

CATTLE CALL

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EXTENSION

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Online at beef.ans.msu.edu

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The Five-State Beef Consortium

by Dan Buskirk and Steven Rust, PhDs

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A rapid exodus of small- and medium-size beef operations from rural America is occurring. If beef production is to be sustainable in rural America, several urgent issues need to be addressed. There is a need for producers to unite resources, goals, and management to gain input cost efficiencies, reduce inefficiencies associated with segmentation, create a uniform product, maintain market access, and add value to their product. Cooperative solutions to these issues will increase production efficiency and enhance profitability of small- and medium-size farms.

In 1995 the Five-State Beef Initiative was formed to address common concerns and issues impacting profitability and sustainability of the beef cattle industry in the Eastern Corn Belt. The five states include Illinois, Indiana, Kentucky, Michigan, and Ohio. In September of 2000, the Initiative received a \$2.5 million USDA Initiative for Future Food and Agricultural Systems grant to further its goals and create the Five-State Beef Consortium. Consortium Partners represent a cooperative effort of land grant universities, state departments of agriculture, cattlemen's association's, livestock marketing organizations, Farm Bureau, and post-harvest Partners. These Partners in the Consortium have agreed to try something new and different — they have agreed to unify their resources and efforts both in education/outreach and research to create the needed industry change.

The goal of the Consortium is to strengthen economic opportunities for the Eastern Corn Belt's beef industry by providing added value to the consumer through a responsive production and marketing system. The Stakeholders (beef producers) and Partners in this Consortium are currently utilizing the people, cattle, land, research and educational efforts in the region to develop this new model. High quality, well-marbled, tender beef is the target product to best utilize the resources in the region. The Consortium's challenge is to develop profit opportunities for Stakeholders by coordinating genetic change, production management practices, marketing, and information sharing within a segmented industry. The objectives of the Consortium are to 1) create a collaborative education/outreach effort that will facilitate development of a coordinated high quality beef production, marketing and information system in the Eastern Cornbelt, and 2) create a collaborative regional research effort that will examine and develop solutions to impediments in a coordinated beef production system.

To accomplish objective 1, the Consortium will:

- Develop a regionally-coordinated education network to assist with learning and decision making in the coordinated system
- Develop a regionally-coordinated Integrated Resource Management (IRM) network to help cow/calf, backgrounder, and feedlot operators adopt record keeping systems
- Create a regional Coordinated System Resource Management program to monitor product flow throughout the system and to ensure that Consortium targets and specifications are fulfilled
- Aid in refinement of production units by providing Stakeholders with access to previously unavailable information so that the proportion of cattle meeting production and end-product targets may be increased
- Coordinate with, and develop quality assurance and food safety guidelines based on research conducted by the Beef Industry Food Safety Council

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- Design standardized health programs to minimize respiratory and other disease problems, as well as antibiotic use
- Develop recommendations and create educational materials to facilitate estrus synchronization and artificial insemination programs.
- Coordinate genetic change by establishing criteria to be used by Stakeholders to select natural and artificial insemination sires based on performance and carcass EPD (including tenderness) information
- Assist in environmental stewardship and maintenance of environmentally responsible production units
- Create certification requirements to ensure that record-keeping meets Consortium standards, environmental stewardship meets federal, state, and local requirements, production practices meet Quality Assurance guidelines and NCBA's Brand Like Initiative specifications
- Develop a source verification system utilizing electronic identification of individual animals to collect, track, analyze, interpret, coordinate, and disseminate information at all levels of the production and marketing chain so that Stakeholders and Partners may make rapid management and financial changes
- Disseminate system summaries and research and educational publications generated in the five-state region through use of the internet
- Serve as a catalyst to facilitate equitable contractual arrangements between Partners and Stakeholders

To accomplish objective 2, the Consortium will:

- Develop and calibrate an economic simulation model of the entire beef supply chain
- Utilize the simulation model to identify business structures that represent the most favorable return vs. risk implications for Stakeholders
- Utilize the model to determine premium structures necessary to achieve a steady flow of quality product and to analyze the impact of various pricing mechanisms and contract scenarios
- Explore new, non-evasive, approaches for determining beef tenderness using an advanced vision optics and image processing system to meet the goal of producing consistently tender beef in the region
- Identify critical control points, hurdles, trends, and progress made toward target specifications through research of the vertically-coordinated system database
- Evaluate existing preconditioning programs in the region and develop an effective standardized preconditioning program
- Administer a mini-grants program to promote regional education/outreach and research collaboration in addressing opportunities and impediments

Five thousand animals will be identified in the fall/winter of 2000 using electronic ear tags to facilitate collection of performance data through each stage of the production system to the point of carcass fabrication. This number is expected to grow to 30,000 animals by the third year of Consortium activity. Action Teams, with Partner and Stakeholder representation, have been formed to work on the objectives as stated above. The current action teams include:

- Certification
- Coordinated System Resource Management
- Data Management
- Economics
- Genetics
- Health
- Integrated Resource Management
- Product Quality
- Reproduction

More detailed information will be forthcoming in the *Cattle Call* as the Action Teams develop their plans for implementation. *CC*

Sire Certification for the Five-State Beef Initiative

by David Hawkins and Dan Buskirk, PhDs
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To increase the number of cattle in the five-state region that will perform and meet the carcass specifications of a quality beef system, the Five-State Beef Initiative (FSBI) has appointed a genetics action team to develop guidelines for scoring potential sires. A system has been developed using breed percentile rankings for Expected Progeny Differences (EPDs).

A **Performance Power Score** (PPS) has been developed by averaging an bull's percentile rankings within his breed for birth weight, weaning weight, yearling weight and maternal milk EPDs. A bull whose average score is 65% or lower (a higher average percentile rank) would certify for performance in the FSBI program.

A **Carcass Power Score** (CPS) has been developed by averaging the respective breed percentiles for ultrasound intramuscular fat and percent retail product. For a bull to certify for use in FSBI herds, his CPS must be 80% or lower. Bulls that do not have ultrasound EPDs may qualify if they have carcass EPDs for marbling and percent retail product.

Complete details are available from Dave Hawkins or Dan Buskirk at the MSU Animal Science Department. *CC*

Indexing the Balanced Bull

MCA's Bull Test Program

by B. Dennis Banks and David R. Hawkins, PhDs
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Genetic gain is maximized by the selection of the parents with the greatest genetic potential. Recent years have found producers demanding information on the Expected Progeny Differences (EPD) of bulls purchased for breeding stock. Information ranking animals in the population allows buyers to determine the genetic potential of parents relative to animals in the entire population. Test station data consist of a much smaller group of contemporaries. These data serve to measure traits that are not available on the population at large. The EPDs also allow the incorporation of information on relatives of the bulls in the test to assist in the determination of genetic potential of the herd sire. This information greatly increases the accuracy of the genetic evaluation.

Each herd has different breeding objectives and goals. Each buyer should have a different ranking of bulls they would like to purchase...

We would be the first to admit that the ranking of bulls for a sale is an impossible task. Each herd has different breeding objectives and goals. Each buyer should have a different ranking of bulls they would like to purchase and it is impossible to sell all the bulls at a single time. The MCA Bull test has determined the sale order of the bulls by using an index that uses a star system. By comparing the percentile rank of bulls based on test information and data from the breeds national genetic evaluation, it allows potential buyers to assess the merits of the individual while on test and on a complete breed basis.

A general concern of buyers of test station bulls around the country has been that bulls which rank high on test are large framed, high growth bulls with high birth weights. With this in mind, the MCA Bull test advisory committee approved a sale order index that incorporates additional traits of economic importance. The new index will give credit to EPDs of the bull for each breed in the determination of sale order. Additionally, scrotal circumference of the bulls will be factored into determining sale order. This type of index will penalize bulls of high birth weight, excessive or insufficient milk, while clearly identifying the ranking of the bulls in the breed. An index similar to this was adopted by the Indiana test in 1994 and met with the approval of the majority of potential buyers.

The index itself will rank the bulls into star categories. Ranks of the bulls will be assigned to classes that utilize the EPDs of the bulls from the respective breed associations and measurements taken during the MCA test. The rank of the bulls within the breed will be used to assign stars dependent on the classification of the trait into HIGH, INTERMEDIATE or LOW desirability. It is the desire of the committee to offer to its buyers a group of bulls that are balanced for the needs of

the industry and better suited for the average commercial producer's needs.



Expected Progeny Differences

The following five traits rank bulls according to their EPDs within their respective breed associations (Table 1). These data clearly reflect the genetic potential of the individual within the breed. A percentile of 0 to 20 is indicative of a rank within the top 20% of all bulls nationally within each respective breed.

Weaning and Yearling Weight EPDs assign the greatest number of stars to the bulls that rank high in the national population. The HIGHEST bulls will receive the greatest number of stars. The stars will allow for quick and easy identification of bulls superior for these traits as compared to all other bulls in the respective breed. Most breeders will want to benefit from the increased genetic potential of bulls with high national ranking for these traits.

Birth Weight EPD is more desirable for lower values. The lower the birth weight EPD, the more desirable the bull as a candidate for most breeding programs given he is acceptable in growth EPD. Bulls that receive 5 stars will rank in the top 20% for the LOWEST birth weight EPDs in each respective breed association. Clearly, beef producers need to identify bulls that pose little difficulty at birth but great early growth potential. Bulls that offer moderate growth coupled with excessive birth weight EPDs will be penalized by this system. Animals that have a high birth weight EPD must have a superior weaning and yearling growth EPD to offset the birth weight.

Milk EPD in the cowherd must match management and feed resources of the individual farm. Since each farm has established a cowherd that is reproductively sound for a given set of environmental conditions, most producers do not need to increase milk. Increased milk must be accompanied with increased nutrition and the cost associated with the feed supply. Bulls that are breed average will be assigned the most desirable value. For these reasons milk EPD will be classified as an INTERMEDIATELY preferred trait. Should producers need increased milk, they should refer to individual EPD listings to identify the bulls needed by that particular breeding program.

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Table 1. Star allocations for the five EPD traits

Percentile	Weaning Weight	Yearling Weight	Birth Weight	Milk	% Retail Product
0% - 20%	*****	*****	*****	*	*****
21% - 40%	****	****	****	***	****
41% - 60%	***	***	***	*****	***
61% - 80%	**	**	**	***	**
81% - 100%	*	*	*	*	*

Balanced Bull *Continued from Page 3*

Percent Retail Product (PRP) EPD The percent retail product EPD combines hot carcass weight, fat thickness, ribeye area and KPH into a composite EPD. The EPD is expressed as a percentage. It should be noted that the formula is heavily influenced by the fat thickness measurement. The percentage retail product (zero trim) is computed by $65.69 - 9.931 * \text{fat thickness (in)} + 1.2259 * \text{ribeye area (in}^2) - 1.29 * \text{KPH (\%)}$. Most breeders will want to benefit from the increased genetic potential of bulls with high national ranking for these traits.

MCA Test Measurements

The measurements of the bulls taken at the test station are ranked into 5 classes for 3 traits. This is purely a measure of the relative rank of the bulls in the MCA test station contemporary group for average daily gain (ADG) and weight-per-day of age (WDA). Adjusted scrotal circumference (SC) is a trait of absolute value. These traits will classify bulls into specific criteria.

ADG and WDA are classified into 5 categories determined on the rank in the test station. The top bulls get 5 stars based on the percentile ranking. This indicates the performance of the bulls for growth on test (Table 2).

Table 2. Star allocation for growth measures

Percentile	Average Daily Gain	Weight-per-Day of Age
0% - 20%	*****	*****
21% - 40%	****	****
41% - 60%	***	***
61% - 80%	**	**
81% - 100%	*	*

Yearling Adjusted Scrotal Circumference stars are increased with increasing measurements of the bulls (Table 3). However, the bulls must meet specific requirements for certain categories. Unlike the percentile classes, this class may find many bulls with the same number of stars. It has been a general

Table 3. Star allocation for Scrotal Circumference

Scrotal Circumference	
Greater than 35 cm	*****
34.0 - 34.9 cm	****
33.0 - 33.9 cm	***
32.0 - 32.9 cm	**
Less than 31.9 cm	*

recommendation that bulls used in rotational program should have a minimum SC of 34 cm. Bulls that are to be used in terminal breeding situations should have a threshold of 32.0 cm.

Sale Order

Bulls will be ranked according to the percentile rank nationally for EPDs and the test station data for WDA, ADG and SC. Each bull will be assigned a maximum of 5 stars for each of the 8 groups (see Table 4). Thus, 40 stars are possible for each bull. Bulls accumulating the greatest number of stars will sell first. Ties will be broken on the existing across breed index utilizing the ADG and WDA of the bulls. Bulls without EPDs will have them estimated by the available information. This can be accomplished by taking estimates of the sire and/or dam.

Table 4. Example sale order

Sale Order	Breed	Expected Progeny Difference					Rank at Test Station			Index
		BW	WW	YW	MILK	PRP	ADG	WDA	SC	
1	Angus	*****	*****	*****	*****	*****	*****	*****	*****	40
2	Angus	****	*****	*****	*****	*****	*****	****	*****	38
3	Simmental	*	*****	*****	*****	*****	*****	**	*****	33
4	Simmental	NA	NA	NA	NA	NA	*****	*****	*****	25
5	Angus	**	**	**	**	**	**	***	*****	20

Bulls without EPD information will be given 2 stars as a measure of uncertainty. Therefore, a bull that receives 5 stars in each of the 3 test station categories (ADG, WDA, SC) would have a total of 15 stars (3x5). If no EPD data are reported, 2 stars would be assigned to the categories with missing information to each of the five EPD traits (BW, WW, YW, MILK, PRP). Thus, in this example, 15 stars plus 10 gives a total of 25.

This system should allow bulls that better fit the needs of the commercial cattle industry to rank higher in the sale order. It certainly seems to better fit the industry than the ranking based solely on ADG and WDA. Hopefully, the following example will allow you to see the proposed system.

Please note that bulls without EPD information available (NA) are assigned two stars. The index should allow bulls with confirmed genetic superiority to move higher in the sale order. Additionally, this index will allow bulls with moderate milk EPD, low birth weight EPD, and large testicle size to receive credit for these economically important traits.

Results from in the initial year of using an index similar to this one as compare to selling bulls based on simply average daily gain and weight per day of age favored the index. The index had about a 10% advantage in ranking bulls based on the sale price received. The correlation of the index using only ADG and WDA with sale price received was .45. Using the index with EPD and the star system, the correlation jumped to .54. When the sale order of the top 10 bulls were compared, the index using EPDs again had approximately a 10% advantage in correctly ranking top bulls if the sale price received was the objective of the index. **CC**

Identification is Step One in Management

by Dan Buskirk, PhD
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The beef industry is rapidly moving from managing herds to managing individuals. The very first step necessary to manage individual animals is to uniquely identify them. Proper individual identification is important for managing health, nutrition, and breeding and selection programs. Identification is also vital for evaluating animal productivity and economics as well as indicating ownership and verifying the source. As the industry finds communication solutions and increases the flow of information between industry segments (seedstock, cow-calf, background, feedlot, and processor) cow-calf producers must position themselves to benefit from this information. Although many producers have been identifying both cows and calves for years, it may be time to rethink the method or numbering system. For others, there is no time like the present to start identifying your animals. Take a look at information from the National Animal Health Monitoring System (NAHMS) Beef Cow-Calf Management Practices survey of 2,713 producers from 23 states across the U.S. The survey reveals that a majority of producers (52%) did not individually identify their calves. In addition, nearly 47% of operations did not individually identify their cows. How will these producers take advantage of individual animal information? The answer: They won't. All the data or information in the world is worthless without proper identification.

Proper individual identification is important for managing health, nutrition, and breeding and selection programs.

other identification approved by either the US or Michigan Department of Agriculture. Compliance with this section of the law is the responsibility of the owner.

Identification System

The most important requirement of a good identification system is to have unique identification. The method selected should provide a permanent identification that is unique regardless of the animal's age. It should be consistent throughout the herd and across time. The system should avoid duplication for at least 10 years. One such system, shown in Table 1, uses an international letter code (Table 2) to designate the year of birth. Every animal should be identified within 24 hours of birth or at purchase. One should make the first number assigned to a calf its permanent herd number. In other words, do not assign a number to a calf at birth and then assign that calf another number when it enters the herd as a replacement animal. This only serves to complicate record keeping by requiring cross-references and increases cost. It is important to record the dam and sire ID along with the calf ID at birth. Future information collected on the calf (i.e. feedlot performance, carcass data) will be of much greater value for use in selection if it can be referenced back to the dam and/or sire.

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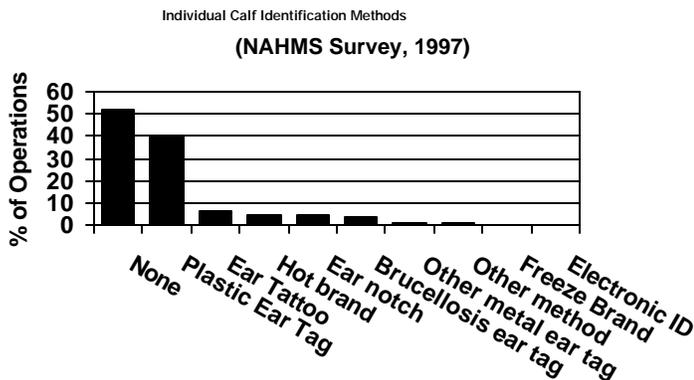
Table 1. Example identification system

Year of Birth	Birth Order	Animal ID
2000	1st	K1 or K001
2001	25th	L25 or L025
2002	50th	M50 or M050

Table 2. International year/letter codes*

1991 A	1999 J	2007 T
1992 B	2000 K	2008 U
1993 C	2001 L	2009 W
1994 D	2002 M	2010 X
1995 E	2003 N	2011 Y
1996 F	2004 P	2012 Z
1997 G	2005 R	2013 A
1998 H	2006 S	2014 B

*The letters I, O, Q, and V are not used.



Of particular importance to Michigan producers is the new law contained in the animal industry act requiring that all cattle bear "official identification" before they leave a premise. In many cases this would be a metal TB tag with a unique code, but may also be an electronic identification, or

Identification *Continued from Page 5*

Another system, for herds with less than 100 calves uses the last two digits of the year along with birth order (Table 3).

Table 3. Example identification system for herds < 100 calves

Year of Birth	Birth Order	Animal ID
1999	1st	9901
2000	1st	0001
2001	25th	0125
2002	50th	0250

Identification Methods

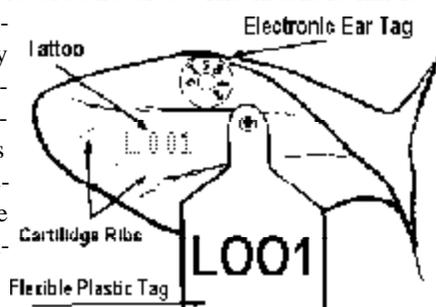
The method chosen should be durable, visible from a distance, easy to apply, and inexpensive. There are a variety of identification methods that may be used alone or in combination. One may want to consider two identification methods to maintain positive identity. For example, a metal tag may be used to cross-reference a lost plastic ear tag number.

Plastic Ear Tags

Plastic ear tags are the most common method of identification. The plastic tags come in a variety of sizes and colors. They are easy to install with an applicator gun. When positioned as diagramed below, they are easily visible and have good retention. The tag should be placed in the middle of the ear and between the second and third rib of cartilage. Tags may come pre-numbered or blank. One should use ink that is long lasting and weather resistant.

Tattoos

This permanent method of identification involves tattooing of a number/letter combination in the ear with indelible ink. The tattoo should be placed in both ears, usually above the second rib of cartilage so as not to interfere with ear tag placement. The tattooing outfit consists of a plier-type applicator with a set of numbered- and lettered-needles. The indelible ink is rubbed into the punctures in the ear made by the needles. After healing, the tattoo is a permanent. However, it is not visible from a distance so it should not be the only means of identification.



Hot or Freeze Brands

Branding is the process of destroying hide pigmentation (color-producing) cells without damage to the hair follicle. This process can be done either with a hot or cold branding iron. Hot or fire branding is accomplished by heating the branding iron

whereas freeze branding is accomplished by super-cooling the branding iron in liquid nitrogen or mixture of dry ice and alcohol. The success of branding depends on the age of the animal, hide color, time of the year, branding site, and the length of time and method of application. Branding can be used for unique individual animal identification or as herd identification. Disadvantages of branding include variable results and hide devaluation.

Electronic Identification

Electronic identification consists of an electronic transponder that is either implanted or placed in an ear tag or bolus. The most popular form currently is the electronic ear tag. Electronic ear tags are generally about the size of a 50¢ piece and are applied in a similar manner to a plastic ear tag. The electronic transponder contains a unique 15-digit number. However, only the last several numbers are visually printed on the tag. The full number must be read with an electronic ID reader. Electronic ID's are becoming the identification method of choice where cattle from different farms/ranches are commingled. As processors adopt the technology, returning carcass data to cattle owners will become a nearly instantaneous process. Like tattoos, electronic ID's are not visible from a distance so they should not be the only means of identification.

The future holds some interesting prospects for animal identification, including iris scanning, retinal imaging, antibody fingerprinting, and others. Most importantly today is that all of your animals are uniquely identified and that you use a system consistently. *CC*

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National Animal Health Monitoring System. 1997. Part 1: Reference of 1997 beef cow-calf management practices. USDA:APHIS. Ft. Collins, CO.

Nelson, L. A., W. L. Singleton, and T. M. Lutz. 1994. Beef cattle identification methods. Purdue University. Bulletin AS-410.

MCA/MSU Bull Test Sale

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Research Roundup

by Harlan Ritchie, Dan Buskirk and Steven Rust, PhDs
MSU Beef Cattle Specialists



No Significant Differences Between Calf-Fed, Short-Yearling or Long-Yearling Steers in Marbling or Meat Palatability

In general, the cattle feeding and packing industry has greater confidence in the ability of yearling steers to grade Choice than calf-feds. However, research results on this issue are mixed. Some studies in recent years have shown little or no difference. In this trial, University of California scientists allocated fall-born Angus x Hereford steers at weaning time (May) to three nutritional groups: 1) calf-fed (CF) steers were immediately sent to the feedlot; 2) short-yearlings (SY) remained an irrigated pasture until September, then sent to the feedlot; 3) long-yearlings (LY) remained on irrigated pasture until September, then on native range until the following May, then sent to the feedlot. Steers were finished on a high-energy corn diet until average backfat for the group reached 0.5 in. At equal backfat depths, LY had heavier live and carcass weights than SY and CF. However, CF tended to have a higher percent of total carcass fat than SY and LY (28.1, 26.8, and 25.3%, respectively). There were no differences between groups in shear force, or taste panel tenderness, juiciness or flavor scores. The authors stated these results confirm that backgrounding increases the weight at which cattle reach slaughter finish. Meat quality was not affected by the finishing periods which ranged from 83 to 192 days. They concluded that prolonged grazing can be used to reduce time on feed without adverse effects on quality grade or meat palatability (Sainz et al. 2000. *J. Anim. Sci.* 78 [Suppl. 1]: 157).

Heritability of Warner-Bratzler Shear Force Was High in Carcass Data From Simmental-Sired Cattle

Researchers collaborating in the NCBA Carcass Merit Project (Cornell, Kansas State, Colorado State, and Texas A & M Universities) reported on results of Warner-Bratzler shear force measures of tenderness of progeny of 27 Simmental bulls (total of 310 progeny). The estimate of heritability was 0.48, which is higher than most shear force heritability values in the literature.

The range in shear force EPD was also relatively large, from -.29 kg for the most tender sire to .16 kg for the least tender sire, a difference of .45 kg (1.0 lb). All in all, these data suggest that selection for tenderness in the Simmental breed could prove to be quite effective. The authors also reported the genetic correlations of shear force with other important carcass traits. The correlations with marbling, ribeye area, and carcass weight were zero, indicating that selection for reduced shear force would not affect these traits. The correlations with fat thickness and yield grade were (-0.11 and -0.37 respectively), indicating that selection for reduced shear force could be accompanied by some increase in carcass fatness (Zhang et. al. 2000. *J. Anim. Sci.* 78[Suppl.1]: 59).

A Selection Index for Terminal Sires

As EPDs are developed for more traits, there is a need for a decision support system to help producers weight the EPDs according to their economic value. Studies are underway to develop multi-trait selection indexes that would provide such a system. Agriculture and Agri-Food Canada scientists at the Lethbridge Research Centre reported a study in which they have constructed an index for selection of terminal sires. A total of six selection objectives were compared and each included five economically important traits from birth to slaughter. Relative economic values for the five traits were based on a review of recent studies. The selection objective chosen as most preferable had the following relative economic values for the five traits: birth weight (BW), 1.0; weaning gain (WG), 1.5; postweaning gain (PWG), 1.5 marbling (MARB), 2.0; and lean yield (LY), 3.0. Selection based on this objective will result in higher WG, PWG, MARB and LY, but lower BW. On average, 6.9% of the economic gain will be from birth weight, 22.7% from the two growth traits, and 70.4% from the two carcass traits. Using the results of this study, a selection index, known as the "Terminal Sire Value" (TSV), has been developed for the Conception to Consumer Program of the Canadian Charolais Asso-

ciation. The TSV weights the EPDs of the five traits and is calculated as follows: $TSV = (-8.17 \times EPDbw) + (2.63 \times EPDwg) + (3.11 \times EPDpwg) + (86.21 \times EPDly) + (293.26 \times EPDmarb)$. The TSV is expressed such that the overall mean is 100. (Caron and Kemp. 2000. *J. Anim. Sci.* 78[Suppl.1]: 57).

Optimum Ribeye Size Defined

For some time, the beef industry has debated the question, "What is the ideal range in ribeye size?" In a Colorado State University study, restaurant-ready loin steaks representing three different portion sizes (constant weight within a portion size) were portioned from 71 Low Choice beef carcasses representing seven ribeye size groups (ranging from 11 sq. in. and less to 16 sq. in. and greater), in 1 sq. in. increments. A total of 568 steaks were cooked on a grooved grill to medium rare doneness and evaluated for cooking characteristics and sensory attributes. As expected, thickness of all portioned steaks decreased as ribeye area increased. Conversely, steak thickness increased as ribeye area decreased. Average thickness ranged from 1.11 in. for the smallest to 0.87 in. for the largest ribeye group. Average cooking time decreased significantly from 19.5 to 11.3 minutes, as ribeye area increased because larger ribeyes had been cut thinner so as to achieve a constant weight. Tenderness scores were significantly lower for ribeyes larger than 16 sq. in. compared to smaller ribeyes. Foodservice operators desire steaks that provide a consistent eating experience together with cooking times that are not unduly long. The authors concluded that steaks portioned from carcasses with ribeye areas between 12 and 15 sq. in. can optimize both cooking time and tenderness for the foodservice sector. Such steaks will fall in a thickness range of 0.9 to 1.0 in. and a medium rare cooking time of approximately 13 to 16 min. (Dunn et al. 2000. *J. Anim. Sci.* 78:966).
CC



AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY INSTITUTION

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