal does not kick you when you wash the underline, brisket (between the front legs) and twist (between the rear legs). Leave the tail till last so the animal does not slap you with a wet, soapy tail.

The hooves, knees and hocks are often stained and will require extra soap and work to get clean. The tailhead and just behind the poll will also be dirty because the animal cannot reach these areas to lick or scratch them.

After you have completely soaped your animal, begin rinsing at the head and move along the topline toward the back. Move down both sides and rinse the underline, legs and tail.

Always spray water from rear to front, against the growth of the hair and remove all of the soap.



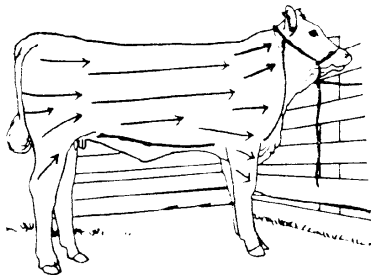
It will take more than one washing to get your animal clean. Show animals should be washed once before you first begin to work the hair, then at least once a month until your show.

After your first washing at home, you should use an insecticide to control lice and mange. Use this insecticide again following the first and last wash at the show. This will help to prevent infestation with lice or mange from other animals.

DRYING

A blow dryer can be used to quickly and easily remove moisture from the animal. Blow the hair forward, working from back to front of the animal. Take care to blow the hair evenly and avoid hair divisions. By combing or blowing the hair in the directions shown in the following diagram, you can make the hair lie smoothly and give your animal the appearance of having a longer body. Unshaven neck and shoulders will make the body look even longer.

In warm weather, using a blower is not recommended to dry the hair. Use of a dryer, in combination with warm weather will dry out the hair and hide. The amount of natural oil will be reduced and the hair will become hard to manage.



CLIPPING

It is important to secure your animal so it cannot move around while you are clipping. A blocking chute is the easiest and safest way to restrain your animal for clipping. Use a halter to tie your animal with its head high.

To get ready for clipping, gather all your supplies together: clipper heads, extension cord, lubricating oil, combs, brushes and sprays.

Prepare your animal for clipping by washing and blowing the hair dry. Blow the hair on the tailhead and topline upward and forward. Blow dry the outside and inside of the rear and front legs. Brush the hair in these directions.

Becoming efficient at clipping requires practice, organization and thought. If you plan to clip several animals, have them all ready. Clip all your animals with one clipper head before changing to another.

About Your Clippers:

1. To do a good job of clipping, your clipper must have sharp blades. As soon as the blades begin to get dull, get them sharpened or replace them with new blades. The type of hair they cut and how often you use them will determine the life of your blades.

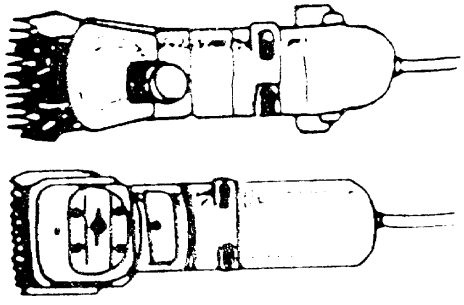
2. Always keep your clippers well lubricated. Put a few drops of clipper lubricating oil in the holes in the clipper heads before you use them. Oil the clippers during use to keep them from getting hot and dull.

3. Always keep your clippers clean. Using your blow dryer is a fast and easy way to blow old hair and dust from the blades. Clean your clippers by dipping them, while running, in diesel fuel or solvent. Dry them off before putting them away.

4. Reduce the tension on the blades before you put your clippers away. Don't forget to tighten them before you start to use them again. If they are not tight, they will not cut properly and they could fly lose and injure you or your animal.

There are two types of clipper heads used for clipping beef cattle:

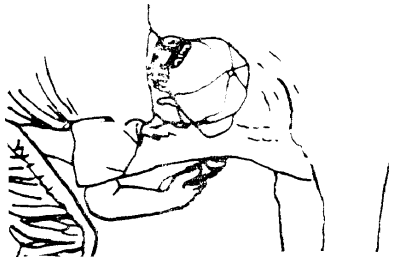
The sheep head has comb-like blades and is used for cutting longer hair and blending.



The flat head has small, fine blades and is used for shaving off all the hair in any spot (head, underside and brisket).

The Belly

Clipping the hair from the belly will make your animal look taller and cleaner.



Using your flat head clippers, clip a horizontal line along the base of the belly from the rear flank to the heartgirth immediately behind the front legs. Take care not to make this line too high up on the belly. Clip all the hair underneath this line. During cold weather, you may want to leave some of the hair on the belly to protect the animal from the cold.

The Udder and Twist

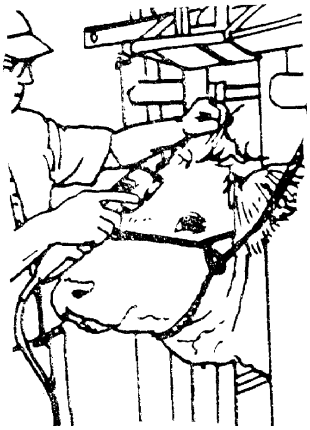
So that the judge can easily view the udder on females, clip all of the hair from the udder. On your steer, trim the twist area to the deepest and fullest look possible.

The Head

Using flat head clippers, shave the head to give it definition and make it look longer and sharper. To give the cleanest cut, cut against the growth of the hair. Shaving the ears is optional. Clip the side of the head and under the jaw and muzzle. Move from the base of the ear toward the jawbone. Move down to the dewlap and brisket. Shave the neck only when there is enough time before your show for some of the hair to grow back.

Methods of clipping the head will vary depending upon the season, your personal preference and the type and appearance of your

animal. On polled animals, you may want to leave a tuft of hair which you can later groom to make the animal appear longer. Steers usually have their heads clipped completely.



The Brisket

Clipping the brisket will clean up the brisket area and make it look trimmer. Pulling the hide tight with your free hand, trim the brisket using your flat head clippers. Be sure to blend in your cutting lines.

The Legs

Your treatment of the legs will depend on the condition of your animal. If your animal has desirable legs, you will likely want to trim most of the hair from them.

Boning the legs will give the appearance of thicker and sturdier legs. To bone the legs, rub saddle soap down each leg, rubbing the soap into the hair around the entire leg. Then, using a scotch comb, comb the hair upwards against the growth of the hair. Clip off all of the long hairs to even out the length of the hair on the legs.

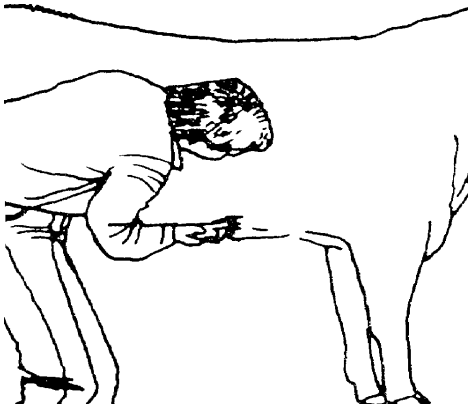
The Tail and Hind End

There are several different ways of clipping this area. The tail can be completely clipped, or clipped only on the side with the long hair left on the back to be groomed later. Watch beef shows and talk to people at beef shows to find out which method you should use.

Blending

You cannot avoid clipping lines, but you can hide them. Blending, or making the change from shorter clipped to unclipped or longer areas, will hide your lines and make your animal appear smoother.

Tilt your clippers slightly on the side and run them lengthwise along the line. Or, hold the clippers upright with your free hand under the blade to give you more control. Gradually increase the angle of the blade as you work up the side of the animal. To do a good job of blending, you need a steady hand, patience and lots of practice.



GETTING READY FOR THE RING - The Finishing Touches

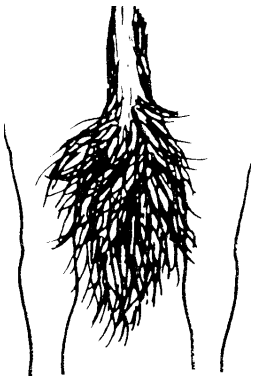
The Body

Show foam and body products for grooming the body hair are available at farm supply shops. Find out which ones work the best by experimenting with them and talking to people at beef shows. Generally, these products are used to work the hair and hold it in position for long periods of time.

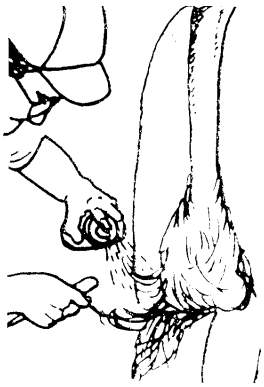
The Tail

The two methods of grooming the tail are:

1. **PYRAMID** - The pyramid is usually used on mature animals two years and older. It fills in the twist area. Follow these steps:
    1. Comb out the tail.
    2. Backcomb the tail to form the hairs into a pyramid shape.
    3. Spray to hold the shape.



2. **TEARDROP** - To make your younger animal look balanced and stylish, the tail is usually brought up so it is even with the underline and made into a teardrop shape.



Follow these steps:

1. Comb out the tail.
2. Take a few strands from the bottom of the tail bone and divide them into two.
3. Tie these two pieces of hair around the tail at the height which will make the bottom of your teardrop even with the underline. Spray a little bit of adhesive on your tie to hold it.
4. Backcomb the rest of the tail hairs and spray a light mist on them.
5. Form into a loose ball or teardrop shape, by lightly pressing in the hair. Try to keep it flat on the side against the animal's body so it will lay naturally.

To give the appearance that your animal is slightly higher in the rear end than in the fore, groom the tail and tailhead hair to a peak and trim using clippers or scissors.

The Head

To make the head appear longer and more feminine, the hair on the poll may be left long and formed into a pyramid.

Comb the hair on the poll into a pyramid shape, then spray with adhesive to hold.

Just before you enter the show ring, wipe off your animal's eyes with a cold cloth. This will help to refresh them and they will appear more alert in the ring.

After the Show

After the show, thoroughly soap and rinse your animal to remove everything you applied to the hair. To remove the adhesive, use mineral oil or a commercial remover. Make sure to thoroughly remove all of the mineral oil from the hair because the adhesive will not stick where there is the least bit of mineral oil.

BEEF SHOWING

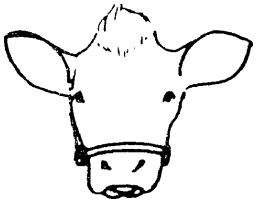
No one is born with the ability to be a good showperson. Only with many hours of training, practice and experience can you become successful. Beef showmanship styles are constantly changing, so it is important that you be familiar with show ring practices in your area. For more information, contact your lo

YOUR ANIMAL

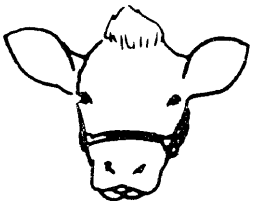
Whenever you take an animal into the showring, that animal should be in the best possible show condition. Whether you are in a showmanship or conformation class, your animal should be groomed and its feet should be properly trimmed.

Not only must your animal be well groomed, it must also be well trained and easy for you to manage. That means that you will have started working with your animal many months before show day. Training is not something which can be done overnight.

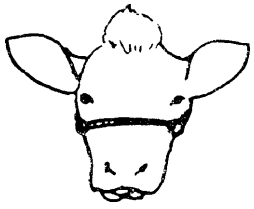
A properly adjusted halter will give you the control you need over your animal. When well placed on the animal's head, it will give the animal an attractive appearance. Non-sisal rope halters can be used for training and restraining your animal, but leather halters should be used in the show ring. Begin using a leather show halter at least two weeks before show day.



too low



correct position

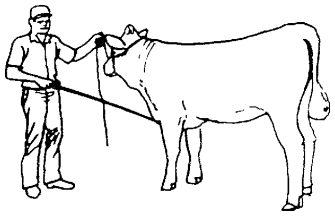


too high

When leading, hold the halter shank in your right hand about 30 cm from the animal's head. Do not coil the shank around either of your hands. This will be dangerous for you if the animal should bolt. Hold the length of shank in your left hand with the show stick. Your hands should be about 45 cm apart.

When you stop to place your animal, hold the shank in your left hand, letting it hang down. The shank should not be so long that it reaches the ground when you hold it like this. A length ending about 30 cm above the ground is recommended.

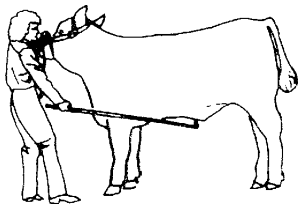
Show Stick



Show sticks may be made of wood, aluminum or fibreglass and can be purchased or made at home. Your show stick should be long enough so that you can comfortably reach the back feet of your animal when you stand at the head. It should not be so long that it is awkward for you to use.

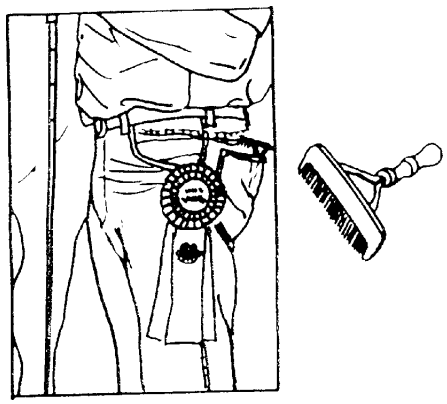
When leading the animal, hold the show stick in your left hand with the point end backward. Hold the stick with about 3/4 of it behind your hand.

When you stop to set up your animal, smoothly move the show stick to your right hand and your halter shank to your left hand. When set up and standing, use the show stick to gently scratch the underline of your calf. Through your practice, you will discover the exact scratching location which works best on your calf.



Comb

A scotch comb is recommended for use in the show ring. When the hair on your animal is changed by the judge or another animal, use the comb to quickly and smoothly comb the hair back into place. Carry the comb in your back pocket with the teeth pointing towards your body and away from the animals.



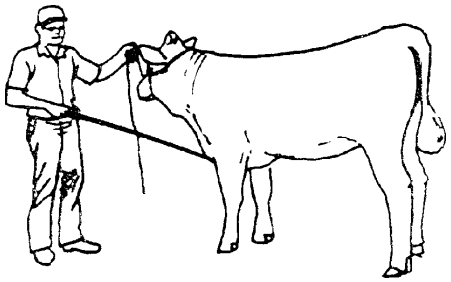
THE JUDGE

Showing your animal to the judge

Always know the identity of the judge and ringperson in each of your classes. Be knowledgeable about your animal and ready to answer any questions you may be asked. The most common question is: "When was your animal born?"

When the judge moves toward your animal to look at it, make sure you are not standing directly in his/her line of vision. Keep your

animal completely under control at all times. Move slightly to give the judge a clear view of your animal.



When the judge handles your animal

Judges often handle beef animals:

- to determine the amount of condition;
- to examine your grooming job; and
- to see your reaction.

If the judge moves the hair on your animal, be ready to return the hair to its original position. Pull your scotch comb from your pocket and use it quickly and smoothly.

YOU - THE EXHIBITOR

Your Appearance

While in the show ring, your dress should always be neat and clean. Individual shows, clubs or districts may have their own dress codes, so be sure to find this out ahead of time. To keep clothes clean until show time, many members wear coveralls and remove them just before the show.

Always wear safety footwear when working with cattle. Steel toed safety boots are recommended.

Eye Contact

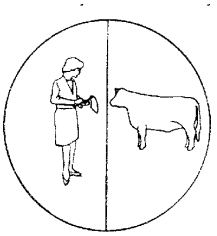
Keeping eye contact with the judge is important. It shows that you are alert to his/her movements and requests. But, don't overdo it - you don't want to get into a staring contest with the judge.

Keep your eyes on the judge (and ringperson) and your animal at all times.

If you are moving ...

... divide your time equally among the judge, your animal and where you are moving to.

If you are stationary ...

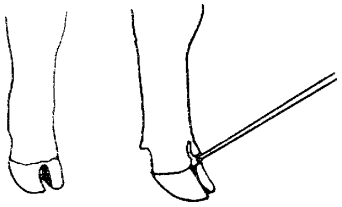


... divide your time equally between the judge and your animal.

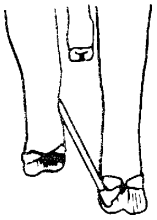
When you stop in the show ring, take care not to bump or crowd other animals and leave at least one metre of room between animals whenever possible. Avoid all low spots and place your animal's front feet on higher ground whenever possible. Quickly and smoothly set up your beef animal. When your beef animal is set up properly, the four feet

will be squarely placed underneath him or her when viewed from the front and rear. Place the animal's rear feet first, then place the front feet.

The Rear Legs:



To move a rear foot backwards, pull back slightly on your halter shank and use your show stick to apply backward pressure between the toes of the foot.

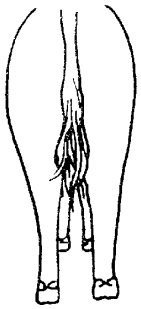


To move a rear foot forward, pull forward slightly on your halter shank and use the show stick beneath the dew claw to apply forward pressure on the foot.

When viewed from the side, the rear foot closest to the judge should be placed slightly behind the other foot. When you view from behind the animal, the hind legs should be squarely placed so that your animal shows maximum thickness through the hind quarters.

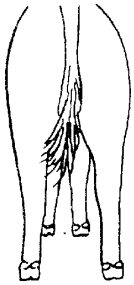
Too Close

The animal looks narrow and awkward. It appears as if there is less muscle in the hind quarters.



Proper

The animal looks natural, comfortable and muscular.

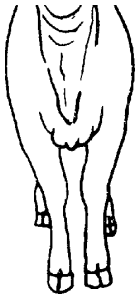


Too Wide

The animal looks uncomfortable and muscle in the hind quarters is not well shown.

The Front Legs:

Keeping complete halter control of your animal, use your feet or your show stick to properly place the animal's front feet. It is possible to place the front feet using only halter control, but this comes only with lots of practice and patience. When viewed from the side, the front foot closest to the judge should be placed slightly ahead of the other foot.

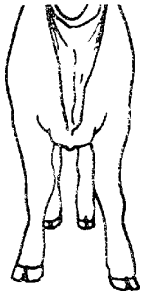


Too Close

The animal looks narrow, weak and awkward.

Proper

The animal looks natural and comfortable with width and strength through the shoulders and chest.



Too Wide

The animal looks uncomfortable and front legs appear weak.

Moving Your Animal in the Ring

When entering the ring, move clockwise, keeping an eye on the judge or ringperson for room for others to follow.

Always stay far enough away from the outside of the ring, and from the animals in front and behind you, so the judge can comfortably move around your animal.

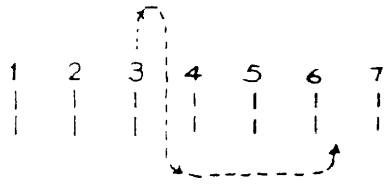
If your animal becomes difficult in the ring, remain calm and continue to work with it. If the animal in front of you will not move, tap it gently with your show stick or hand. Do not pass another showperson unless the judge or ringperson instructs you to.

Changing Position in Line

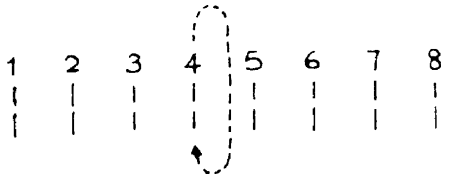
When you pull into line as requested, leave about one metre of room between you and the next animal. When lining head to toe, leave approximately one metre between your animal and the one in front of you. Avoid moving in and out of the line unless it is necessary.

Always allow your animal enough room to make a comfortable turn. Turn in a clockwise direction, moving around your animal. Avoid making sharp or awkward turns.

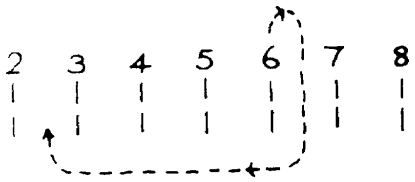
Moving from position 3 to 6:



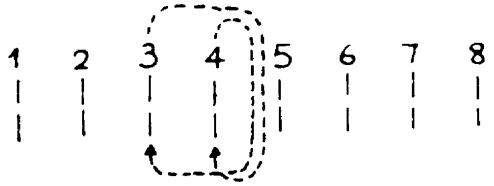
When you must set up again in the same position:



Moving from position 6 to 3:



Switching positions 3 and 4 (4 would move out first):



THE CLASS

There are generally two types of classes. In the conformation class, the animal is judged on its conformation. In the showmanship class, the judge places the showperson according to this recommended scorecard:

SUGGESTED SHOWMANSHIP SCORECARD

Exhibitor	20 points
• personal appearance	
Appearance of animal	30 points
• cleanliness • grooming	
Showing of animal	50 points
• how well animal is trained • how well animal responds • individual poise and skill	
TOTAL	100 points

Be sure to find out in advance what type of class you will be in. At some shows, classes may be a combination of showmanship and conformation.

FINAL HINTS

- Every class is an opportunity for you to learn and gain more experience.
- Before you go into the ring, take a deep breath and relax.
- Keep your attention focused - ignore what is going on outside the ring.
- Don't stop showing until you are out of the ring.
- Be courteous and show good sportsmanship.
- Smile.

BEEF JUDGING

ALL LEVELS

ROLL CALL

What are your experiences in beef judging? Share these with your club.

The aim of the beef industry is to efficiently produce carcasses of the type and quality demanded by the consumer. The ability to look at the live beef animal and evaluate its potential to produce these carcasses is a challenge to you and to others in the beef industry. We use live animal appraisal techniques in the showring, the feedlot, the pasture and at the auction sale to assess the quality of our beef animals. This is what we refer to as judging beef - the art of visually comparing and ranking beef cattle.

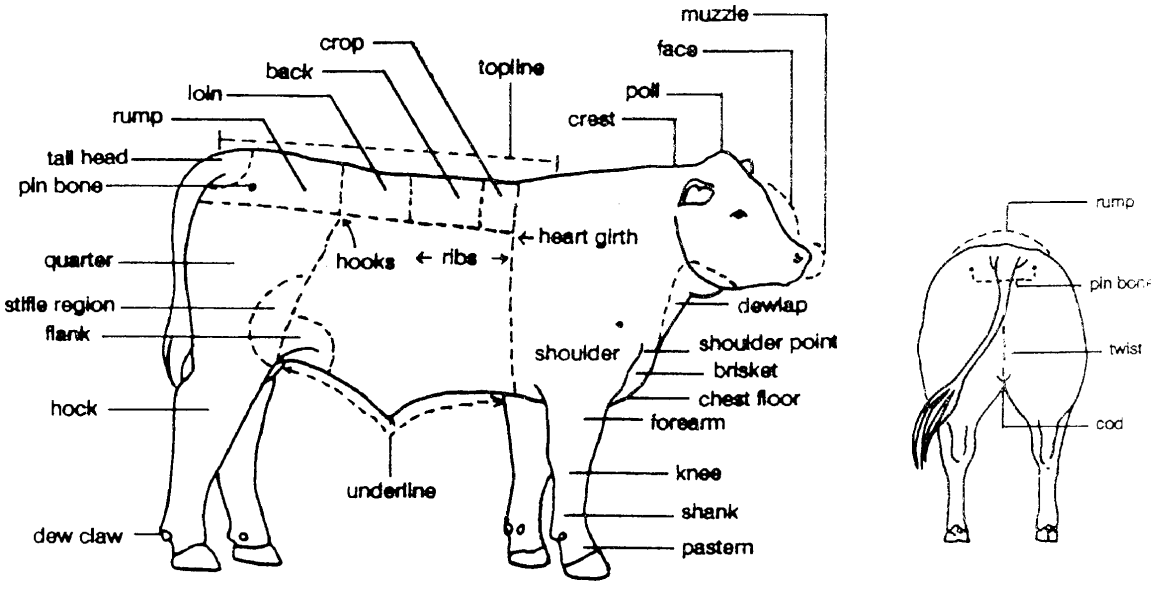
The objective of this unit is to:

1. Give you background knowledge of the structure and function of the beef animal so you know the important points to look for when judging beef.

2. Show you how to determine if a particular animal possesses these important traits.

First we must know what a beef animal looks like...

PARTS OF THE BEEF ANIMAL



BEEF TERMINOLOGY

One of the most confusing things about judging is the terms we use to describe the animals. It may be hard to define some of these terms because they have different meanings to different people. Let's have a look at some of the more common terms and their definitions.

Market Steer Terminology

Muscle
- red meat or lean.
- that part of the carcass which is not bone or fat.

Carcass
- the part of the animal which remains after the removal of the head, feet, hide and internal organs.
- the carcass is composed of bone, muscle, fat and connective tissue.

Finish
- the amount of fat covering on a market animal.

overfinished - the animal has too much fat cover.

underfinished - the animal doesn't have enough fat cover to fall into a desired grade.

Cutability
- the saleable meat in proportion to the total carcass.
- a high cutability, or high proportion of red meat to bone and fat, is desirable.

Frame
- skeleton size.
- this can be determined by looking at bone length and width and is easy to see in areas where there is nothing but bone, such as the cannon bones.

Structure
- must be sound or free from any defects which inhibit performance.
- must be correct and show the desired structural traits.

Balance
- the overall view of the animal, including how well the parts blend into one another and how freely and smoothly the animal moves.

Trimness
- freedom from excess fat or finish.
- this can be determined by looking at places where fat tends to accumulate - the brisket, flank, and twist.

Grade
- the description of a carcass receives based on maturity of the carcass, the quality (colour, texture, and firmness of the muscle and fat) and the meat yield.

Style
- way of going, alertness, gait, colouring.
- this is often referred to as eye appeal.

Meatiness
- the degree of muscling.
- a meaty animal will have superior muscling.

Breeding Animal Terminology

The terms used for breeding stock are similar to those used for market animals. Soundness, correctness and breed character are most important in conformation of beef breeding stock. There are several terms which relate to these qualities.

Conformation - the overall structure of the animal.
- includes all the points mentioned.

Masculinity - this term is used to describe bulls.
- massiveness and strength of the animal.
- secondary sex characteristics such as well developed and defined muscles, thickness throughout the shoulder, neck and crest regions, overall well developed forequarters and a well developed scrotum.

Femininity - this term is used to describe heifers and cows.
- refinement of the head, neck and shoulders, the degree of muscling, evidence of udder and teat development.
- females should have smoother muscling than bulls and should be more refined through the head, neck and shoulder.

Breed Character - the shape of head, length of body, height, colour markings and other characteristics as defined by the Breed Associations as characteristic of that breed.

Condition -this means the same thing as finish does for the market animal.
- It is the amount of fat and muscle that the animal is carrying.

Broodiness -indicators that a female will be or is a good mother.
- includes adequate size and frame to carry a calf, udder and teat development and disposition.

Capacity - also means volume or depth.
- the size and frame of an animal in relation to its ability to carry a calf, develop desirable muscling, and remain structurally sound over the years.

Progeny - the offspring of calves of a female or bull.

JUDGING THE CARCASS CLASS

When you judge a carcass class, you do the same thing as the graders.

You look for the carcass or carcasses which will grade Canada A1. You place the carcasses in order from highest to lowest quality.

The steps you should follow are:

1. Determine the maturity. You can determine this by looking at the amount of bone ossification or hardening.

2. Check the colour of the muscle and fat. Look for bright red meat and a white fat cover.

3. Check the yield. Look between the 12th and 13th rib and see how much fat there is. A Canada Grade A1 must have between 4 and 10 mm of fat.

Look for a carcass that has ample red meat. The muscles should be large and bulging with the appropriate amount of fat cover. The muscles

should be long and tapered where they attach to the bones and full and thick in the middle. Check to make sure the meat is firm and "bounces" back when you press into it. Remember that muscle is firm and fat is soft.

RESOURCES

Canadian Cattlemen's Association

Suite #215
6715 - 8th Street N.E.
Calgary, Alberta
T6E 7H7

Cattle… Good for the Environment

The Canadian Cattle Industry and the Environment - Just Facts

Beef Information Centre

1081 Roosevelt Crescent
North Vancouver, B.C.
V2P 1M4

Cattle are Environmentally Friendly

No Bull, Just Facts - Straight Answers on Drug Use in Beef Production

Is Beef Getting a Bum Rap? Harrowsmith Magazine (reprint) February 1994

Beef Up Your Business - So What Do You Know About Beef?

How Now Green Cow - The Role of Cattle in World Food and Environmental Issues

Beef Pasture to Platter VHS video - 7 minutes

Environmental Sustainability of the Beef Industry

British Columbia Cattlemen's Association

10145 East Trans Canada Highway
R.R.#2
Kamloops, B.C.
V2C 2J3

Meet Molly - Your Friend and a Friend of the Environment

British Columbia Ministry of Agriculture, Fisheries and Food

Resource Management Branch
Abbotsford Agriculture Centre
1767 Angus Campbell Road
Abbotsford, B.C.
V3G 2M3

Environmental Guidelines for Beef Producers in B.C.

Weigel Educational Publishers Limited

2114 College Avenue
Regina, Saskatchewan
S4P 1C5

The Living Soil: Land Use and Society
(ISBN 0-919879-54-3)
This is a sixty-four page workbook for youth which is recommended as a resource for teaching issues related to agricultural sustainability. It includes a variety of environmental activities.

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