**Breed Improvement Article**

# Ultrasound, Carcass Value and Genetic Evaluation

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## Introduction

This article was prepared to assist CLA members in understanding the role of ultrasound technology and how ultrasound data can be used in genetic evaluation of carcass value traits. The topic of ultrasound is very confusing given all the information that is available and the fact that all breed associations have not adopted a standard approach to using ultrasound data. Ultrasound is a very powerful technology when used in a structured herd-recording and genetic improvement program. Ultrasound data used in isolation with measurements on a single animal can be very misleading since there is no point of reference to compare the measures against. This is exactly like saying that an animal weighs 1350 pounds. Unless other important information such as breed, age, sex, weight of animals it was raised with, etc. are supplied an animal's weight is essentially useless.

## What should you try to improve – ultrasound or carcass traits?

The underlying facts are that ultrasound is a technology that allows a trained technician to accurately collect rib eye area, fat thickness and percent intramuscular fat data on yearling replacement cattle. However owners of slaughter animals do not get paid for ultrasound traits. They get paid for carcass value of slaughter steers and heifers. Carcass value is determined by Yield Grade (Lean Yield) and Quality Grade (Marbling Score). The lean yield calculation is controlled by three factors: carcass weight, carcass rib eye area and carcass grade fat. Quality grade is simply the carcass marbling score of A, AA, AAA and Prime. There are other factors such as youthfulness of the carcass and meat colour but these are not major factors for most young slaughter steers and heifers. Carcass value traits are of economic importance to your customers. Thus the traits that you want to improve are the ones of economic importance, namely carcass lean yield, carcass grade fat, carcass rib eye area and carcass marbling score.

## Carcass value and ultrasound data – what's the story?

Since breeders can collect a lot more ultrasound than carcass data for the same cost and effort it would be very advantageous to use ultrasound data to assist with genetic improvement of carcass value traits. Thus the keys to the use of ultrasound data are the genetic associations between ultrasound data on young replacement bulls and heifers and carcass value traits on slaughter steers and heifers. Fortunately, research conducted over the past several years has demonstrated that these genetic associations are sufficiently large and positive, generally ranging from 0.6 to 0.8 on a scale of -1 to 1. This indicates that ultrasound technology can be effective for collecting live animal data useful for genetic evaluation of carcass value traits.

## Carcass value EPDs and ultrasound data

The approach that is being explored by the Canadian Limousin Association and North American Limousin Foundation is to combine ultrasound and carcass data in to one genetic evaluation. This is simply an expansion of the current genetic evaluation approach that includes growth traits and milk. This approach utilizes both ultrasound and carcass data to produce carcass value expected progeny differences (EPD). In this system breeders do not have to concern themselves with ultrasound EPD because they have carcass value EPD. Thus the system is simplified and breeding programs can focus on carcass value traits that are key to determining economic value of a carcass.

**Ultrasound data sounds good but what animals should be measured?**

Just like any other trait the more animals that can be accurately recorded the more accurate the EPDs will be. Historically, ultrasound data has been collected on yearling bulls and primarily in test stations. This is useful data but it only represents a small fraction of the Limousin population. Collecting ultrasound data on all yearling animals tested in the herd is a very good strategy. A good rule of thumb is if you collect a yearling weight on an animal collect ultrasound data as well. From a genetic evaluation point of view an ultrasound record on a yearling heifer is worth just as much as an ultrasound record on a yearling bull. Procedures have been developed to include both bull and heifer ultrasound data as separate indicators of carcass value traits in genetic evaluation. In this way ultrasound data from heifers and bulls will be included and correctly weighted for its contribution to carcass value traits. In addition to herd-recorded data, procedures are being developed to include bull test or central test station data in North American Cattle Evaluations.

**If ultrasound is so good why collect carcass data?**

Ultrasound data is very important in genetic evaluation of carcass value traits because ultrasound data can be collected on essentially all cattle, it is collected at a young age and is cheaper to collect than carcass data. With all these advantages ultrasound data sounds like the only data that ever needs to be collected for carcass value traits. However caution must be urged in coming to that conclusion. Remember that ultrasound data is associated with carcass value traits through the genetic correlations between ultrasound and carcass value traits. These correlations are estimated from the population and represent the best estimate over the entire population. In breeding programs we often look for the animals that are outside the usual trends because these are the ones that can contribute the most to genetic improvement. If we do not collect and use actual carcass data then our ability to find these outstanding animals will be diminished because EPD will be bound by the genetic correlations among ultrasound and carcass value traits. Therefore it is important to continue to collect carcass data and utilize both ultrasound and carcass data in genetic evaluation of carcass value traits.

**Summary**

Live animal ultrasound data in combination with carcass data can be a powerful tool to enhance genetic evaluation and selection for carcass value traits. As a good rule of thumb, collect ultrasound data on every animal with yearling weight data. Collection and utilization of ultrasound and carcass data in genetic evaluation is a focus of the CLA breed improvement program. Members with questions about ultrasound are urged to contact a board member or the CLA office.