Carcass Data Collection Guidelines

Canadian Simmental Association
Guidelines for the collection of
carcass and ultrasound data
for use in genetic improvement programs.

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Introduction

Beef cattle breeders are in an extremely powerful position in maintaining and improving the quality of the Canadian beef supply. The old adage that you can't make a silk purse out of a sow's ear is true in the beef world as well, and genetic inputs control the end product quality.

Research shows that carcass traits tend to be in the moderately heritable range (0.26 to 0.35), meaning that genetic selection using tools like carcass EPDs can be very effective in maintaining and improving upon various attributes of carcass merit.

Canadian Simmental breeders have a variety of options at their disposal for the collection of valuable carcass and/or ultrasound data that can be included in genetic evaluation and used to enhance carcass traits, and target specific markets. The purpose of this document is to provide an outline of these options. By outlining some of the options and important points on data structure, producers who are interested in investing time and money in carcass testing can ensure that their data is as useful as possible for evaluation.

The practical application of these guidelines can be as varied as a producer's imagination.

Why Carcass and Ultrasound Data

The question often arises as to why we should collect carcass/ultrasound data at all, and why we don't collect one over the other. Historically carcass information has proven difficult and often expensive to gather. If we look at Canada's place in the global beef industry and our global competitive advantages, it becomes evident that we need to objectively measure carcass characteristics in order to maintain and improve our position in the global beef business.

The heritability of carcass traits is generally described as being moderate, which means that selection on these traits can result in reasonably rapid progress.

Table 1. Heritabilities of Simmental Carcass Traits	
Carcass Weight	0.34
Percent Retail Cuts	0.26
Marbling Score	0.35

Carcass data and ultrasound data are not the same thing, and one cannot replace the other however they are ideal complements to each other to increase the amount of information available on the relevant carcass traits in seedstock. Because of the complementarities between carcass and ultrasound data, they can provide a powerful tool for genetic improvement when combined.

Carcass data provides a good measure of the actual performance of our breeding stock, under industry and various market conditions. Ultrasound provides us with a way to rapidly and inexpensively collect data on young potential seedstock.

How Does Carcass and Ultrasound Data Fit Together?

As previously stated, carcass data and ultrasound data, although similar are not identical or replaceable measures for each other. They do however provide various advantages and when pooled together with growth data in a genetic evaluation, can provide a complete picture of relative carcass merit of seedstock animals.

The advantages of carcass data are that it provides a working base for the evaluation and lets us accurately evaluate progress and provide perspective to the ultrasound data.

Ultrasound data provides a rapid, relatively low cost way to assess young seedstock and collect large volumes of data on replacement animals.

Because of the nature of the two types of data, it is vital that datasets are complete where possible for all animals. For example, if you have a group of calves that is split with carcass data collected on half and ultrasound collected on the other half, it is imperative that complete growth data on the entire group is submitted. This provides the ties needed to establish the proper perspective of the where animals rank against each other in the herd.

In effect the growth and pedigree data provide the links to tie all the different types of carcass and ultrasound information together.

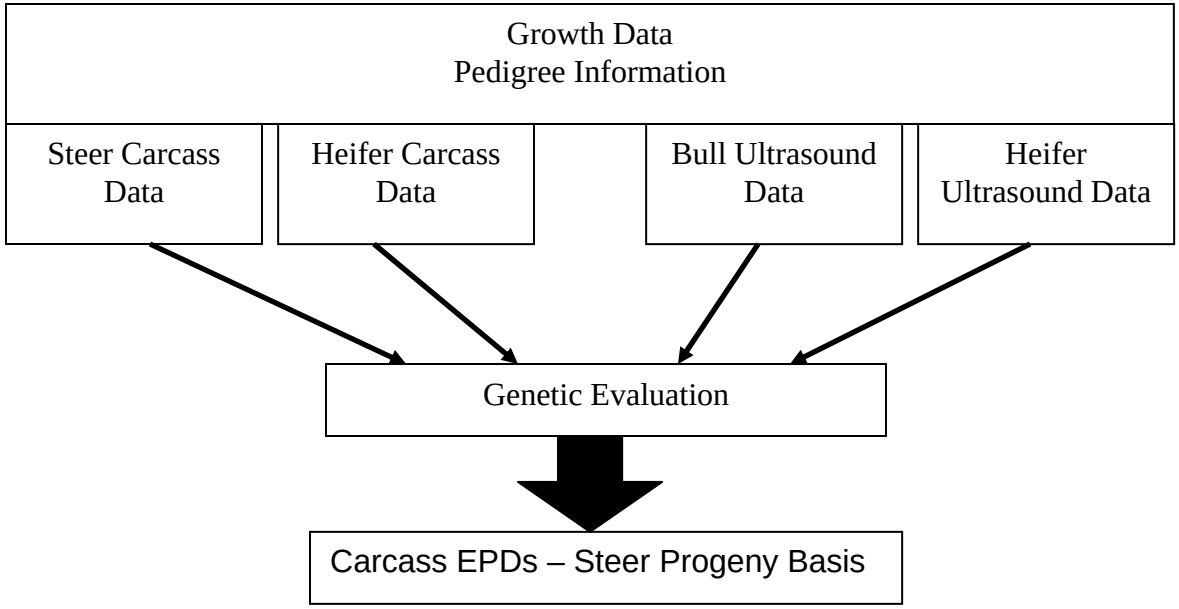


Figure 2: diagrammatic representation of how carcass and ultrasound data complement each other in genetic evaluation, and how growth data ties the carcass and ultrasound data together.

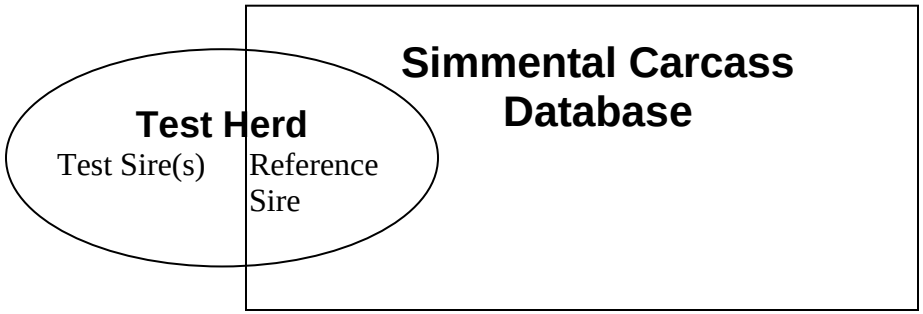
Key Points

Contemporary Groups – A contemporary group is defined as a group of calves of the same sex, and breed composition, born with a 90 day time frame that are managed in the same way. This is a key concept for genetic evaluation, as only those animals that are in the same contemporary group are directly compared. Contemporary groups help to account for environmental differences, as animals in the same contemporary group have been exposed to the same environment, therefore differences should largely be genetic in nature. Accurately defining management groups, birth date and breed composition are key concerns for accurate genetic evaluation.

Animals should be managed together with minimal culling occurring prior to weaning weigh dates, and preferably throughout the entire test.

Contemporary groups containing only 1 calf cannot be used for genetic evaluation. In other words, an ultrasound or carcass record on only one animal is not useful data for genetic evaluation.

Reference Sires – It is important that sires to be tested can be linked to the existing carcass database. For this reason the use of a reference sire is strongly encouraged. An ideal reference sire should be a bull with strong ties to the general Simmental population, and should have high carcass EPD accuracies. The reference sire in the breeding program ties the data to the carcass database, and also provides ties between contemporary groups and over time.



A list of approved reference sires can be obtained from the CSA.

Figure 2: The reference sire is a sire that has already been tested with other sires, and thus provides a direct link to the carcass database. This allows direct comparison between the new test sire and other animals in the carcass database.

- χ A record on a single animal with no contemporaries cannot be used for genetic evaluation

- ✓ Randomly mate cows to test bulls.
- ✓ Mate bulls at the same time so that the offspring have the same average age.
- ✓ Rear the calves together and treat them all alike.
- ✓ Apply minimal culling to the calves at least prior to the first weighing (eg. weaning).
- ✓ Slaughter the calves as a group.
- ✓ If the offspring have to be split into groups for practical management, make sure that each bull is represented in each group.
- ✓ If the progeny test is carried out over more than one operation, the best design is to use all bulls on all operations. However, this can be relaxed by having at least one sire that links the operations provided he has sufficient progeny on each property.

Progeny Numbers – while there is no specific requirement for number of progeny per test sire, the more progeny that can be tested the higher the resulting accuracy of the EPDs (the more reliable they are). As more progeny are tested, the total cost of testing increases. It is also important to consider that the number of progeny tested may be higher than the number of progeny that can be included in the genetic evaluation. For example, calves may get sick while on feed, and thus should not be grouped with progeny that were healthy throughout the finishing phase. Resulting accuracy values will vary based on contemporary group size, number of sires represented in the contemporary group, data quality and structure of the progeny test. These factors combine to result in the 'effective' number of progeny that result in the ensuing accuracy.

Effective Progeny Number (EPN) – An indication of the amount of information available for estimation of expected progeny differences (EPDs) in cattle evaluation. It is a function of number of progeny of a parent, but is adjusted for their distribution among herds and contemporary groups and for the number of contemporaries by other sires. EPN is less than the actual number of progeny because the distribution of progeny is never ideal.

It is recommended under ideal conditions that the test be structured to target at least 25 progeny from randomly mated females be available for slaughter from a single reference sire, or a combination of 20 calves from two reference sires. Tests with fewer progeny per bull are possible, however it is important to remember that there is less room for error and that the ensuing genetic evaluation will be less accurate. Fewer progeny may be a good option for those wishing to test several potential young sires.

Mating Protocol

While it is possible that a breeder may own the walking rights on a highly proven carcass sire, the use of reference sires, infers that an artificial insemination program is likely to be required. It is recommended that some form of estrus synchronization be utilised in order to reduce variation in the age of the calf crop and produce more uniform contemporary group structure.

It is also vital that mating be conducted in a random manner, with no preselection of which test sire should be mated to which cow.

Animal Identification

Loss of identification is the most common cause of lost progeny test records. Sires, Dams and Calves all need to be uniquely identified. Various slaughter plants require different types of identification such as electronic tags for collection of carcass data on calves, and it is important to check with the respective plant prior to slaughter to ensure that these needs are met. As well, cattle are often retagged upon

- χ Loss of animal identification between production stages is one of the primary reasons for lost data
- ✓ It is important to maintain a record of each calf's national identification number, visual tag number, feedlot tag, electronic tag and carcass number

entering various stages of production. It is essential to maintain an accurate and detailed cross reference file of the tag for each animal. The national identification number is a good reference number for this purpose.

Information to be Maintained in the Cross Reference File (where applicable)
National Identfication Number (CCIA)
Visual Tag Number / Colour
Feedlot Tag Number / Colour
Electronic Identification Number (EID)
Carcass Number

Finishing and Slaughter Guidelines
Cattle can either be placed directly on feed following weaning or can go on a backgrounding protocol. Cattle should be on feed for a minimum of 180 days following weaning and 100 days following backgrounding. For cattle that are backgrounded a weight should be taken at the end of the backgrounding phase at approximately 1 year of age, and again at the end of the finishing stage.

- ✓ Ensure all animals are treated in the same way at the feedlot
- ✓ Slaughter all calves at a group average back fat

Weights should be taken on all calves at weaning, even those that are not continuing on test (eg: Option 3: Carcass Data on Non-Select Progeny)While post-weaning gain testing is optional, it is STRONGLY RECOMMENDED as it can greatly increase the accuracy of genetic evaluation and the subsequent value of the data collected. Cattle should be fed as a group in the same facility.

Cattle should be slaughtered at a relatively constant body composition (backfat) endpoint prior to 18 months of age and at a maximum weight of 1350 pounds. When the group reaches this average compositional endpoint, the entire group should be slaughtered together. This allows for direct comparison of slaughter results and maintains contemporary group definitions. This is key to a successful test. Pens should not be “skimmed” for cattle that are finished, while leaving others on feed for an extended time period.

Industry Standard Procedures
Industry standard procedures for transport, handling, and humane and hygienic slaughter are recommended and endorsed for progeny testing. Additionally, procedures such as implanting and vaccination upon feedlot entry are also recognised as industry standard procedures, and can be used by producers where desired. It is important that if treatments are done that they are done across the entire group. For example, if calves are to be implanted at feedlot entry, then all calves should be implanted with the same protocol and implant product.

Data Requirements for Genetic Evaluation

Key to the success of carcass data evaluation is proper data structure and collection of all relevant traits. Participation in carcass data collection occurs well before any carcass data is collected. In order to conduct genetic evaluation on the information it is important that several pre-slaughter measures are taken.

Required data is indicated with an *****, however collection of optional data can produce dramatically more accurate proofs and collection of this information is recommended where possible.

Pre-Weaning Data

In order to accurately evaluate carcass data, certain data is required in advance of carcass data collection.

National Identification Number
Herd Identification (Unique animal identification)
Dam identification (CSA Registration number if it is a registered dam)
Dam breed makeup
Sire identification (CSA Registration number)
Birth date (Day/Month/Year Format)
Sex (M/F/S)
Birth Management Group
Birth weight (optional)
Calving Ease (optional)
Weaning date
Weaning weight
Weaning Management Group
Castration date (if applicable)

Post-Weaning Data

Feedlot Identification (cross-referenced to birth herd identification)
On Test Date
On Test Weight
Yearling Date
Yearling Weight
Yearling Management Group

It is advisable that those animals to be tested, as well as all of their contemporaries be evaluated at each stage of production (Birth, Weaning, Yearling) prior to slaughter as this provides background information that results in a more accurate evaluation of relative carcass merit.

Carcass Data

Electronic or Feedlot identification (cross-referenced to birth herd identification)
Plant / Grader
Slaughter Date
Slaughter Live Weight
Hot Carcass Weight
Rib-Eye Area
Average Fat
- 3 fat measurements around the 13th rib

Grade Fat
Muscle Score
Marbling Grade and Score

Table 2..Suggested Calendar for Carcass Data Collection

Date	Action
Prior to Weaning	- explore marketing and feeding options, trying to select a feedlot and/or buyer that can work with selected packing plants to collect detailed carcass information
One Month Prior to Slaughter	- contact the beef grader and inform them that you will be sending cattle - contact the Canadian Simmental Association for information and carcass data collection forms
One Week Prior to Slaughter	- reconfirm with the plant, the grader and the Canadian Simmental Association - schedule a visit with the plant to view grading if possible
Date of Shipping	- inform the plant the cattle are arriving and ensure they are collecting ear tag, carcass number and carcass weight - contact the grader and inform them that the cattle have been shipped (with approximate kill time if possible)
Day of Grading	- attend grading if possible (admission to the plant is not possible in all facilities)
Carcass Reports Received from the Grader	- submit carcass information including tattoos and management groups to the Canadian Simmental Association

Ownership Options

There are a variety of ownership option available to producers interested in participating on a progeny testing program. While producers may wish to retain 100 percent ownership of their cattle through the entire testing process, this is not required. A data transfer agreement can also be arranged between the producer, the CSA and the other participants down the production chain. This ensures that the data on the cattle is collected and available for genetic evaluation, yet does not require ownership of the calves by the cowherd, or bull owner.

The CSA will work with interested producers to arrange suitable marketing arrangements, however the CSA in no way assumes responsibility for ownership or marketing of calves on the program. Producers are encouraged to optimise the value they receive for their cattle.

- ✓ Data Transfer Agreements can be used to ensure that feedlot and/or slaughter information is reported on calves

Option 1: Participation in an Organized Progeny Testing Program

The major difference between an organised progeny test and some of the other options for collection of carcass data is primarily in the level of supervision and control over the structure of the data that is collected.

While it is possible for individual producers to design and operate an organised progeny test, the CSA is working with producers and cowherds to supervise a structured progeny test. There are two options available in option 1. They are as follows:

a) $3000 and 60 straws of semen
This options targets 25 to 30 slaughter progeny and produces a carcass evaluation with a relatively high accuracy. A sire that participates in this option is eligible for reference sire status. This is a good option for herdsires, and AI sires.

b) $1500 and 30 straws of semen
This option targets roughly 12 to 15 slaughter progeny and produces a less accurate proof on the sire. Option b is an excellent choice for testing a larger number of young potential sires.

- ✓ Participation in an organised carcass progeny testing program may require export qualified semen – consult your AI stud for details

The costs associated with the program cover the cost of breeding the cowherd, obtaining reference sire semen, electronic identification tags, and staff time involved in co-ordination of the project.

In the program, cows are randomly mated and information on the offspring is recorded. Additionally, calves are tracked through the feedlot and the packing plant and detailed grading information is obtained. All cows used in the program are uniquely identified.

Producers who are interested in organising their own progeny testing program are encouraged to contact the CSA prior to embarking on the process (see Option 2).

Option 2: Producer Organised Progeny Testing Program

In a producer organised progeny testing program, the individual seedstock provider organises the matings, and the data collection. This option is more structured than Option 4: Collection of Carcass Data on Commercial Progeny of a Purebred Sire and involves more than simply collecting commercial data, as the program is designed with structured matings, reference sires, and collection of data for genetic evaluation in mind.

It is important to include the use of a reference sire in designing the test, and to ensure that random mating occurs. It is possible for seedstock producers to operate this type of test in their own herds, or in their commercial customers herds. Keys to the success of any type of program of this nature is contemporary group structure, random mating, use of a reference sire and accurate and complete data collection.

An organised progeny test is a large undertaking and a significant investment of time and money may be required. It is essential to try to maximize the value of the data collected.

Technical guidance is available by contacting the Canadian Simmental Association office.

Option 3: Carcass Data Collection on Non-Selected Progeny

This option is where a breeder chooses to feed out the calves that are not selected as replacement seedstock animals. It is imperative that if this option is to be used, that complete growth data on all calves is reported, including both selected and non-selected animals. This allows the proper emphasis to be put on the records during genetic analysis.

There is opportunity for interested breeders to work together to feed out larger pens of cattle, or to work with existing facilities such as bull test stations to feed out and collect data on these non select seedstock.

It is also strongly recommended that if this option is used, that selected replacement animals be scanned using approved ultrasound technology and technicians.

- ✓ If collecting carcass data on non-select progeny, collect complete pre-slaughter data on all animals and ultrasound data on animals that are kept as replacements

Option 4: Collection of Carcass Data on Commercial Progeny of a Purebred Sire

It is possible, if calves can be traced back to their original sire, to collect carcass data from commercial calves that can be used in genetic evaluation. Purebred producers who also operate commercial herds, or have customers who retain ownership on their commercial cattle may find this to be a useful option. This option may be especially useful for those commercial producers who are using artificial insemination in their breeding programs and can readily sire identify their calves.

There are a wide variety of options available to producers such as partial ownership of feedlot pens, pooling cattle from various operations or working with a feedlot to share data.

In truth the collection of carcass data is only limited by data requirements, and the ingenuity of the participants.

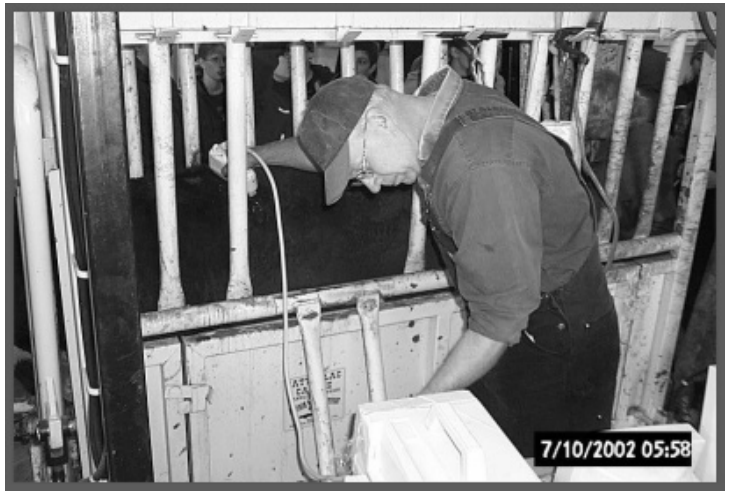
- ✓ If collecting carcass data on commercial progeny, they must be sire identified
- ✓ It is important to record dam information and growth information on commercial calves

Option 5: Ultrasound Data Collection

Ultrasound uses high frequency sound waves to penetrate the animal's hide. As these waves encounter different types of tissue, they "bounce back" to a receiver at different speeds and computer software then interprets the reflected sound waves to produce a 3 dimensional image. Ultrasound works in a manner very similar to the SONAR found in submarines.

Although not the same as carcass data, ultrasound data is a perfect complement to a carcass data collection program. Ultrasound provides a relatively low cost way to rapidly collect carcass indicator information on young seedstock. Other advantages of ultrasound include:

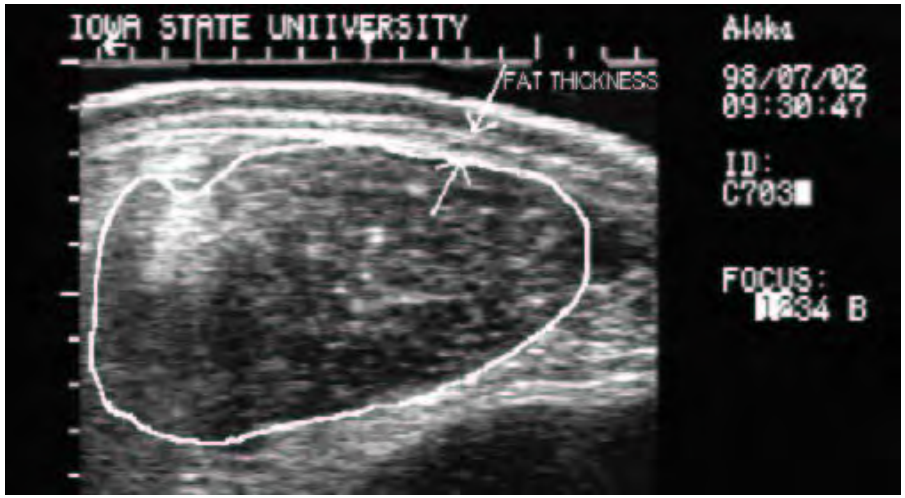
Relatively low cost
Non-invasive technology
Ability to collect images on live animals and replacements
Ability to rapidly collect large amounts of data
Ability to reduce generation interval



Ultrasound is rapidly becoming a valuable tool in the genetic selection toolbox. If we believe that the genetics we produce will be multiplied through the commercial industry and that the ultimate result of this is beef; then we must also acknowledge that the end consumer ultimately drives demand for our product. If this is the case, then hopefully end product considerations enter our selection decisions and ultrasound becomes a technology that should be considered in a breeding program.

- ✓ Always use a certified technician and laboratory to collect and process images

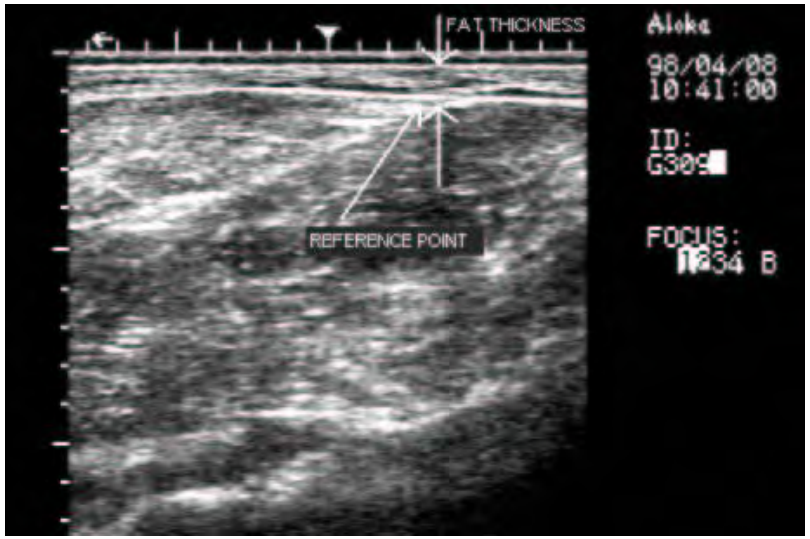
The advantages of ultrasound are many. Collection of ultrasound records is relatively low cost, when compared with operating an organised progeny testing program. Since many more ultrasound records can be collected than carcass progeny records the resulting carcass EPD are more accurate using ultrasound and carcass data together. As well there is the opportunity to scan animals at around a year of age and produce a genetic evaluation. In a carcass testing scenario, a bull will sire calves at one year of age, and the calves will not be ready for slaughter until the sire is 3 years old, at the earliest. Therefore using genetic evaluations including ultrasound measures allows for earlier and more accurate selection decisions, shortens the generation interval and increases response to selection. Ultrasound is also highly repeatable (consistent), heritable (passed on) and highly correlated (related to) with carcass traits.



Ultrasound basically works by using a transducer on the outside of the animal between the 12th and 13th rib. This machine sends high energy sound waves into the rib-eye, and as the waves encounter different types of tissue, such as fat or muscle, they bounce back with different speeds, where they are picked up by the transducer again, creating a picture. Using analysis software and a trained technician, the picture can be evaluated for back fat, rib-eye area and marbling. An ultrasound image is a snapshot in time of the dynamic rib-eye of a living animal.

- ✓ Technicians are often busy, contact them early
- ✓ By working with neighbours to schedule a technician visit to your area scanning costs can be reduced

It is important to note that an ultrasound record on an animal is not the same as a carcass record from progeny of an animal. It is also important to note that an ultrasound record on a young replacement bull or heifer is not the same as either an ultrasound or a carcass record on a finished steer or heifer. What is important is that ultrasound can help determine differences between animals, and that these differences are reflected in their progeny. If for example, we are selecting for larger rib-eye areas, it does not matter that ultrasound records do not measure exactly the same thing as carcass records from progeny. What is important is that selection on either a carcass or ultrasound basis ultimately leads to the same end result, progeny with larger rib-eyes in this case.



It is also important to ensure that information you collect has the most value possible. Scans should be taken on cattle between 12 and 15 months of age, using a certified technician. As well, complete contemporary groups should be scanned. Scanning one prize winning bull calf accomplishes nothing, as there is no basis for comparison. Scanning all of your bull and heifer calves will result in information that can be used to accurately determine differences and thus selection decisions. Scanning yearling heifers is extremely valuable. Since yearling heifers tend to deposit more fat than yearling bulls their ultrasound measurements tend to be better associated with progeny carcass fat measures than yearling bull ultrasound measures.

- ✓ Ultrasound images should be collected on complete contemporary groups

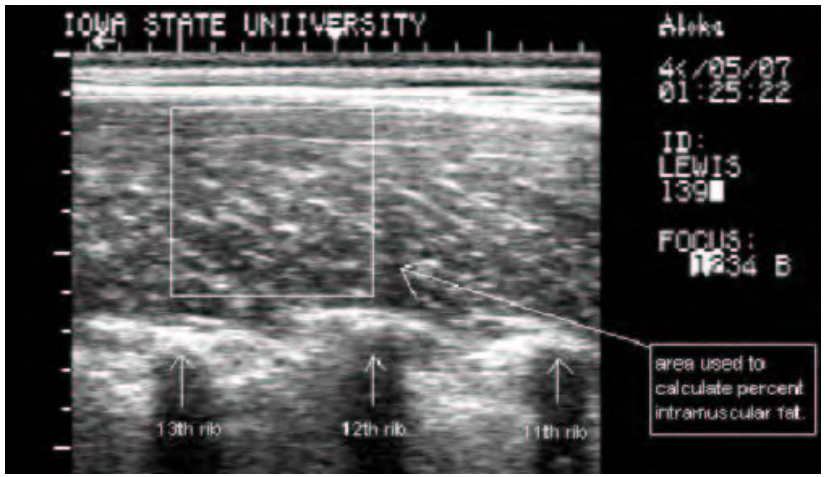
Images should be collected on complete contemporary groups. Ideally both heifers and bulls will be scanned. It is also extremely important that all animals in the herd have performance records that are as complete as possible. This includes calves that may have been culled prior to scanning. Because traits are interrelated, information on calves included up to weaning can be included in genetic evaluation to help improve the accuracy of the calculations, and therefore better portray the end product genetics of scanned seedstock.

As previously stated, ultrasound allows us to rapidly and relatively inexpensively collect large volumes of data on young seedstock that can be used to augment existing and future carcass data. By funnelling growth, carcass and ultrasound information through genetic evaluation, we arrive at a set of carcass EPD values that express genetic differences between animals, based on the performance of slaughter steer progeny.

Ultrasound Guidelines Council (UGC)

UGC is the regulatory body governing the use of ultrasound technology for beef cattle selection.

"The Beef Cattle Ultrasound Technician UGC program is a new beef industry organization responsible for developing, maintaining and governing proficiency-testing protocol and standards for all beef cattle ultrasound technician certification. The program committee is composed of beef breed organization representatives nominated by the U.S. Beef Breeds Council, university personnel involved in ultrasound research and national cattle evaluation programs using ultrasound data, representatives from industry companies and technician organizations that support the beef cattle industry through ultrasound service programs." www.ultrasoundbeef.com December 3, 2002



- ✓ Ultrasound Images should be collected on cattle between 320 and 430 days of age

In order to have ultrasound records accepted by the CSA and included in a North American evaluation it is important that the images are collected and interpreted by an UGC certified personnel. This will ensure that the ultrasound measures are accurate and repeatable across different locations.

Two areas of proficiency testing and certification are available: Image collection (field certification) and laboratory interpretation (lab certification). Images collection includes a rump image, 12-13th rib cross-sectional image and percent intramuscular fat images. Laboratory interpretation covers both image quality assessment as well as performing the measurements for the ultrasound traits.

Field technicians are evaluated for the ability to collect quality images. Lab technicians are tested for their ability to interpret images and identify quality images from inadequate images. Testing includes both a practical and written component with required marks on each to achieve certification.

Approved scanning technology includes:
Aloka 500 with 17cm transducer
Aloka 500 (new) with image magnification and 17cm transducer
Classic Scanner 200 with 18cm transducer
Falco 100 with 18cm transducer

- ✓ Ultrasound Images from heifers provide valuable information about marbling

Guidelines:

1. Ultrasound images should be collected by an UGC certified field technician.
2. Images should be interpreted by an UGC certified lab technician, and results reported to the association for inclusion in the ultrasound database and genetic evaluation.
3. Scanning should be done on complete contemporary groups of calves between 320 and 430 days of age.
4. Complete performance records should be available on all calves in the contemporary group (including those culled from the group prior to scanning).
5. Ultrasound should be collected on animals receiving enough energy in the diet to express differences/variation in marbling.
6. **Book early!!!** Ultrasound technicians are limited and very busy. Book early to avoid disappointment. Even 6 to 8 weeks early may not be soon enough to book an appointment. Ultrasound technicians are generally very busy at this time of year, and co-ordination should be done as soon as possible for those interested. Travel costs and sometimes scan costs can often be reduced by scheduling a time when the technician is in your area, or working with neighbours to provide larger groups of cattle in the local area for scanning.

- χ Ultrasound images on only 1 animal cannot be used for genetic evaluation
- χ Chute side (non UGC) images cannot be used for genetic evaluation

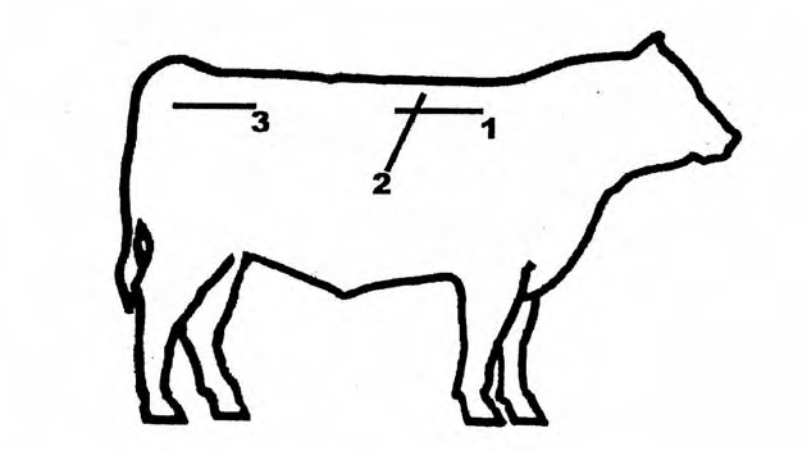
Steps to Follow:

1. Contact your technician. Ensure you clarify that you want to have UGC ultrasound done as chute side data cannot be included in genetic evaluation
2. Contact the CSA to obtain Barnsheets
3. Submit your images and Barnsheets to an approved laboratory. These labs are in the United States so ensure that the package in sent and labelled as “no value” for customs. Additionally,

some labs do not process images on account. You may wish to contact the lab with your credit card to ensure rapid processing of your images.

4. Reports will be received from the CSA upon receipt of the ultrasound data from the lab.

Table 3. Canadian Ultrasound Technicians
For an Up to Date list of Technicians and Approved Labs please visit: **www.ultrasoundbeef.com**



Transducer positions

1. Intramuscular Fat (Marbling)
2. Rib-Eye Area, Rib Fat
3. Rump Fat

Picture from BIF Guidelines for Uniform Beef Improvement Programs Eighth Edition.

Genetic Evaluation – Carcass EPDs

All carcass and ultrasound data that is collected is submitted to the Multi-Breed International Cattle Evaluation conducted at Cornell University. There the data is pooled with that collected by the American Simmental Association, edited for correctness and evaluated.

The end result of this process is carcass EPDs.

Simmental carcass EPDs are calculated for Carcass Weight, Rib-Eye Area, Backfat, Marbling Score and Percent Retail Cuts.

Carcass Weight – The hot carcass weight of a bull's progeny. Expected progeny performance is reported in pounds and adjusted to a slaughter age of 475 days. The EPD predicts the difference in average carcass weight of a bull's progeny, compared to progeny of all other bulls evaluated. A positive value indicates heavier than average carcass weights, while a negative value (-) indicates lighter than average carcass weights.

Marbling Score – A subjective evaluation of the amount and distribution of intramuscular fat. Degree of marbling is evaluated in the rib-eye muscle between the 12th and 13th rib and is a major factor in determining USDA quality grade. Carcass marbling scores range from 1 (devoid) to 10 (abundant). Expected progeny performance is reported on a carcass basis in tenths of a marbling score and adjusted to slaughter age of 475 days. The EPD value predicts the difference in average marbling score of an animal's progeny compared to progeny of all other evaluated bulls. A positive value indicates higher than average marbling scores, while a negative value (-) indicates lower than average scores.

Percent Retail Cuts – An estimate of the yield of closely trimmed, boneless retail cuts from the round, loin, rib and chuck. Expected progeny performance is reported in percent and adjusted to a slaughter age of 475 days. The EPD predicts the difference in average cutability with values greater than zero indicating higher than average percentage yield in retail cuts, while a negative value (-) indicates less than average percentage yield in retail cuts.

Rib-Eye Area – The rib-eye area of a bull's progeny as measured by a grader between the 12^{th} and 13^{th} rib. Expected progeny performance is reported in square inches and adjusted to a slaughter age of 475 days. The EPD predicts the difference in average rib-eye area of a bull's progeny in relation to progeny of all other sires evaluated. A positive value indicates a larger then average rib-eye area, while a negative value (-) indicates a smaller than average rib-eye.

Back Fat – the back fat measurement of a bull's progeny as measured by a grader on the 12th rib. Expected progeny performance is reported in tenths of inches and is adjusted to 475 days of age. The EPD predicts the average difference in backfat from a bull's progeny in comparison to all other bulls evaluated. A positive value indicates a relatively fatter carcass, while a negative (-) value indicates a carcasses carrying less than the average amount of back fat.

1 inch = 25.4 millimetres
1/10 inch = 2.54 millimetres

Comparison of US and Canadian Carcass traits

Carcass trait EPDs are based on the USDA grading system. The marbling grades differ between the two systems as do the carcass yield calculations. Table 9 provides a comparison between the quality grades of the two systems and the marbling score.

This genetic evaluation uses Percent Retail Cuts to estimate carcass yield which is described by the following formula:
Percent Retail Cuts (%) = 51.54 – 5.784*rib fat (in.) – 0.462*kidney/pelvic/heart fat (%) -0.0093*carcass weight (lbs) + 0.740* ribeye area (in.2)

Table 4. Quality Grade (Marbling) Comparison

USDA Grade	CBGA Grade	Description
Prime	Prime (AAAA)	Slightly abundant
Choice	AAA	Small
Select	AA	Slight
Standard *	A	Traces
	B1	Devoid
* USDA Standard does not correspond exactly with CBGA A grade due to slight differences in other quality attributes within the grading systems.		

The Canadian system calculates Lean percent as follows: Lean % = 63.65 + 1.05 (muscle score) - .76 (grade fat) where muscle score and grade fat are measured using the Yield Ruler. Producers can compare these two calculations to determine the impact of carcass EPDs.

Grading of beef carcass is conducted by the United States Department of Agriculture (USDA) and the Canadian Beef Grading Agency (CBGA) respectively. For further information view the following websites: http://www.telusplanet.net/public/cbga/ or www.cbef.com for Canadian information , http://www.beefimprovement.org/proceedings/tait.html for information on the percent retail cuts equation and http://www.beefimprovement.org/guidelines/App3-2.PDF for marbling scores and quality grades and http://www.beefimprovement.org/guidelines/Chap3.PDF for general information on evaluation for carcass merit.

Sample Carcass Data Collection Forms

CSA Member #:_____ Name:_____

Plant:_____ Lot #:_____ Grader:_____

Kill Date (D/M/Y):____ / ____ / _____ Grading Date (D/M/Y): ____ / ____ / _____

#	Carcass ID	Tattoo / Tag	Hot Carcass Weight	Rib-Eye Area	Fat 1	Fat 2	Fat 3 Grade	Marbling		Muscle Score
								Grade	Score	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

Notes:

Usually your grader will have grading forms, however copies are available from www.simmental.com or the CSA office.

Sample Ultrasound Data Collection Forms

Canadian Simmental Association **Ultrasound Barn Sheet**

Refnum	Tattoo	Tag	Sex	Birth Date (dd/mm/yyyy)	Sire Reg	Dam Reg	Scan Weight (lbs)	Scan Date (dd/mm/yyyy)	Mgt Date (dd/mm/yyyy)	Scan Grp Code	Type (Y,S)	Sex (M,F,S)	Diet	Comments
2002123456	ABC	2003M	M	15/01/2002	123456	654321								
2002123457	ABC	2005M	M	27/01/2002	123456	654322								

Ultrasound Barn Sheets are pre-printed and must be obtained by contacting the Canadian Simmental Association office.

Recommended Reading

Canadian Food Inspection Agency Meat Cuts Manual
http://www.inspection.gc.ca/english/bureau/mcmancv/mcmancve.shtml
Canadian Beef Grading Agency
http://www.telusplanet.net/public/cbga/
Canadian Beef Export Federation
http://www.cbef.com
Beef Improvement Federation
http://www.beefimprovement.org
http://www.beefimprovement.org/proceedings/tait.html
http://www.beefimprovement.org/guidelines/App3-2.PDF
http://www.beefimprovement.org/guidelines/Chap3.PDF
Bovine Myology and Muscle Profiling
http://bovine.unl.edu/bovine3D/eng/nIntro.jsp