Zollner

PROCEEDINGS

BEEF IMPROVEMENT FEDERATION

RESEARCH SYMPOSIUM & ANNUAL MEETING

BEEF IMPROVEMENT FEDERATION

22ND
MEETING

MAY 23 - 27, 1990

B I F

HAMILTON, ONTARIO, CANADA

1990 BEEF IMPROVEMENT FEDERATION BOARD OF DIRECTORS

NAME	1990 YEAR TERM	REPRESENTING
Paul Bennett	1991	Eastern BCIA
Glenn Brinkman	1992	Central BCIA
Jack Chase	1992	Western BCIA
John Crouch	1990	Breed Association
Bruce Cunningham	1991	Breed Association
Glenn Debter	1992	Eastern BCIA
Bob Dickinson	1991	Central BCIA
Loren Jackson	1991	Breed Association
James Leachman	1990	At-Large
Steve McGill	1992	Breed Association
Marvin Nichols	1990	Central BCIA
Jim Spawn	1990	Breed Association
Wayne Vanderwert	1991	Breed Association
Leonard Wulf	1992	At-Large

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Paola de Rose	Agriculture Canada
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Charles McPeake	Executive Director
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Keith Vander Velde	NAAB
Gary Weber	USDA - Ext.
Daryl Wilkes	NCA

1990 BEEF IMPROVEMENT FEDERATION CONFERENCE

Royal Connaught Hotel, Hamilton, Ontario, Canada
May 23rd to 27th, 1990

Wednesday, May 23rd

1:00 p.m. - 9:00 p.m.	Registration	Hamilton Room
6:00 p.m.	Board of Director's Meeting	Dundurn Room
7:30 p.m. - 9:30 p.m.	Welcome Reception	Ontario Room

Thursday, May 24th

7:00 a.m.	Registration Continues	Hamilton Room
7:00 a.m. - 7:45 a.m.	Buffet Breakfast - Master of Ceremonies: Brian Pogue, Conference Co-chairman	
8:00 a.m.	Opening Ceremonies and Welcome	Ball Room
	SYMPOSIUM: GOALS AND STRATEGIES OF BEEF IMPROVEMENT Moderator: Mr. Ken Aylsworth, General Manager, Canadian Charolais Association	
8:15 a.m.	CANADIAN BEEF GENETICS: PROFILES, PROGRAMMES AND PROGRESS Ms. Paola deRose, Manager, Beef and Sheep R.O.P. Programmes, Agriculture Canada	
9:00 a.m.	AN OVERVIEW OF AMERICAN EVALUATION PROGRAMMES Mr. Ike Eller, Beef Cattle Specialist, Virginia Poly-Tech	
9:45 a.m.	Coffee Break	
10:15 a.m.	A PRODUCER PREPARING FOR THE 1990s Mr. Stan Church, Church Simmental Ranch, Calgary	
10:35 a.m.	COMPOSITE INDEXES - GOOD OR BAD? Dr. Jim Wilton, Professor of Animal Breeding, University of Guelph	
	PREDICTING PERFORMANCE OF COMMERCIAL CATTLE Dr. Gary Crow, Professor of Animal Breeding, University of Manitoba	
	THE FIRST STEP: A COMMON BASE FOR ALL BREEDS Dr. John Pollak, Professor of Animal Breeding, Cornell University	
11:35 a.m.	Discussion	
12:00 Noon	Lunch	Ontario Room/Connaught Square
	Moderator: Mr. John Willmott, General Manager, Canadian Angus Association	
1:15 p.m.	AN INNOVATIVE APPROACH TO BEEF CATTLE BREEDING Mr. John Stewart Smith, Canadian Beef Boosters, Calgary	
1:35 p.m.	BEEF BREEDING TECHNOLOGIES UTILIZING BIOTECHNOLOGY Dr. Charles Smith, Professor of Animal Breeding Strategies, University of Guelph	
2:20 p.m.	Discussion	
3:00 p.m.	Coffee Break	
3:30 p.m.	COMMITTEE MEETINGS	
	CENTRAL BULL TEST COMMITTEE Chairman: Ron Bolze 1. Threshold Model for Calving Ease for Simmental Data John Pollak, Cornell 2. Threshold Models for Calving Ease for Other Breeds with an Index Approach. Keith Bertrand, Georgia 3. Does Calving Ease Threshold have application to identification of Central Test Station Calving Ease Bulls? 4. A summary of surveys on categorizing test station bulls for light birth weight, high growth rate and optimum milk. Ron Bolze	Ontario Room

	LIVE ANIMAL AND CARCASS EVALUATION COMMITTEE Chairman: John Crouch Status of Research Relating to Carcass EPDs Doyle Wilson	Aberdeen Room
	GENETIC PREDICTION COMMITTEE Chairman: Larry Cundiff 1. Interbreed EPDs J.R. Nodder 2. Resolution of US Beef Breeds Council Concerning Interbreed EPDs Dick Spader, American Angus Association 3. A common Base for All Breeds John Pollak 4. Genetic Prediction for Calving Ease John Pollak 5. A New Model for Interbreed EPDs B. Golden, Colorado State University 6. Age of Dam Adjustment Larry Benyshek, University of Georgia 7. Other Business	Bayshore Room
	SYSTEMS COMMITTEE Chairman: Darryl Stohbehn Management summaries for commercial cow-calf operations. Review of methodologies to calculate statistics such as percent calf crop, calving distribution.	Burlington Room
	REPRODUCTION AND GROWTH Chairman: Keith Vander Velde 1. Adjustment Factors for Scrotal Circumference 2. Age at Puberty	Dundurn Room
5:00 p.m.	CAUCUS FOR ELECTION OF DIRECTORS	
6:00 p.m.	Social Hour	Connaught Square
7:00 p.m.	Awards Banquet Master of Ceremonies: Jack Chase	Ball Room

Friday, May 25th

Early	"Performance North" Marathon Run	
7:00 a.m.	Breakfast Master of Ceremonies: Jim Leachman	Ball Room
8:15 a.m.	Announcements	
	SYMPOSIUM: EVALUATING AND IMPROVING THE PRODUCT Moderator: Mr. Keith Coates, Commercial Field Officer, Canadian Hereford Association	
8:30 a.m.	WHAT THE CANADIAN CONSUMER WANTS Ms. Carolyn McDonnell, Manager, Beef Information Centre	
9:15 a.m.	SATISFYING THE CONSUMER ON A CONSISTENT BASIS Dr. Steve Jones, Meat Research Scientist, Agriculture Canada	
10:00 a.m.	Coffee Break	
10:30 a.m.	INSTRUMENTATION IN DETERMINING CARCASS MERIT Dr. Howard Swatland, Professor of Meat Science, University of Guelph	
11:15 a.m.	Discussion	

UNIVERSITY OF GUELPH WORKSHOPS

Buses depart the Royal Connaught Hotel, Hamilton at 12:30 p.m. on Friday, May 25th. Lunch will be served enroute.

Presentations offered at 2:00 p.m. 3:00 p.m. and 4:00 p.m. in the Animal Science Building:

1. Discussion led by Dr. Steve Jones, Agriculture Canada. Carcasses demonstrating proposed Canadian Grading System where payment is based on cutability and marbling.

   Room 156

2. Presentation by Dr. Jim Stouffer, Ithaca, New York. Live animal demonstration with the recent advances in ultrasonics.

   Judging Pavilion

3. Wendy Rae, University of Guelph. Participants will work through an exercise that combines live animal data, carcass data and meat quality data to determine overall carcass quality for a wide range of carcass types.

   Room 102

4. Dr. Ron Ball, and Wendy Rae, University of Guelph. Developments in how instruments can be utilized in determining carcass quality; inspection of instruments at University of Guelph, meats wing.

   Cutting Room

5. Dr. Bob Kemp, University of Guelph. EPDs using bull test contemporary groups. The Expected Progeny Differences and Across Breed Comparisons generated by the Ontario Bull Test Program.

   Room 171.

Presentations offered at 2:00 p.m. and 4:00 p.m. in room 1438, Ontario Veterinary College:

1. Comments about ET and Beef Production. Dr. Walter Johnson.

2. New Frontiers in Embryo Biotechnology

   a) Embryo Micromanipulation (splitting, cloning and sexing)
      - Dr. Naida Loskutoff
   b) In Vitro Techniques
      - Dr. K.P. Xu and John Pollard

Presentation offered at 3:00 p.m. only:

Tour of Ontario Veterinary College; meet at room 1438 OVC

THE BIF CONFERENCE CHAIRMEN INVITE YOU TO ATTEND

A STEAK BARBEQUE
AND
OPEN HOUSE

5:00 p.m. Friday May 25th

Arkell Bull Test Station

(Buses depart for tours following this event)

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CANADIAN BEEF GENETICS

-PROFILE, PROGRAMS AND PROGRESS-

E.P. de Rose
Agriculture Canada

PROFILE:

The Countries

The north American continent is traversed by the world's longest unguarded border. This intangible line hugs the 49th parallel from the Pacific coast to Lake Superior, and thence flows eastward with the great lake waters to the Atlantic ocean.

To the north of the border lies Canada. This vast country of 3.9 million square miles is home to 26 million inhabitants, of whom 72% live within 100 miles of the border. To the south is the United States. Though the USA is slightly smaller in geographical area, its people number 250 million. This multitude is distributed more evenly than are the Canadian people, who cluster to the south. The affinity Canadian's display for the border lands doubtless reflects retreat from the inhospitable climate of the north, perhaps tempered with an attraction toward their neighbours in the south.

Canada is composed of ten provinces and two northern territories. The eastern coast is not heavily populated: the four maritime provinces contain only 9% of the population. Six of every ten Canadians dwell in Quebec and Ontario. The three prairie provinces house 17% of the populace, while British Columbia, on the Pacific coast, holds the remaining 12%.

The Cattle

There are 4 million beef cows in Canada (one cow for every 6.5 people). By contrast, the USA has 40 million beef cows (one cow for every 6.25 people). Beef consumption in the two countries is similar: 38 kg/Canadian/year, 44 kg/American/year.

While the human population in Canada congregates to the south and to the east, the cattle population is concentrated on the western prairies. Alberta ranches alone are home to 40% of Canadian beef cows. An additional 24% are found in Saskatchewan. Ontario and Quebec hold less than 20% of the national beef herd.

The focus of Canada's feeding and slaughter industry has recently shifted from the east, where the consumers are, to the west, where the cattle are. Alberta plants currently process 44% of the national kill. Ontario plants handle 26%.

The North-South Connection

An interesting picture of Canada evolves. The well populated portion of the country is a few hundred miles deep, but stretches the width of the continent: over 3,000 miles. The people and their beef supply are widely separated. East-west trade and transportation networks are essential.

The USA is an integral part of the picture. With both human and cattle populations that are ten times greater than Canada's, the USA is a dominant force. American supplies and markets are often larger and closer than Canadian ones. California rivals the Ontario/Quebec market for size and for proximity to western Canadian cattle. The Canada-United States Trade Agreement (free trade) strengthens the inevitable link between our nations.

In 1989, Canada exported 386,000 slaughter cattle, over 3,000 beef seedstock, and 187 million kgs of beef to the USA. The smaller Canadian market absorbed 37,000 slaughter cattle, under 1,000 breeding head, and 48 million kgs of beef from the USA.

Canadian Cattle

Between 10% and 15% of Canadian beef cows are registered. The major breeds are Hereford, Charolais, Simmental, Angus and Limousin, with 1989 registrations and recordations (in 000's) of 50, 26, 21, 19 and 12, respectively. Over 20% of registered cows are artificially inseminated. Between 15% and 20% of registered cows are performance recorded through recognized programs.

The vast majority of Canadian beef cows are unregistered: most are crossbred. These cows are the heart of Canada's beef production industry. Between 2% and 3% of commercial cattle are performance recorded.

PROGRAMS:

Program Coordination

The National Advisory Board for Beef Cattle Improvement (NABBCI) coordinates Canadian genetic improvement activities. This Board has representation from the purebred and crossbred beef organizations, producer groups, the artificial insemination industry, the federal and provincial governments, and other involved groups.

Herd Performance Programs

Many groups operate herd performance programs in Canada. The common goals are to provide a management and genetic improvement tool to the producer, and to obtain data to support enhanced genetic improvement through genetic evaluation. In 1989, records were collected on almost 200,000 calves.

The Federal-Provincial Record of Performance (ROP) Program for beef cattle was initiated over 25 years ago. The program has evolved to service the needs of purebred and commercial cattleman. Co-ordinated by Agriculture Canada, this program is offered in cooperation with provincial governments, provincial producer associations, and breed associations. Currently, ROP is available through regional offices in nine Canadian provinces, and through the Canadian Angus, Limousin and Maine Anjou Associations.

The provincial government of Ontario offers the Beef Herd Improvement Program (BHIP) to Ontario producers. This program, initiated in 1984, has a large commercial component.

Several long standing, independent, breed association programs are available. The Canadian Charolais, Hereford and Simmental Associations offer the Total Herd Evaluation (THE) Program, Charolais Herd Analysis and Records Management (CHARM) Program, and the Simmental Program. More recently, other breed associations and user groups are developing herd programs.

The various programs collect information on calving ease, birth weight, weaning weight and yearling weight. Adjusted values, indices and sometimes EPDs are generated. The NABBCI provides a National Standards Document which outlines recommended procedures for herd test programs.

Bull Test Programs

Many groups across the country undertake bull testing activities. In 1990, approximately 115 stations tested over 14,000 bulls nation wide. Adjusted values, indices, and sometimes EPDs and ABCs (Across Breed Comparisons) are provided.

Test stations which operate within the NABBCI's Central Test Station Guidelines are eligible for official recognition. The Guidelines are designed to ensure that bull testing provides for accurate genetic comparison of bulls, in addition to aiding the merchandising of superior cattle. For example, bulls should a) be between 160 and 250 days of age upon arrival at the station, b) be in groups of at least 12 bulls, where age range does not exceed 60 days, c) undergo a minimum 28 day adjustment period, and d) be monitored for a minimum 112 day test period.

Progeny Test Programs

The popularity of formal progeny test programs has declined somewhat, as herd programs, coupled with advanced technology, have provided accurate genetic evaluations. Some programs do operate in Canada. The aim is generally to collect specialized information or to ensure collection of sufficient records to obtain accurate evaluations for specific bulls. The longstanding Charolais Conception to Consumer (C to C) program involves assessment of carcass quality.

Genetic Evaluation

The Beef Sire Evaluation Program (BSEP), formerly the Beef Sire Monitoring Program (BSMP), has provided EPDs for Canadian beef sires for over 15 years. The program has evolved greatly, and continues to develop to meet the needs of Canadian industry.

Data from all recognized Canadian herd performance programs is used in the evaluation, which is performed by Agriculture Canada's Genetic Evaluation Section. The program utilizes an Individual Animal Model (IAM), multiple trait, Best Linear Unbiased Prediction (BLUP) analysis. The BSEP moved to semi- annual production in 1990. Data are carefully edited. The evaluation imposes connectedness criteria on herds, and requires a minimum contemporary group size of five calves of one sex. Each breed is evaluated separately. However, the model contains breed of dam effects to allow the incorporation of commercial data.

EPDs and accuracies for calving ease, maternal calving ease, weaning gain, maternal milk, and yearling gain are published. Proofs are published in a multi-breed sire summary for all active bulls which exceed 40% accuracy for weaning gain direct, and which have been used in at least three herds.

An EPD module is in use in the field. This animal model, within herd module utilizes sire proofs for all traits from the BSEP. These proofs are combined with all historical herd information to quickly generate EPDs on sires, cows and calves, as herd information becomes available. This module is integrated with the ROP program. A second module has been developed which utilizes sire and dam EPDs from the BSEP. Various herd performance programs in Canada may shortly adopt one of these modules.

The Canadian Simmental and Charolais Associations and the Ontario Ministry of Agriculture and Food coordinate independent genetic evaluation programs. These programs use data from various herd and bull test programs, and produce EPDs for a variety of traits.

PROGRESS:

Genetic Progress

Genetic change is evident in most Canadian cattle breeds. Progress rates are moderate: generally between 0.1% and 0.5% per year. The majority of genetic change has occurred for weight traits. Changes in maternal traits are much lower.

Most sire summaries include tables of genetic progress for various traits over the last 15 to 20 years. Similar rates of change are in evidence for Canadian and American populations. For example, breeds on both sides of the border showing progress for weaning weight ranging from minimal (eg. 0.2 lbs or 0.1% annual increase) to considerable (eg. 1.3 lbs or 0.5% annual increase).

Under single trait selection for heritable traits, attainable progress rates approximate 1% per annum, with natural breeding, and up to 2% annually with artificial insemination. While most breeds have not practised single trait selection, breeding programs have heavily emphasized weight traits. Progress rates of 0.5% annually may reflect considerable progress given simultaneous selection for genetically antagonistic traits (eg. milk and growth). However, rates of 0.1% can not be considered adequate, especially where considerable use of artificial insemination occurs.

Low progress levels pinpoint inadequacies in breeding programs. Low selection intensity, long generation interval and failure to use genetic information in selection/culling decisions may be at fault.

Meaningful Progress?

While progress rates may be too low in light of theoretically attainable levels, the same rates may be too high in light of economic beef production. That which is attainable, and that which we should strive to attain do not always coincide.

Taller, heavier cattle have not been an "American dream", but a "North American" one. Weaning and yearling weights have increased: often to the detriment of calving ease and milking ability. In addition, the complementary breed differences utilized by commercial cattlemen in the efficient production of beef have dwindled.

Through scientific use of genetic information in well designed breeding programs, we can certainly "go faster". Whether we will actually "progress" is a separate issue.

The fundamental step to genetic improvement is the definition of breeding goals. In theory, genetic trend estimates assess progress toward defined goals. In reality, such estimates provide clues to the goals breeders actually pursue. The genetic trends of the next 15 to 20 years will make interesting reading.

Progress with Programs

Canadian genetic improvement programs are dynamic: they evolve and improve. There is growing commitment to performance recording in Canada. More herd test programs will provide EPDs on cows and calves in the near future. Most programs will soon incorporate an EPD module to ensure timely production of EPDs. The national coordination of bull test activities will be increased. In conjunction with this initiative, a national bull test data base will be created, to facilitate computation of EPDs for station tested bulls. Both herd, progeny and bull test programs are looking for ways better address endpoint/carcass characteristics.

The operation of the BSEP is evolving into a working industry-government partnership. Under this structure, the program will continue to develop. The BSEP will shortly incorporate birth weight into its multi-trait framework. In addition, the incorporation of bull test data and the production of EPDs for station tested bulls is a priority. Alteration of the model to allow reformation of contemporary groupings at weaning is required. Development of an EPD module for use in test stations will occur.

Progress with Coordination

Canadians are eager to integrate and coordinate their genetic improvement activities for beef cattle. Linking herd test, progeny test and bull test programs, and integrating main-run and modular genetic evaluations with all programs is an ambitious task. However, the benefits to genetic improvement and marketing are considerable. To facilitate development of such a national system, the NABBCI will take a leading role in the definition of National Standards outlining optimum practices for herd, progeny and bull test programs, genetic evaluation, and release and publication of genetic information.

Continued Progress

Canada has a strong foundation to build upon. The cattle, the people and the programs are equal to the challenge of continued genetic improvement. Superior Canadian beef cattle will serve Canada and serve her friends, neighbours, customers and clients: across the border: across all borders.

Information Sources:

- American Breed Association Sire Summaries (Angus, Horned Hereford, Limousin, Polled Hereford, Simmental)
- American Embassy in Ottawa
- Agriculture Canada
- Canadian Beef Breed Associations (Angus, Charolais, Hereford, Limousin, Simmental)
- Canadian Meat Council
- Statistics Canada
- United States Department of Agriculture

AN OVERVIEW OF AMERICAN EVALUATION PROGRAMS

A. L. (Ike) Eller, Jr.
Extension Animal Scientist
Virginia Polytechnic Institute & State University
Blacksburg, Virginia

The cattle industry in the U.S. is a very large and diverse one which is still very much segmented with only a moderate amount of vertical integration. January 1, 1990 figures show a total cattle population of 99,337,000 head. A very comparable number of cattle as were counted in 1962 and down significantly from the peak of 132 million head in 1975.

Beef cows are more or less important in nearly every state in the U.S. Total beef cow numbers of 33.7 million head January 1, 1990 also are quite comparable to numbers counted in 1964 and down from the 1975 peak of 45.7 million head. Western states including California, Oregon, Washington, Idaho, Montana, Colorado, Nevada, and Utah have 16.6% of the nation's cows. The Plains states including Minnesota, North and South Dakota, Nebraska, Iowa, Kansas, and Missouri have 27.7%. The Southwest states of Arizona, New Mexico, Oklahoma and Texas have 25.8%. The Southern states bounded by Louisiana, Arkansas, Kentucky, the Virginias and Maryland have 24.3%. The eastern Cornbelt states of Wisconsin, Michigan, Illinois, Indiana and Ohio have 4.5%, and the Northeast states from Pennsylvania and New York north have only 1.1% of the beef cows.

Looking at trends in beef cow numbers and herd size comparing census figures from 1978 to 1987, there is a trend for cow herd size to become larger and numbers of herds to become smaller. Herd numbers dropped from 954,360 in 1978 to 841,778 in 1987 (8% drop). Corresponding cow numbers dropped from 34.3 million to 31.6 million (5% drop). The average herd size overall has increased by 4.7% going from 35.9 to 37.6 head. The 1987 census shows 31.6 million cows and 841,778 herds. By size groups (small 0-50 cows, medium 50-200 cows, and large 200+ cows) this amounted to 10.7, 11.0, and 9.8 million cows held in 690,875, 127,517, and 23,386 herds by respective size.

Though it would, in many ways, be more efficient to move calves directly from cow herds to feedlots, most of them still go through a stockering/backgrounding program before going into feedlots for finishing. The cattle feeding industry has become rather centralized in the mid-section of the country and thus the packing industry is centralized in the same area. The 13 major cattle feeding states are Arizona, California, Colorado, Idaho, Illinois, Iowa, Kansas, Minnesota, Nebraska, Oklahoma, South Dakota, Texas, and Washington. The four major states are Nebraska, Texas, Kansas, and Iowa. Numbers of feedlots in the 13 states from 1985 to 1989 have decreased from 10,635 to 9,408 with a definite trend across the country for the greatest decline in feedlots with less than 1,000 head capacity.

The four major meat packers currently slaughter about 70% of the fed cattle in the country and produce 80% of the boxed beef. This means that many small to medium size beef packing plants across the country have closed their doors during the past decade.

The bulk of the fed cattle are sold based on live weight and estimated grade. Only a very small proportion are sold based on carcass weight and grade.

There is a move on foot to move toward value based marketing but changes will no doubt come about slowly.

In the U.S. market, the bulk of the beef is handled as boxed beef moving from the packer level to the retail level though there are several packers who are experimenting with marketing programs that would allow carcasses to be broken to retail cuts at the packing plant level.

U.S. beef is still priced largely based on quality grade, yield grade, and carcass weight.

The U.S. system of beef production and marketing has, perhaps, not provided the economic incentive for commercial producers to select for carcass traits in their production programs.

Present Evaluations Available for Purebred and Commercial Producers

Beef cattle improvement programs got their start in an organized way in the 1950's following research which produced heritabilities and other perimeters on the economically important traits in beef cattle. The first state beef cattle improvement association was organized in Virginia in 1955 and the majority of states organized such associations through the 1960's. The Extension Service in most states became deeply involved in performance testing and in the weighing and grading of calves and yearlings at the farm level. Most universities set up programs to service the performance testing needs of beef producers in their states. Performance Registry International became prominent in the late 50's and through the 60's and operated nationally to electronically handle performance records on both registered and commercial cattle.

In those early days, records were rather simple including adjusted average daily gain and in lots of cases visual evaluation or grade. These early programs gave way to a standardization of the use of adjusted 205-day weaning weight and ratio and adjusted 365-day weight and ratio. Later, other measures such as frame size, backfat, and scrotal circumference were added. Breed associations became active in handling the performance records on breeder's cattle in their respective breeds in the 1960's. Today, practically all of the performance records on purebred cattle are handled through the various strong national breed associations.

Standardization of performance programs was a problem in the early days but the U.S. Beef Performance Records Committee amalgating the efforts of the state BCIA's, national breed associations, and PRI made the first stab at standardization of performance programs with the Baker Report of 1965. In 1968, BIF was founded and has continued to provide a forum through which performance organizations have standardized programs and look for better ways to handle beef evaluation data. Central bull test stations begun to emerge in the 1950's and have persisted as a place where breeders could test a portion of their bulls under a common environment and merchandize those bulls to the seedstock and commercial producers. The early central bull tests keyed in primarily on rate of gain but from the mid-60's on have followed the guidelines of the Beef Improvement Federation and have included complete performance records for growth, backfat, scrotal circumference, frame size, and in the latter years have provided EPD's coming from breed associations. Data on bulls tested in central test stations have largely been lost as far as national genetic evaluation is concerned. Also, bulls being tested by breeders in central test stations have been lost as contemporaries in these breeders herd record programs.

At the same time, central bull test stations have no doubt added greatly to the educational effort of scientific cattle breeding and selection.

In the 1960's, several breed associations became extremely concerned with carcass evaluation as did the Performance Registry International. These groups put large amounts of financial support into structured sire progeny carcass evaluation programs. At the same time, many state BCIA groups assisted by operating sire progeny carcass evaluation programs on a structured basis feeding data into national breed and PRI programs. This effort was largely dropped in the 1970's due to its failure to be accepted as an economically feasible activity for breed associations and breeders.

In the 1970's, breed performance programs became much stronger and estimated breeding values were embraced as a method to provide much more accurate selection criteria in the economically important traits.

The use of EBV's became fairly standard and were printed on performance pedigrees and on breeder's herd summaries coming from national breed associations. Expected progeny difference or EPD's have replaced EBV's in the 1980's and have become the standard measure used in national genetic evaluation in all breeds.

Current Genetic Evaluation

One of the most important activities of BIF has been its effort in national sire evaluation programs. Through BIF, leading beef cattle geneticists have led in national sire evaluation programs which have been utilized in standardized ways by the National Breed Associations who have printed breed sire summaries. Only two years ago did the name of the BIF committee change. It is currently the BIF Genetic Prediction Committee.

In 1971-72, the first National Sire Summary was published by a beef cattle breed association. At this time, the idea of extending beef performance records into a national progeny testing program was quite revolutionary. Until 1972, truly accurate comparisons of bulls could only be made within a herd-year-season contemporary group. The first and subsequent national sire summaries compared bulls across herds and/or generations. Today, almost all major breeds of beef cattle publish national sire summaries. The following table gives the breeds who are currently operating national genetic evaluation programs and are producing one or two breed sire summaries a year. The computations for these breed programs are either handled by the University of Georgia, Cornell University, or Colorado State University as indicated in the below table which gives information as to traits evaluated in each breed.

National Genetic Evaluation Traits
Evaluated for Each Breed and the University Involved

	Trait									
	CE	BW	WW	YW	Mat. CE	Mat. WW	Mat. Milk	SC	Yr. Ht.	Gest. Length
<u>Univ. of Georgia</u>										
Angus		x	x	x		x	x			
Hereford		x	x	x		x	x	x	x	
Polled Hereford		x	x	x		x	x	x		
Limousin		x	x	x			x			
Shorthorn		x	x	x		x	x			
Chiniana		x	x	x		x	x			
Brangus		x	x	x		x	x			
BeefMaster		x	x	x		x	x			
Brahman		x	x	x		x	x			
Santa Gertrudis		x	x	x		x	x			
<u>Cornell Univ.</u>										
Simmental & Simbrah	x	x	x	x	x	x	x			
<u>Colorado State Univ.</u>										
Red Angus		x	x	x		x	x			
Charolais		x	x	x		x	x			
Salers		x	x	x		x	x			
Gelbvieh	x	x	x	x	x	x	x			x
Tarentaise		x	x	x		x	x			

With the early sire summaries which were largely structured, three major problems existed from the industry's point of view. First, bulls had to produce progeny before entering the program which resulted in published evaluations of old bulls. A second problem with NSE was breeders, particularly purebred breeders, contended some bulls in NSE were being mated to superior cows causing a serious bias in the evaluation of those bulls. Research showed this second problem to be more perception than reality. The third problem was NSE programs did not use the individual's own performance record in the analysis. This was not a serious problem with bulls with a substantial number of progeny, however, for the young bull with only a few progeny it meant neglecting a very important piece of performance information. Another deficiency with NSE was that it provided genetic values on males only. Thus, the females which provide half the genes in the population were ignored.

In 1984-85, a major break-through occurred with the use of the "reduced animal model" termed RAM for short. Application of this mathematical model to beef cattle performance records provided genetic evaluations free of all problems associated with NSE. Application of this model merged on-farm and ranch testing programs with NSE to form what is now called National Cattle Evaluation *(NCE)*. Today, NCE is a reality for most of the major beef breeds in the U.S. It has several distinct advantages over NSE programs. NCE provides a genetic value for an individual animal which incorporates any combination of progeny, pedigree and individual record information. The procedure adjusts for superiority or inferiority of the mates of the individual. The program provides maternal genetic values for those traits which are maternally influenced such as weaning weight. The procedure accounts for genetic change over time in a breed providing more precise comparisons of individuals from different generations. NCE computes genetic values for all animals in a breed in including sires and dams as well as non-parent young animals.

Traits available for comparison vary among breeds as indicated in the above table. Traits evaluated are birth weight, weaning weight, maternal ability expressed as pounds of weaned calf, yearling weight, hip height, scrotal circumference and calving ease.

Best linear unbiased prediction procedures (BLUP) used in National Cattle Evaluation programs are complex for sure. Refinements are being added such as the threshold model now being used by at least one breed association for traits that are threshold in nature.

Coordination

As earlier stated, the Beef Improvement Federation is the organization through which standardization and progress has occurred. Thus, BIF can be called the coordinating organization for all performance programs in the U.S. since BIF does periodically promulgate guidelines for these programs.

Otherwise, there is no strict coordination of programs for beef cattle improvement in the U.S.. If one studies procedures used at central bull test stations, it will become obvious that though procedures are similar there are many differences in these programs. There has been some effort expended toward coming up with a procedure that would allow EPD's to be calculated on bulls in central test stations for the growth traits. No results have yet been reported and no recommendations have come forth to date.

Performance programs offered for commercial producers are many and varied with the advent of the use of personal computers. There are many software programs that are available and in use across the country with very little coordination. Several states are using the CHAPS program developed by the University of Illinois and North Dakota State University. Many other states are using the Beef Wean Program developed under the auspices of BIF. In my view, it is fortunate that coordination of programs has been voluntary rather than somehow mandated. This procedure has allowed many good and useful innovations to come about.

In general, state beef improvement associations (BCIA's) have become, perhaps, less purposeful in the last decade. Few of these now handle performance records from registered herds. This is proper. All of these records should go through National Breed Association programs and become part of NCE data. State BCIA's in many states do, however, operate performance programs for commercial producers and are deeply involved in central bull test station activities.

Issues Facing Genetic Evaluation

Beef cattle evaluation programs have certainly come a long way in the U.S. over the last 30 years. Some would say procedures and programs have matured and arrived. Even so, there are several issues unresolved some of which no doubt will be important during the next 10 years. These are:

1. A rectification of Canadian and U.S. systems. Most of our breeds have cattle on both sides of the border. Perhaps, it would be useful for Canadian and U.S. cattle in a particular breed to be evaluated through the same system and by the same scientists for the production of sire summaries.
2. Across breed EPD's. There is considerable interest on the part of commercial crossbred producers and seedstock producers producing composites to work out methodology that will make EPD's readily applicable and easily understood.
3. The accurate collection of data at the farm and ranch level is a continued concern. This data is basic to national cattle evaluation. Many purebred breeders may not see the need for painstakingly accurate and complete records at the farm or ranch level because of the availability of EPD's and less emphasis on individual performance records.
4. Genotype - environment interactions.
5. Selection criteria. Do current evaluations in all programs give EPD's that allow the commercial industry to properly select for finished weight, mature size, growth and maturity patterns, reproduction and the like? We currently have EPD's on the traits but, perhaps, they are not complete enough.
6. Carcass traits. There is considerably more work to be done in this area. Can we truly use ultrasound? Can we measure marbling with ultrasound or some other procedure in the live animal? Have we nailed down the relationship between external fat and marbling?
7. Reproductive traits. EPD's are fairly complete for many economically important traits but more work will be needed to quantify those difficult reproductive traits.
8. Perfection of multiple trait animal model methodology and the use of the threshold model in the instance of threshold traits.
9. Research to validate EPD's under conditions where genotypes vary greatly and in environments where little of the data for some of the breeds have been collected.

1990 BEEF IMPROVEMENT FEDERATION CONFERENCE
ROYAL CONNAUGHT HOTEL
HAMILTON ONTARIO, CANADA
MAY 24, 1990

A PRODUCER PREPARING FOR THE 1990's

STANLEY A. CHURCH
CHURCH SIMMENTAL RANCHES
CALGARY, ALBERTA

It is indeed an honour to have been asked to address the Beef Improvement Federation. I have closely followed the Federation over the last 20 years and have the highest respect and admiration for the courageous leadership that this Federation has shown the beef industry in North America.

At the outset I wish to be clear that I am not here to present a technical research paper. I propose to outline how we use performance testing in our own purebred herd and how I see the role of performance testing in the future.

I have been involved in the purebred cattle industry since I acquired my first purebred Hereford cow at the age of 10 years. My initial exposure to performance testing came from my late father, Bert Church, who performance tested his purebred Hereford cattle beginning in the 1960's.

Together with my wife, Frances, we started Church Simmental Ranches in 1969 and I would be amiss if I didn't acknowledge the impact of such leaders in performance testing that we found in the Simmental breed, including Travers Smith, Hans Ulrich and Ron Gibson. To these gentlemen I am truly indebted.

Later I was fortunate enough to serve as President of the Canadian Simmental Association on two occasions, and as such was able to rub shoulders with some of the most talented and skilled people in performance testing in both Canada and the United States and I hopefully gleamed a little bit of knowledge from same.

Church Simmental Ranches quickly established themselves as a seedstock producer in the Simmental industry and in November, 1974 we held our first Production Sale. We immediately encountered the problem of many seedstock producers as to how to use performance testing to its maximum and still exist in the framework which has become known as the purebred business in the North America.

We have carried on with our annual production sale ever since 1974 and are currently holding same in December of each year. In the early days the emphasis was mainly on selling replacement females while at the same time selling a few herd sire prospects. We sold the balance of our bulls through normal outlets in the following spring.

We found that this procedure was not satisfactory inasmuch as we were splitting our post-weaning test group of bulls by selling some in the late fall of the year and others in the spring of the next year. We also were not satisfied with selling bulls at various consignment sales where management and presentation is more important than the actual genetic potential of the bull involved. Furthermore, feeding a yearling bull with maximum feed up to a few weeks before the bull was being turned out to serve cows was not in the best interest of the ultimate purchaser.

We had looked at having a spring sale at our ranch for both females and bulls, however, this would not work for two reasons:

1. We used the same facilities for our sale as we did for our spring calving and therefore the most appropriate time for a bull sale was right in the middle of our calving season.

2. Historically in Alberta there is a limited female market in the spring as compared with the fall of the year.

With this background we finally developed a performance and marketing program whereby our bulls were sold as calves in December of each year. This program both worked well for our particular management and also has met with success from bull buying customers. The program as it now exists is as follows:

1. We calve our cows beginning in late January through February and early March.

2. Our calves are exposed to creep feed from an early age right on up to weaning.

3. We wean in late August.

4. The calves go straight from weaning on to a post-weaning gain test. Because the calves have had liberal creep feed we find that there is no warm-up period necessary and no setback after weaning.

5. The calves are fed so as to produce a maximum gain from weaning up to the sale day in early December. This allows an approximate 100 day test. We have found, although I am not pretending to have scientific research to support this, that the 100 day test is very nearly as accurate as a 140 day test which is normally found at bull test stations.

   Research carried out by Dr. David Bailey, an animal geneticist at Agriculture Canada Research Branch, Lethbridge, Alberta, indicates that bulls do not need a full 140 day test to evaluate post-weaning gain and yearling growth. Dr. Bailey's research indicated that weights taken 112 days into a post-weaning test were 93% accurate in predicting the 140 day test results. Furthermore, when they analyzed the 7% which were not accurate, they found that these bulls were low end or borderline bulls and did not affect any of the high gaining bulls during their research. For anyone who would wish any further information with respect to Dr. Bailey's research we would suggest you contact him directly as follows:

   Dr. David Bailey
   Lethbridge Research Station
   Lethbridge, Alberta
   T1J 4B1

   Telephone: (403) 327-4561

6. We then offer to winter the bulls from the date of our sale until April 1 of the next year. We are able to winter the bulls in the best interests of the bulls for breeding purposes without attempting to obtain the maximum gain from the bulls up to their first year's birth date.

Our buyers have accepted this program and we believe for the following reasons:

1. They have accepted our performance program where we have always been very careful to use bulls or sons of bulls who have high proofs on either the American or Canadian Simmental Sire Summary.

2. Our buyers accepted our performance program on the sale bulls including the post-weaning gain test.

3. Our buyers appreciate the condition of their bulls in the spring of the year and still know that they have bought a performance tested bull.

4. Our buyers prefer the relatively slower time of year to purchase a bull in December rather than during the spring when he may be very busy with calving out his own cow herd.

5. Our buyers are happy with the tax advantage they receive by purchasing their bull at the end of a given tax year.

WHERE SHOULD PERFORMANCE BE LOOKING IN THE 1990's?

1. With our enhanced ability to measure genetic traits I believe that in the future the North American cattle industry will have to pay more attention to measuring the economic value of carcasses from the sires being used. This, of course, will have to go hand in hand with the packing industry who must pay premiums for superior carcasses before the industry will go to the extra expense of producing same.

2. I further believe in the 1990's that the time has come for University professors, Government officials and Government extension people to outright reject the show ring as having any place in the selection of beef cattle for economic traits.

   It has been my firm belief that the North American showing ring has inhibited the selection of cattle based on economic traits in the beef business. I would ask the universities and government community to be more critical of the show ring and in many cases to remove their support from same.

   You will note that I have not asked the breed associations of either Canada or the United States to take a lead in criticizing the show ring. Having been through the politics of breed associations, I am aware that because a great number of very outspoken and aggressive members of these associations live and die by the show ring, it is impossible for those breed associations to lead the way in condemning our show ring.

In the longer term future it would seem to me that the performance testing which has taken place in North America over the last 20 years will be a sound basis for selecting superior genetics through the advances in embryo technology. We have to acknowledge that the following embryo transplant technology is now a fact of life and is with us:

1. Frozen embryos.
2. Cloned embryos.
3. Sexed embryos.
4. In-vitro maturation, fertilizer and culture.
5. The ability of technicians to successfully implant embryos.

For the past 20 years I have constantly questioned the advances my brother, Dr. Robert Church, (Assistant Dean in charge of research at the University of Calgary Medical School) has predicted in embryo technology. In almost every occasion my pessimism has proven wrong. I have finally come to realize that these new techniques developed in our laboratories are going to have a significant impact on the cattle industry of North America.

With a little imagination one can envisage a cattle industry very similar to the broiler industry in North America. Commercial operators could acquire custom made female recipients who would be small in stature, very fertile, able to calve easily, be relatively high milk producers with virtually no growth potential. These recipient females will be implanted with male embryos of known genetic quality. The result could be an 800 pound weaned calf who would be saleable as a finished steer between 1,200 and 1,300 pounds at 11 months of age with a superior carcass. I can envisage major packing companies producing the embryos and selling them to commercial cattlemen to be implanted into their specially created recipient cows in order that they would have access to this special genetics.

The purebred industry has had many radical changes in the last 20 years, however, with the advent of the technology that we now see with embryos the changes in the next 10 years in the purebred industry may be far greater.

STANLEY A. CHURCH

COMPOSITE INDEXES - GOOD OR BAD?

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The purpose of this presentation is to set out some ideas on how beef producers could establish clear goals and develop the best possible selection criteria in their improvement programs, in keeping with the theme of the symposium, "Goals and Strategies of Beef Improvement." Some of the complications that face us in trying to establish goals are the wide ranges that exist in markets, environments (including feed supplies), cross-breeding programs, and breeds. Each of these complications makes it difficult for us to come up with a simple statement of the goal of an improvement program. In addition, even if we know our goals, we have a wide range of information available to use including visual appraisal through to EPDs on an ever-increasing number of traits. The focal point of this presentation will be the possible use of composite indexes in dealing with these complications.

Composite Indexes

First, what is a "composite index"? In this presentation, a composite index simply refers to a combination of traits into one overall value. The emphasis on each trait depends on its economic importance, which in turn depends on the goal that has been set. For a simple example, let's assume for breed X that our goal is to increase calving ease, increase weaning weight, and decrease fatness at a given market weight. Let's also assume that we can do some pencil-pushing and decide that each unit of change in calving ease (direct effect) is worth \$a, in weaning weight \$b, and fatness \$c.

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Further yet, let's assume we can actually get EPDs for calving ease, market weight, and fatness. The composite index would be:
Composite Index = \$a x EPD for calving ease + \$b x EPD for market weight - \$c x EPD for fatness.

Good or Bad?

The question is whether or not a composite index would be useful or would it just be confusing. Could a composite index help us deal with the complications discussed earlier?

First, the goal for any breed depends on how that breed fits into commercial beef production. For example, a breed used for terminal sires will obviously have different goals than a breed used in rotational cross-breeding. If goals are different from breed to breed a single composite index for all breeds is not a good idea. Secondly, the best bull to use on a farm depends on many factors, such as, what the market outlet is (for example, whether or not there are carcass weight limits); what breeds make up the cow herd; and, what type of feeding program is to be used. A single composite index for all herds is also not a good idea.

Let's look at the use of many composite indexes, then, from the commercial producer's point of view first. There could in fact be a different composite index for each producer. The value of considering a composite index would be that it "wraps up" the package for each producer. The composite index approach simply provides a way of combining information on a variety of traits for prospective herd sires (or dams, or replacement heifers) all of which have varying degrees of strengths and weaknesses for these traits. We could use the term "customized" index to describe composite indexes that were specific to each farm. A customized index for commercial producers fits within a general framework of matching genotype (breed and animal within breed) with management program and resources for maximum efficiency of beef production. Looking at the expected performance of progeny and using across breed comparisons are promising approaches. Such a customized index doesn't look like such a bad idea.

If there are an endless number of weightings of traits and amounts of changes in traits wanted by commercial producers, is there any useful composite index possible for the purebred breeder? One possibility is to consider the role of a breed in general terms; for example, is the breed going to play a role as part of a rotational crossing program, or as part of an F1 heifer program, or as a supplier of terminal sires? Is the role of the breed mainly for use under range conditions or more intensively managed conditions? We could look at this as identifying the market niche of the breed in commercial production. The best composite index would then be based on the changes in the breed that would give that breed a competitive advantage over other breeds in that particular market. A composite index that helps develop a better product looks like a pretty good idea. For extra flexibility there would still be enough difference among bulls within the breed to allow for customized use on specific farms within that market niche.

Developing Composite Indexes

Starting with the commercial producer, we need to define the production program and the market situation. Let's take an example of a commercial producer who retains ownership of calves through to slaughter with a carcass weight of 625 lbs. preferred by packer buyers. Let's assume F1 females are not available so a rotational cross-breeding program is used to raise replacements on the farm. Let's also assume breeds X, Y, and Z appear to suit the general environment and management conditions of the area, and there are reasonable numbers of bulls on the market for each breed. After assessing market requirements, specific feeding programs on the farm, and the current levels of traits of the cow herd, the producer can set goals in terms of both market calves to be produced and changes in the cow herd that are wanted. The more detailed the economic analysis, the more precise will be the knowledge of the economic importance of each trait. A composite index for that producer would then be based on his or her own economic situation.

The index in our example might be some combination of direct and maternal calving ease, direct and maternal weaning weight, post weaning gain, feed efficiency, fatness at 625 lbs. (the identified market weight), and cutability at 625 lbs. Obviously, this composite, or customized, index is not easily obtained since finding the economic weights is not easy and some of the traits we want to change are not currently being evaluated. Decisions on which animals are the best to use are, of course, being made all the time with whatever information is abailable. Taking the approach of setting up a composite index gives us a way of systematically looking at what measurements we want to use and how much emphasis to put on each measurement.

Turning to the purebred breeder, the first need is to identify the major users (buyers) of the product (bulls, semen, or embryos) that is being produced. We can look first at users in terms of the crossbreeding programs they are using. Relative level of economic importance for sires used in rotational or terminal cross-breeding programs might be as shown for a sample of traits:

Traits	All-round sires (rotational crossing)	Meat sires (terminal crossing)
Calving ease direct	3	4
Weaning gain	2	3
Post weaning gain	2	3
Finishing ability	2	2
Calving ease maternal	2	0.5
Maternal milk	2	0.5

These levels are used as an example only. They could be quite different if, for example, the breeds being used in the crossing program were relatively free of calving difficulties. Finishing ability (or conversely predisposition to fattening) could be more important than shown if the market emphasized leanness of beef in a major way.

Once levels of importance for various traits have been established, a composite index can be developed. The relative economic importance shown above must be converted to the same scale as the genetic evaluations of the traits; for example, if genetic evaluations for weaning gain are in pounds, economic importance must be expressed per pound. A composite index can then be calculated that puts the proper amount of emphasis on the evaluations of each trait to develop the best product for the identified market niche as quickly as possible.

Genetic evaluations are becoming available for more traits, more computing software, and economic information is also becoming available. For the beef industry to compete, clearly defined goals and selective criteria for various breeds and management programs are needed. In conclusion, the idea of development and use of composite indexes looks good because it can assist in the selection of the best possible animals for individual breeders.

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PREDICTING PERFORMANCE OF COMMERCIAL CATTLE[1]

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Introduction

One of the keys to a new decade in genetic evaluation and improvement of beef cattle may lie in the need for specification of crossbred cattle performance. Though this need is often expressed with respect to feeder and slaughter cattle, cow-calf operations could also benefit. Genetic evaluation systems should be able to meet this need and are moving in this direction but there are still several missing pieces to the puzzle. Genetic evaluation of beef cattle remains a within-breed enterprise. EPD's have made the process better but the philosophy remains fundamentally a within-breed one. If we recognise that crossbreeding at the commercial level is widespread (Koch et al. 1986) then the genetic evaluation systems must adapt to fill the need for "specification crossbred cattle". We need to be able to predict the performance of crossbreds and we need information to make these predictions from the current cattle population if they are to be anything more than indications. Across-breed EPD's will come eventually and solve many problems but between now and then the current knowledge of breeds needs to be improved (Notter 1989). It is the purpose of the present paper to provide an illustration of methods that could be applied to existing data from breeders' herds to yield predictions of crossbred performance. Though analysis of only one trait (preweaning gain) is presented here the methods could be extended to other traits. Evaluations of other traits are needed for a useful system which could be used by commercial producers to make decisions among breeds, and among mating systems.

Some background to methods

There are several experimental methods used for evaluating breeds. Most of them require a fairly rigid experimental design, usually reserved for work in experimental stations. A good example of an experimental design and analysis is shown in Alenda et al. (1980). The more general procedure reported by Dillard et al. (1980) is a regression approach and it can be applied to crossbreeding data which do not arise from a traditional experimental design. The procedure involves describing the percentage breed composition of each calf and the dam of the calf and regressing calf performance on the breed composition variables. The method will only work if the appropriate data structure exists: links among breeds are required and these links are crossbred calves which, ideally, express their performance in the same contemporary group as purebred calves.

Methods applied in an example analysis of preweaning gain

Preweaning gain records from Ontario, Manitoba, Saskatchewan and Alberta calves born from 1970 to 1989 were used. The data were split up into two ten-year sections (1970-1979, and 1980-1989) and by province for analysis purposes. This was done in order to look at variation among provinces, and

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change over time in estimates of breed effects. Information which would allow subdivision of the records into more natural geographic or environmental groups was not available. Only records from calves from the following breeds were used: Angus (AN), Charolais (CH), Hereford (HE), Limousin (LM), Maine-Anjou (MA), Milking Shorthorn (MS) and Simmental (SM). Many other breeds were represented in the data but were present in very small numbers. All records from purebred calves and calves composed of any combination of the above seven breeds were used in the analysis. The model included year, herd-year, age of dam, sex of calf as well as breed composition, with all effects except herd-year assumed to be fixed effects. Each calf record was described according to the breed composition of the calf, the breed composition of the dam and the amount of direct and maternal heterosis present. Heterosis was assumed to be expressed at the same level regardless of breed combination, i.e. no specific breed combination effects were estimated. In order to handle the varying effects of calf sex and age of dam among breeds, the interaction terms for calf sex by breed direct effects and age of dam by breed maternal effects were part of the model. The computer program of Harvey (1985) was used for the analysis and herd-years were absorbed using the maximum likelihood absorption option.

Breed direct and maternal effects on preweaning gain

The results in Table 1 show the breed direct and maternal effects on calf preweaning gain. In the interests of space only the results for the 1980-1989 analysis are shown for all provinces. Results for the analysis of Manitoba data are shown for both time periods (1970-1979 and 1980-1989) in Figures 1 and 2.

The average heterozygosity of calves and their dams is shown in Table 1. Heterozygosity measures the relative degree of outcrossing that is taking place. A calf that is a first cross (for example a Charolais-sired calf from a Hereford cow) is considered to be 100% heterozygous -- its two sets of genes come from different breeds. A purebred animal of any breed is 0% heterozygous. A Charolais-sired calf from a Charolais x Hereford cow is 50% heterozygous. Similar logic applies to the cow. All provinces shown in Table 1 have a relatively low degree of heterozygosity except for Ontario in which the average calf is over 50% heterozygous. This is not an error -- the data for Ontario prior to 1980 showed heterozygosity levels similar to the other provinces. Recording efforts in Ontario since 1980 have resulted in many records from crossbred calves. As stated earlier it is important for this analysis that there are crossbred calves present in the data. High standard errors of the breed estimates (and low confidence in the estimates) result when there are a small number of crossbred calves.

The breed direct effects on preweaning gain are for an average of the two calf sexes, and are expressed relative to a Hereford base of zero (Table 1). The breed direct effects are really a measure of preweaning growth potential. These estimates appear to be relatively consistent among provinces. The breed maternal effects are for mature cows, and again, are expressed relative to a Hereford base of zero. Breed maternal effects on preweaning gain represent primarily the breed milking ability but it is expressed here in terms of pounds added on to a calf preweaning gain and not pounds of milk. Estimates of breed maternal effects are less consistent among provinces than estimates of the breed direct effects. It is not known if this is due to genetic differences in breeds among provinces or whether the environment in a province augments or limits milking ability of a breed. It is clear from Table 1 and Figures 1 and 2 that there is much more variation among breeds for breed direct effects than there is for breed maternal effects.

Heterosis levels for growth (direct) were low but for the most part positive. Estimates of maternal heterosis for preweaning gain were generally larger than those for growth and give an indication of the value of a crossbred dam. Maternal heterosis increased with age of dam. This appeared to be consistent in results from all provinces.

The breed estimates in Table 1 are of general use in predicting preweaning gain performance of nearly any mating system utilizing one or more of the seven breeds. These predictions will be relative to a Hereford baseline. To give a very simple example the preweaning gain of a Charolais-sired calf out of a Hereford dam would be predicted as follows:

$$P_{ch} = \tfrac{1}{2}(G^c{}_d + G^h{}_d) + H_d + G^h{}_m$$

where $G^c{}_d$ and $G^h{}_d$ = breed direct genetic effects on preweaning gain for the Charolais and Hereford breeds, respectively,
H_d = direct heterosis for preweaning gain, and
$G^h{}_m$ = breed maternal effect on preweaning gain for the Hereford breed.

A numerical prediction of the preweaning gain performance of this cross using (for example) results for 1980-1989 from Manitoba is as follows:

$$P_{ch} = \tfrac{1}{2}(47.4 + 0) + 3.4 + 0 = 27.1$$

This type of calf in Manitoba should, on average, exceed the Hereford purebred mean by 27.1 pounds for preweaning gain. A wide variety of crossbreeding scenarios could be explored (Alenda et al. 1980; Alenda and Martin 1981; Kinghorn 1982).

Does it work?

How good are the estimates of breed direct and breed maternal effects on preweaning gain? One way to answer this question is to have a population of crossbreds with performance recorded in an environment similar to the source of the breed estimates. Predictions of their performance could then be compared to their actual performance. This population of crossbreds should, of course, be genetically related to the source of the estimates. The Foreign Cattle Breed Evaluation (FCBE) study was carried out by Agriculture Canada at two sites: Brandon, Manitoba, and Manyberries, Alberta. Preweaning gain results for the Manitoba experiment were reported by Smith et al. (1987) and represent performance of a variety of crossbred cows rearing calves sired by an unrelated breed. The 21 breed crosses used in their study are listed in Table 2. Sources of breeding stock for their study were breeders in Manitoba and Alberta and the crossbred cows originated from breedings made in the early 1970's (Lawson et al. 1980).

The relationship between actual crossbred performance of FCBE calves from mature cows and predictions based on Manitoba estimates is shown in Figure 3. If the predictions were perfect then all points should lie along a line and this line would have a slope of one. In other words if the difference between two crossbred groups for actual performance was 10 pounds then the difference in the predictions would ideally be 10 pounds. The R^2 values in Figure 3 are an indication of how close the predictions are to the line. The predictions derived from 1970-1979 Manitoba data appear to do a better job than predictions based on the 1980-1989 Manitoba data. Why is this? The Hereford base is not the same for the two sets of breed estimates (1970-1979 vs 1980-1989) but the pattern of points should not be affected by the change in base. A look at results from the recent National Beef Sire Evaluation Program (Agriculture Canada 1990) shows that breeds are changing relative to one another. Breed average maternal ability in the Angus breed is falling while for the Hereford breed it is increasing. This is consistent with what we see in Figures 1 and 2. There are, however, inconsistencies in the pattern of breed differences that are less easy to explain. At any rate, unless there is something wrong with the estimation procedure, we must accept that the poorer predictive capacity of the most recent breed estimates (1980-1989) is a result of breed genetic changes. The crossbreds studied by Smith et al. (1987) were 1970's vintage and if that same crossbreeding trial were to be conducted again at the present time, sampling from the breeds as they exist today, then the results would be different. This is why we need some method of evaluating breeds from the current population and on an on-going basis.

Future needs

A basic need for the future if an evaluation system like the one proposed here is to be used is that crossbred cattle need to be recorded. The crossbred calves are the links between breeds that allow the estimation of the breed and hybrid vigour effects. This is particularly important for traits that have a maternal component.

Further research on estimation techniques are required before we place a lot of confidence in the results from analyses such as those presented here. The ten year averaging that was done in this study may not be adequate to represent the status of a breed. A further deficiency of the present approach is that animal genetic effects are not accounted for. A problem in this respect may be identification of parents of crossbred calves.

It is not enough to predict outputs (such as preweaning or postweaning growth). Based on information given so far in this report it would be easy to select breeds for a given mating system which would produce the maximum amount of weaned calf per cow. This would clearly be an invalid use of the information and would not necessarily result in more efficient production unless information on other traits were considered. The information provided by future genetic evaluation systems should enable commercial producers to select breeds for use in a given system of mating -- be it terminal crossing or rotational crossing. If the mating system allows, producers should be able to take advantage of breed complementarity for a spectrum of traits, not just the ones that are being recorded now. Other traits that are needed include traits associated with reproduction (Nielsen 1989), cow weight and feed efficiency (Buchanan 1989) and carcass traits (Arnold et al. 1989).

It has been assumed in the present study that a breed represents a unique entity which can be characterized by mean values of traits of economic importance. A breed is what it is at the present time because of some sort of common effort by breeders. There is evidence of common goals within a breed though these goals may be difficult to quantify (Koots and Crow 1989). Notter (1989) has pointed out the trend to increasing similarity among breeds, while within breeds the independence of breeders in setting breeding goals operates to maintain genetic diversity. Do we need distinct specification of breeding goals for each breed so that their roles in commercial crossbreeding systems are clear? It will be interesting to see what the 90's bring.

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Table 1. Breed direct and maternal effects on preweaning gain (± standard errors) estimated from Record of Performance data from four Canadian provinces (1980-1989).

	Province			
	Ontario	Manitoba	Saskatchewan	Alberta
# Records	256624	120337	175477	207520
Average heterozygosity (%)				
Calves	51	17	7	6
Cows	24	16	8	7
Breed direct effects (lbs)				
Angus (AN)	42.5 ± 4.0	38.2 ± 5.2	57.1 ± 6.1	40.7 ± 6.2
Charolais (CH)	57.1 ± 3.5	47.4 ± 4.7	84.1 ± 5.7	88.3 ± 6.1
Hereford (HE)	0	0	0	0
Limousin (LM)	27.1 ± 3.6	11.0 ± 7.3	32.4 ± 12.1	45.2 ± 9.7
Maine Anjou (MA)	43.3 ± 7.6	62.7 ± 7.4	46.0 ± 10.4	28.8 ± 18.4
Shorthorn (MS)	12.9 ± 5.3	9.1 ± 7.4	16.3 ± 9.1	17.9 ± 10.9
Simmental (SM)	84.9 ± 3.5	87.7 ± 4.5	98.7 ± 5.2	101.3 ± 5.6
Hybrid vigour	-1.1 ± 0.7	3.4 ± 1.5	3.2 ± 2.0	-1.0 ± 2.1
Breed maternal effects (lbs)				
Angus	-12.4 ± 2.4	-16.9 ± 4.0	-24.8 ± 5.4	-24.2 ± 5.1
Charolais	1.1 ± 2.1	18.2 ± 3.8	-5.4 ± 5.0	-16.7 ± 5.0
Hereford	0	0	0	0
Limousin	9.3 ± 2.5	22.1 ± 6.4	0.8 ± 12.0	-10.0 ± 9.1
Maine Anjou	18.4 ± 5.2	16.9 ± 6.4	21.4 ± 9.3	39.5 ± 12.8
Shorthorn	2.5 ± 3.1	-8.1 ± 5.4	4.4 ± 7.3	-15.0 ± 7.7
Simmental	8.7 ± 2.3	20.0 ± 3.8	12.4 ± 4.8	-3.0 ± 5.1
Maternal hybrid vigour (lbs)				
2 year old cows	4.6 ± 1.0	-0.4 ± 1.5	-2.1 ± 1.9	-1.2 ± 1.9
3 year old cows	6.1 ± 1.1	3.7 ± 1.6	2.0 ± 1.9	3.9 ± 1.9
4 year old cows	7.7 ± 1.1	5.9 ± 1.6	-0.2 ± 1.9	3.6 ± 1.9
5+ year old cows	6.7 ± 0.5	9.5 ± 1.0	5.0 ± 1.1	10.6 ± 1.0

Table 2. Description of the 21 groups of three-breed cross calves with weaning weight records from the Foreign Cattle Breed Evaluation Study, Brandon, Manitoba (Smith et al. 1987). Preweaning gain of these 21 crosses are compared to predictions of their preweaning gain in Figure 3. (See Table 1 for definitions of breed codes).

Breed of terminal sire	Breed cross of first-cross dams			
CH	(HExAN)	(SMxHE)	(SMxAN)	(SMxMS)
		(LMxHE)	(LMxAN)	(LMxMS)
SM	(HExAN)	(CHxHE)	(CHxAN)	(CHxMS)
		(LMxHE)	(LMxAN)	(LMxMS)
LM	(HExAN)	(CHxHE)	(CHxAN)	(CHxMS)
		(SMxHE)	(SMxAN)	(SMxMS)

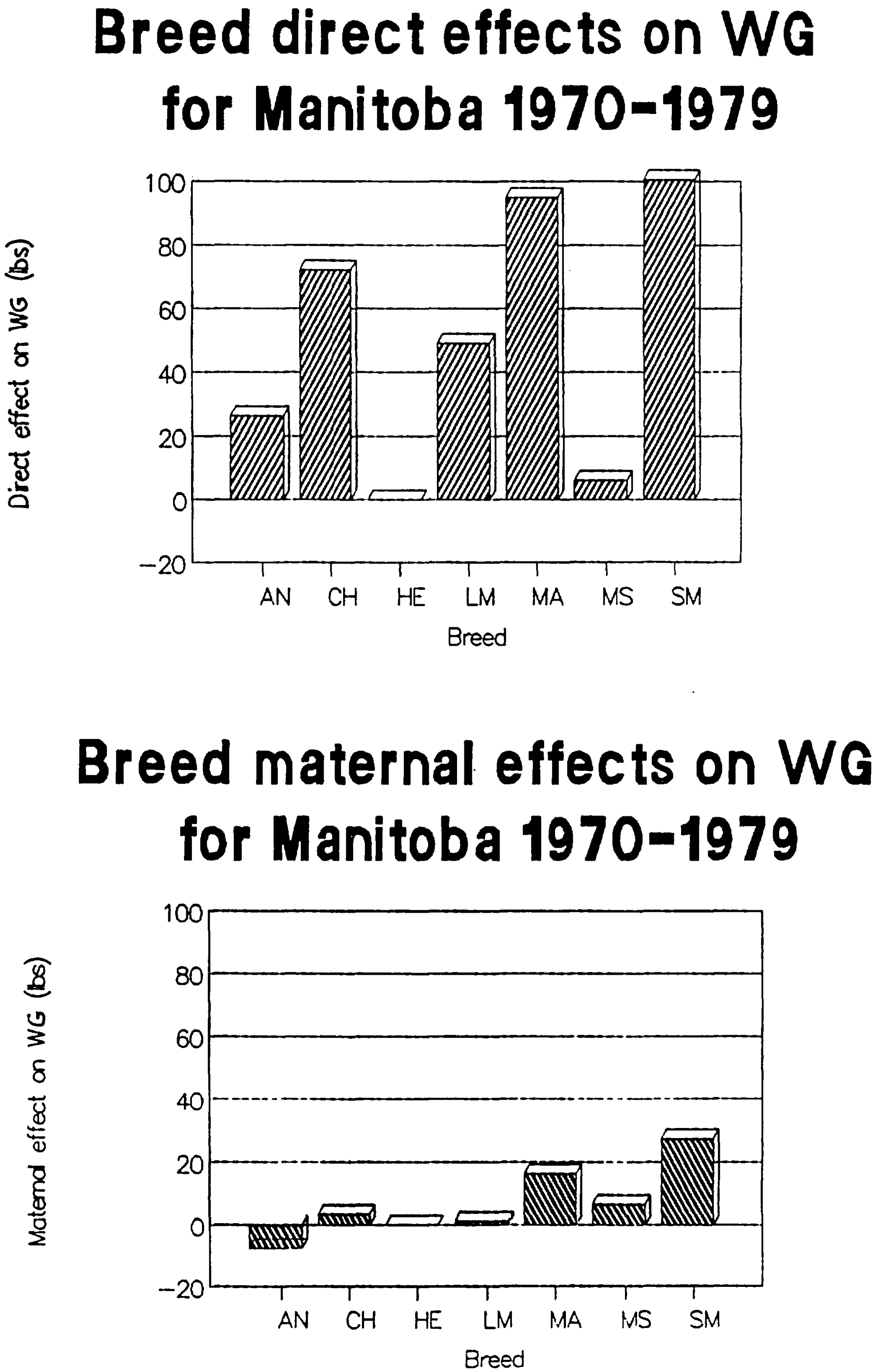
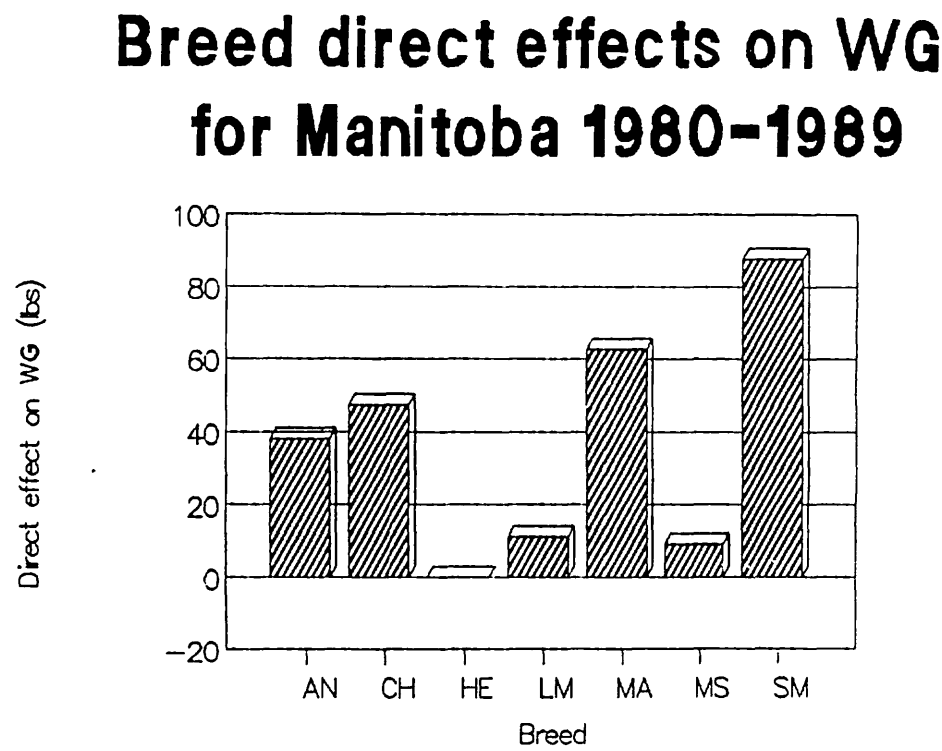


Figure 1. Breed direct and maternal effects on preweaning gain (WG) estimated from Manitoba Record of Performance data from the years 1970-1979. All effects are relative to Herefords. Breed codes are defined in Table 1.



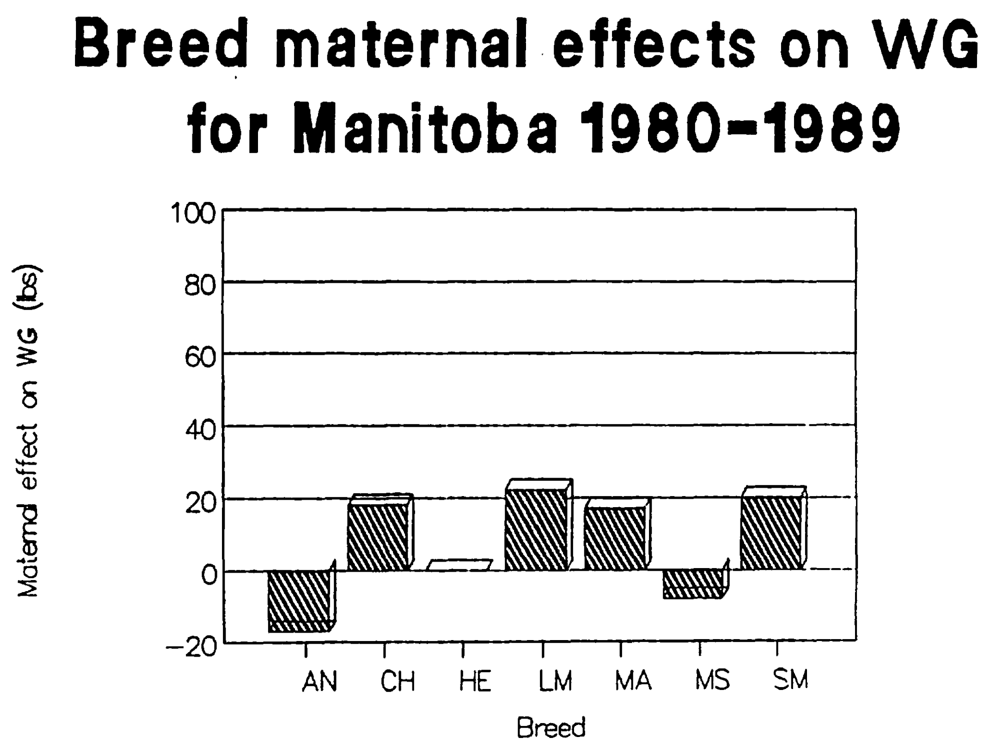
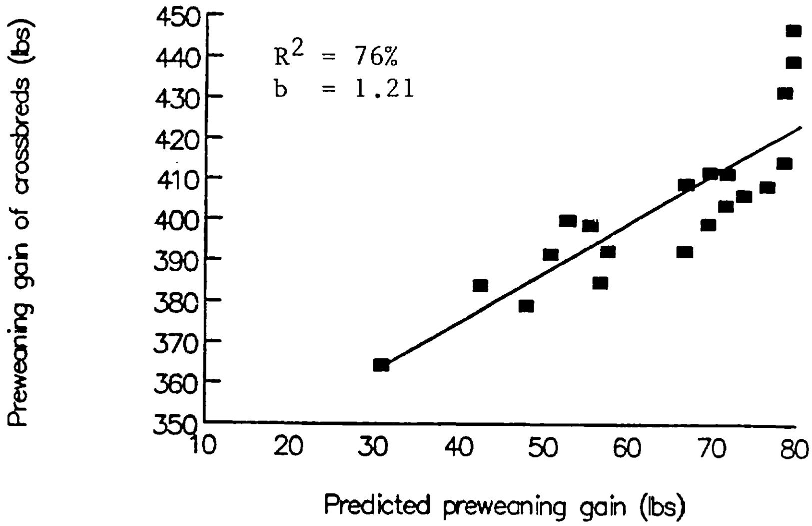


Figure 2. Breed direct and maternal effects on preweaning gain (WG) estimated from Manitoba Record of Performance data from the years 1980-1989. All effects are relative to Herefords. Breed codes are defined in Table 1.

FCBE means vs predictions using MANITOBA 70-79 estimates



FCBE means vs predictions using MANITOBA 80-89 estimates

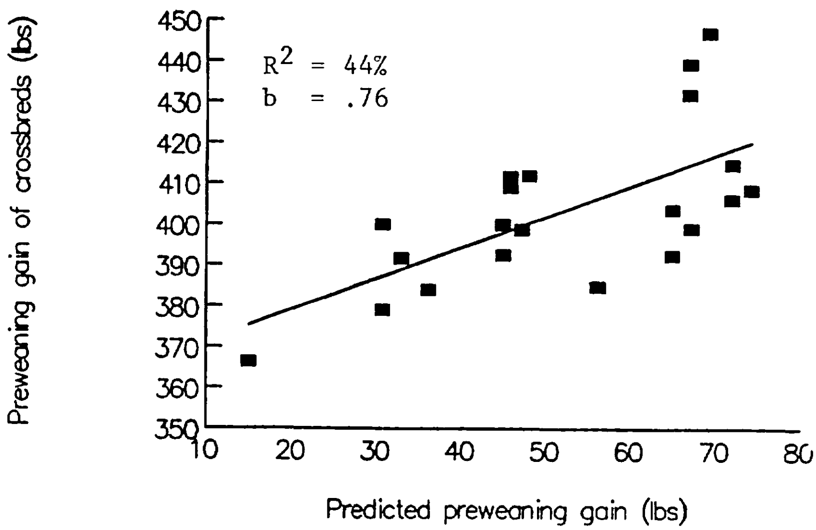


Figure 3. Relationship between preweaning gain means of 21 different types of crossbred calves (see Table 2) from the Foreign Cattle Breed Evaluation Study (FCBE) and predictions using breed estimates from Manitoba Record of Performance Data. **The predictions are relative to a purebred Hereford base.** The R^2 values represent the proportion of variation in the FCBE means that are accounted for by the predictions. The "b" values represent the slope of the best fit line relating predictions to actual performance.

A COMMON BASE

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Introduction

Genetic evaluations in the form of EPDs are currently being provided by most breed organizations to their membership and the commercial industry as tools to aid in making selection decisions. EPDs are reported as deviations. They represent the genetic merit of a particular animal for a trait as a deviation from the average genetic merit of what is described as a base group of animals. The average genetic merit of this base group is zero.

It is important to point out before any further discussion that the choice of a base group of animals is completely arbitrary. Although the choice does influence the magnitude of each EPD, it does not influence the comparison between two EPDs. For example, a base may be selected such that the EPD of Bull A is +30 and the EPD of Bull B is +20. The difference between these two is 10 units. A second base may be chosen such that the evaluation of Bull A is +5, and the evaluation of Bull B is -5. Certainly the magnitude of the EPDs has changed, even to the point where B has been "cursed" with a negative value; however, the difference, 10 units, is still the same.

EPD stands for expected progeny difference. The key word is <u>difference</u>, suggesting a comparison should be made. Using EPDs in comparisons avoids any confusion about what the base is for a particular breed. However, comparisons can only be done within breed. An issue today is using across breed EPDs. This issue has motivated discussion on setting a common base for all breeds because one reason comparisons cannot be made across breeds is that each breed is using a different base. However, this is not the only reason why EPDs cannot be compared across breeds. An excellent review of why EPDs cannot be used across breeds can be found in a paper presented by Notter at the BIF convention in 1989.

Currently, several methods are being used to set a base in the U.S. evaluations. In some breeds, the animal model is used, and in this analysis, the base is automatically set such that the average genetic merit of "base" animals equals zero. The definition of a base animal is an individual for which parentage is not known. The problem encountered when allowing the system to set the base is that as additional information becomes available each year, new base animals may be identified. If more animals are added to the base, the average genetic merit of the group changes, and in a sense, the fixed base floats. In other evaluations, the base is fixed by identifying a group of animals (for example, individuals born in 1978) and forcing their evaluations to average zero. This is done each time the evaluation is run. In Canadian evaluations, a rolling base is used. The base is called rolling because the group used in setting the base changes from year to year. The oldest animals in the previous year's definition are dropped out and the newer animals are added to the definition. This is one form of a floating base.

One can see that there is a whole host of questions, options, and concerns regarding the concept of a base. The objective of this paper is to discuss some of these options and make a recommendation, at least for consideration in the U.S. evaluations of beef cattle, for a common base. The idea of a common base was brought forward in the discussion of across breed EPDs. Although it is not necessary to have all breeds on a common base to achieve across breed EPDs, it may be desireable to at least have the definition of a base consistent in enhancing the understanding of EPDs themselves.

Genetic trend

Before discussing the options and considerations regarding the base group of animals, let's first consider the influence of genetic trend on EPDs. As examples, I will use the genetic trends for weaning weight of the Angus and Polled Hereford populations both for all animals born and for sires by their birth year (Figures 1 and 2). Notice that in early years, i.e., between 1972 and 1976 in both breeds, very little change took place in the population. Since then, steady increases in this trait have been observed in the average EPDs of the progeny born. Note also during this time period that the sires selected from each year's progeny group exceed the average of all progeny born that year by 2 to 6 lb. This difference between the average EPD of sires born and the average of all animals born in a particular year appears to have increased from the 1970s to the 1980s. This increase suggests both an increase in desire to change the characteristic and the ability to identify superior animals to meet the objective. Genetic trends observed in these breeds are an excellent example of what can be accomplished when the desire to change a population exists and when the tools to make this change are available.

Why is genetic trend important? One can see from these figures that the choice of a base will have a marked influence on the magnitude of the EPDs. If the year 1985 was selected as a base such that the average of all animals born in that year was set to zero, it is not hard to envision that a majority of the animals evaluated would have evaluations of zero or less. Conversely, if a base was set such that the average of individuals born in 1972 was set to zero, then again, it is not hard to understand why most of the evaluations for current animals would be positive. There is nothing wrong with selecting either one of these years as a base. The selection will not influence the difference between two EPDs nor will the selection of a base change the ranking of animals or selection decisions. However, the impact of the choice of base on the ability to <u>market</u> animals causes great concern for the selection of a base or in decisions on changing the base. A negative value for most traits (excluding birth weight) carries a negative connotation. Seed stock producers struggle to explain what a negative value means, and uninformed buyers often use the negative sign to eliminate individuals without realizing that may not be necessary.

Figures 1 and 2 show the trend for Angus and Polled Hereford for weaning weight. The trend in Herefords is quite similar. In Simmentals, however, there was a period for which little change occurred in the population for this trait. This time period between 1976 and 1982 corresponded to the time when the breed was placing emphasis on lighter birth weights. The point is that the direction and magnitude of genetic change by year does reflect the desire of the breeders to change a trait and the amount of emphasis placed on achieving that objective. Not all breeds should be selecting for the same traits with the same emphasis. Hence, genetic trends will differ in each breed.

Fixed versus floating bases

As previously mentioned, there are two basic types of bases. One is fixed, and the other is floating. A fixed base is one in which the base stays the same from one evaluation to the next. That is, a zero EPD individual is the same from one evaluation to the next. A floating base is one in which the group of animals representing the base may change from one year to the next. If there is genetic trend in the population, then the zero EPD animal is different from one evaluation to the next in the expected performance of their progeny.

There has been much debate in the dairy and beef industries over setting bases. A central theme of that debate usually is whether to have a fixed or floating base. The advantage of a fixed base is that the EPDs mean the same from one evaluation to the next. That is, a producer can set standards of say +10 lb weaning weight and keep those standards because a 10-lb individual is the same from one evaluation to the next. Conversely, an advantage of the floating base is that the base keeps up with the genetic trend in a population. As such, a breed does not end up in the situation where all individuals may be positive for a particular characteristic, and the extreme animals do not have numbers that in a sense are unrealistic.

Selecting animals to represent the base

For either a fixed base or a rolling base, a decision has to be made as to which animals to use in defining the base. For example, if a particular year is chosen, the choice may be to set the average of all animals born that year to zero or the average EPD of sires or of parents born that year to be zero. One can see from Figures 1 and 2 that the choice will make a difference in the value used to set the base. For example, with Polled Herefords, sires born in 1982 have EPDs about the same as the average of all individuals born in 1987. In populations where effective genetic trend is observed, this will usually be the case. Sires lead the population and hence in a particular year have higher average EPDs than their contemporaries born in the same year.

A common base

The purpose of this presentation is to discuss and recommend a common base to be used by all breeds. The intent would be to have one definition of a base used by all breeds. It is not intended to select a base that produces the same distribution of EPDs, for example, equal numbers of negatives and positives for a trait in each breed. Rather a period of time is recommended to be used by all breeds as a base, and the differential trends for each breed in each trait would then determine the distribution. The advantage of a common base is the advantage of uniformity. One critical factor in the expanded use of and the reliance placed on EPDs is a better understanding of what they represent. Much of the education involved in the use of EPDs is in the hands of extension agents and other individuals who have no affiliation to a particular breed but do get involved in explaining the evaluations of all breeds. Using a common base seems desirable to enhance understanding of EPDs.

Since the definition of a base is arbitrary, there are an infinite number of possibilities. **However, the recommendation put forth in this presentation is to set the base as the average genetic merit of all animals born in the year 1982 to zero.** This would be a fixed base. It would use the EPDs of all animals born in the year, not just the sires selected from that group. The year 1982 was chosen as a compromise. It seems reasonable that the base should be composed of relatively current animals so that unrealistically large numbers do not appear in the sire summaries. Also, several breeds do not have data that go back far enough to establish bases in the mid or early 1970s. Conversely, some breeds have made dramatic changes in their populations since the mid 1970s and have their bases set back in times prior to this. As such, selecting a base in more recent years than 1982 would mean dramatic shifts in their average published EPDs. The contrast between two EPDs would still be the same; however, the perception of large drops in the EPDs would exist and would cause concern for producers in those breeds. The year 1982 would precipitate a drop in EPDs in these breeds. However, by setting it to the average of all animals born in that year and choosing a year approximately midway between when the trend started and now, the change would not be as large as defining the base in a more current year or by using sire EPDs.

It is also recommended that in the upcoming sire evaluations for each breed, an auxiliary evaluation be created using this new base. The breeds would still publish the evaluations from the standard genetic evaluation run; however, they would also have at their disposal the evaluations as they would have been had this base been selected for all traits. There are many traits published in many breeds using many different selection criteria. The only way to get a feel within each breed of how the new base will impact a sire summary or calf crop report would be to run concurrent evaluations. This does not require separate evaluations since setting a base can be accomplished using the EPDs from the published evaluation; hence, it is easy to do. The decision as to whether to adopt the recommended base set forth here or some modification of it could then be made with the realization of how it will influence the evaluations, and the necessary educational materials could be prepared for producers in advance.

Figure 1. Genetic trends in Polled Herefords for weaning weight EPDs

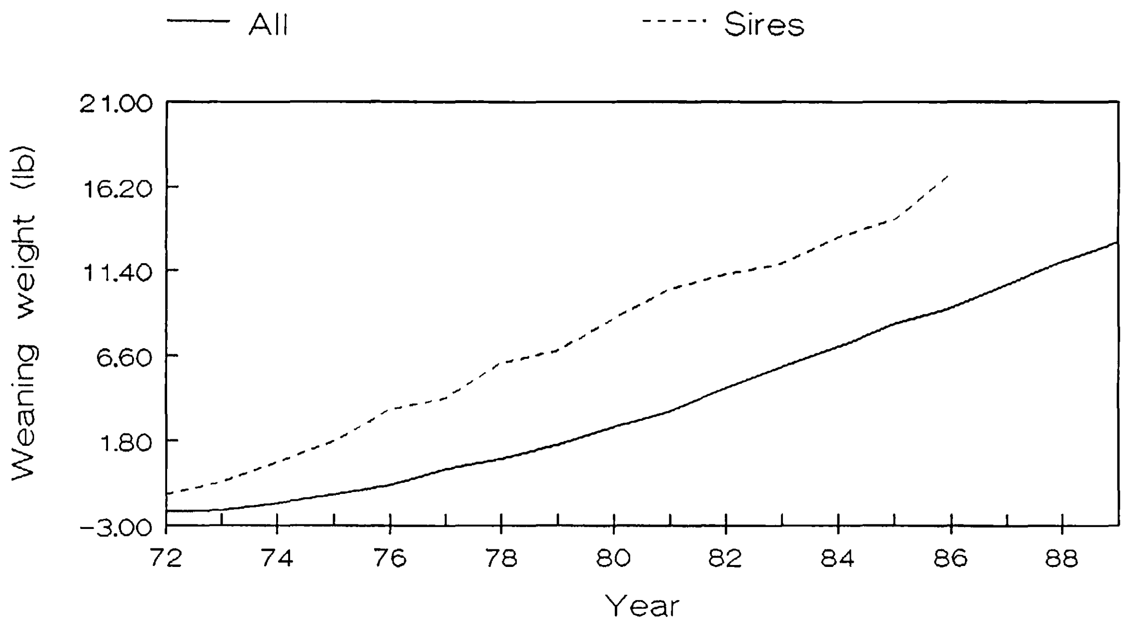
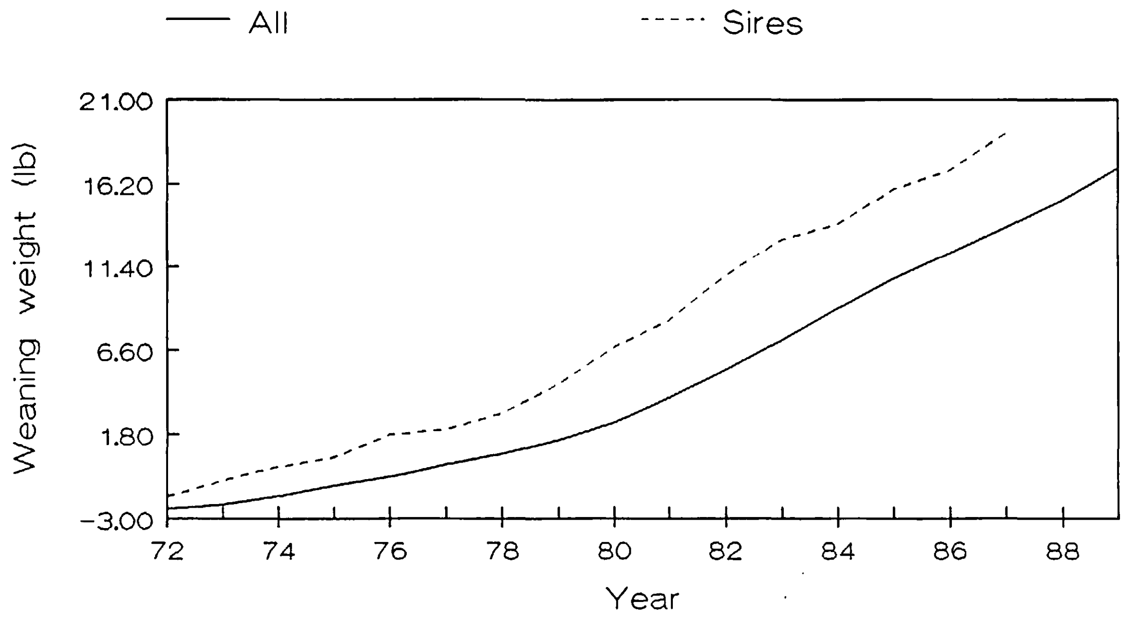


Figure 2. Genetic trends in Angus for weaning weight EPDs



AN INNOVATIVE APPROACH TO BEEF CATTLE BREEDING

John Stewart-Smith
President
Beefbooster Cattle Ltd.
Alberta, Canada

Introduction

Beefbooster Cattle Ltd. was incorporated in Alberta, in 1970 by four commercial cattlemen. Our intention was to emulate the corn, poultry and hog producers and more fully use the genetic potential of cattle to produce beef more efficiently.

Our main concern was to develop a forage converter which could effectively use the range and fodder and withstand the cold temperate climate of north-western America.

Genetic Strategy

A review of the scientific literature showed that the most effective plan for genetic improvement would:-

- exploit heterosis and complementarity via crossbreeding to improve reproductive traits which are of low heritability

- utilize selection to improve traits of higher heritability, rate of gain, feed efficiency and carcass merit

- accelerate the process by "synthesizing" specific seedstock strains.

Most of you are familiar with the work Dr. Roy Berg has done at the University of Alberta ranch at Kinsella. This research together with the teachings of Dr. Howard Fredeen and Dr. Lavon Sumption of Agriculture Canada inspired the creation of the Beefbooster Program. Over the years we have consulted with many other well known scientists firstly as a result of meetings at Dr. Ensminger's International Stockmen's School and latterly at Beef Improvement Federation Conferences. Among the most notable are Larry Cundiff and his colleagues at Clay Centre. Rod Preston formerly at Washington State and now at Lubbock as well as Jim Brinks, Dick Whilham, Merlyn Nielson, Gordon Dickerson, John Pollack, Don Kress, Peter Burfening and the crew at Montana State - more about them anon.

In addition, an examination of the fundamental crossbreeding systems revealed that three basic types of cattle are required:-

1. Maternal types
2. Terminal types
3. Light-birth weight types

Further, searching showed that actually at least five distinct gene pools are required to implement the majority of crossbreeding plans.

Consequently, we established the first Beefbooster G.I.G. (Genetic Improvement Group) and set about producing the seedstock we required.

Seedstock Development

We chose to develop the following strains of seedstock cattle, each with a specific function in crossbreeding and a fixed prime objective measurement for selection purposes, named as follows:-

M1	-	Maternal	-	Weaning Weight
M2	-	All Purpose	-	Weaning Weight
Tx	-	Terminal	-	Post-weaning Gain
M4	-	All-purpose	-	Yearling Weight
M3	-	Bulls for Heifers	-	Birth Weight (restricted)

The technique we have used to develop our synthetic strains is to mix three or more breeds at random and then to consistently select for the characteristics we are seeking, using objective measurements.

Fertility is paramount from a commercial point of view. This is where the real wealth is created in the beef business - without a calf we have nothing. So before we select anything else, we impose three prerequisites on all our seedstock.

1. All seedstock must be born naturally
2. Females, once exposed to breeding, must calve annually
3. Breeding periods of 50 days or less.

Our main purpose has been to provide commercial cattlemen with the building blocks to construct productive cow herds. Our specially developed maternal strains are the core and strength of the Beefbooster Program.

Angus and Hereford breeds were the obvious choices for the foundations of these strains. Weaning weight is used as the prime measurement because it is considered to be the best indicator of cow productivity.

Testing

The next stage, following on the extensive record keeping at the ranches, is performance testing at a central location. In my opinion, test stations in the future will tend to be adjuncts of well managed commercial feedlots to lower costs by using their capabilities. It is expensive to test bulls, so more effort will also be put into determining appropriate Test Station Entry Qualifications so as to avoid wasting resources testing sub- standard bulls.

Beefbooster uses three testing regimes; each with different energy levels and duration, but appropriate to the different kinds of cattle being tested.

On completion of the tests the bulls are selected using a combination of selection indices and independent culling levels as well as some subject assessment of structural soundness and disposition. Those that meet these criteria are then evaluated for Breeding Soundness by our theriogenologist. The bulls which pass all the tests and meet our standards are then certified as Beefbooster breeding bulls and are offered for sale. This past season, of the 3,073 bull calves which were born in the seedstock herds 1,281 were put on test, of these 630 qualified and 526 were offered for sale. Breeders take home about 3% of the calf drop.

Overall on-going Policies

a) Disposition. Any cattle that are difficult to manage or are a danger to those that handle them are removed.
b) Hair colour is not an attribute of meat or eating quality so is ignored.
c) Polledness can be easily attained by physical dehorning so is disregarded.
d) Cattle with defective feet are culled - hoof-trimming is not allowed.
e) Cows which have to be milked to get their calves sucking are culled automatically.
f) Multiple sire breeding is used to put indirect selection pressure on mating ability.
g) None of the herds will be closed completely.

Progeny Testing

We run a Progeny Testing/Monitoring herd of 240 crossbred cows. Female replacements are obtained by purchasing heifers from some of our customers so that the herd is a representative sample of the commercial Beefbooster cows. The cows are bred to 2 year old Tx bulls supplied by Breeders in single sire groups. The herd is fully performance recorded and all the progeny are fed to slaughter and carcass data obtained by using the `Blue Tag' service. Consequently, we can monitor the results of applying our program and make whatever changes are deemed necessary.

Computers

Electronic Data Processing has become an integral part of seedstock production. It enables breeders to identify superior individuals faster and more accurately. Beefbooster has developed a comprehensive system for storing and analyzing performance data as an aid to selection and to measure progress.

Elements of a Genetic Improvement Program.

In summary, the essential components are:-

1. The development of the various 'distinct' strains of cattle required for crossbreeding using indigenous cattle as foundations.
2. A test station where the potential sires can be further evaluated.
3. A progeny test/monitoring herd.
4. Facilities where the post-weaning performance as well as the carcass merit of the off-spring of the progeny-test herd can be measured.
5. Computer capability sufficient to process the data collected as an aid to faster, more accurate selection.

Progress

Presently, we have a project underway with Montana State University to analyze our past data. The data is in three parts, the Cow/calf File, Bull Test File and Progeny Test File. The project will not be completed until the fall of this year, but preliminary examination has already yielded some interesting results. Adjustment factors for sex and age of dam on both birth and weaning weight need to be different for each strain. We will be using multiplicative rather than additive adjustments. Overall, the phenotypic time trends indicate that our program has been effective. Weaning weight has increased on average by 7.75 lbs per annum. Of most interest is the performance of the M3 strain; despite an overall decrease of .58 lbs per annum in birth weight, weaning weight has continued to increase at 5.31 lbs per year. We await, with interest, the reports on the Bull & Progeny Test Files to be followed with recommendations to improve our selection methods especially for the Test Station entry and final selection of Beefbooster sires.

Marketing

We market a breeding system not just bulls. A breeding plan is designed with each customer and we undertake to supply him with the bulls he will require to implement his plan. We use formula pricing, based on the calf market, and a modified Lassiter system to allocate our bulls, and thus secure a continuous supply for our customers.

By now, you will have noted that we do many things differently to the traditional cattle breeder.

Performance is paramount, we use it for selection not as a merchandising tool.
We use multiple sire breeding so do not have pedigrees.
We are more concerned with populations of cattle rather than individual beasts.
We do not participate in Shows or Judging contests, we produce functional rather than ornamental cattle.
The hype of auctions is not our style, sale price is not necessarily a measure of genetic worth.
We disregard indicator traits or 'brand marks'.
Our performance tests vary according to the function of the cattle.
About the only conformity is that we do use the same year letter!

Organization

Beefbooster is organized as a series of companies which are controlled by Beefbooster Management Ltd. (BML). The G.I.Gs or subsidiary companies are owned jointly by BML, the Licensed Breeders and the Test Station Operator. The shareholding of the Breeders is in proportion to the value of the bull calves they test. This structure enables the Company to own all the potential sires and so control testing, selection and marketing procedures. The key to the whole system is the Licensed Breeders' Agreement which is a voluntary undertaking by the breeders to do certain things with their herds and so obtain the benefits of cooperation through Beefbooster. Breeders have first choice of selecting herd sires which they purchase at cost. They receive a Seedstock Premium on every bull that is sold for breeding. Also, all performance data is electronically processed and reported back to them. Breeders are free to leave the organization, in which event their shares are redeemed by the Company.

Conclusion

Naturally, I am bullish about the future of the beef industry. I am confident that we will keep and maybe even increase our market share here at home as North Americans. Further, that we will compete successfully for a share of the Japanese and Pacific Rim markets that are opening up. Much of the resources now devoted to grain production for export will shift to the production of beef. Why else would a grain company like Cargill enter the meat packing business?

Beefbooster intends to play a part in realizing the opportunities which lie ahead.

May 4, 1990

Beef Breeding Technologies: Utilizing Biotechnologies

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Concern will be with the use of current and future biotechnologies on the genetic improvement of beef cattle. There will also be effects of the biotechnologies on production levels and systems but these will not be considered here. Genetic improvement is by the seedstock breeder for the commercial producer. The objective is to improve economic merit, to increase the efficiency of beef production for the consumer. Economic efficiency involves many traits and they should be combined according to their relative economic value. Animals need to be recorded in a fair test, genetically evaluated for their economic merit and the best selected for breeding. The selection response per year will depend on the intensity of selection, the accuracy of selection and the interval between generations. Some indication of the rates of genetic change theoretically possible in cattle relative to other species are given in Table 1. It shows that with the low reproductive rate and long generation interval it is difficult for cattle to compete in rates of genetic improvement. Breeders often favour selection on visual traits which they feel are indicators of economic merit, so use indirect selection. This is rarely as effective as measurement and direct selection on the economic traits themselves.

Effectiveness of Beef Cattle Breeding in North America

How well have beef cattle breeders in North America been doing in genetic improvement? Some results are shown in Table 2. The rates achieved are much lower than those shown to be possible in Table 1 and much smaller than those achieved by the other meat species. Broilers, for example, maintained a rate of 5% improvement per year in 8 week weight over a 20 year period in the sixties and seventies, actually doubling weight over the period and they are still claiming substantial gains of 2-3% per year. Can beef cattle breeders compete with the better use of selective breeding systems and with the advent of new biotechnologies such as embryo transfer? I hope to show that the competitive position can be greatly improved.

My impression of beef cattle breeding in North America is that all breeds are heading for the same perceived optimum size. Small breeds are getting bigger and the large breeds are easing on size and concerned with calving difficulty. Also, beef cattle geneticists have tended (wrongly) to equate economic merit with growth rate. Little attention seems to be paid to the role of the breed. Efficient production systems use crossbreeding and breeds should be selected for their role in the system. There are three main roles: 1) terminal sire breeds whose commercial progeny are all slaughtered; 2) maternal dam breeds whose female progeny are used as breeding cows; and 3) general purpose breeds which are used as purebreds or in a rotational crossbreeding system. Surplus matings in the rotational systems can be made to terminal sire breeds, in a rota-terminal system. Some indications of the breeding objectives for the three different breed roles are given in Table 3. Each breed, or breeding group, needs to derive the relative economic values for the traits and base their selections on these. Notice that I have given growth rate rather low importance. It is efficiency of growth, and efficiency of reproduction in maternal breeds, that are important.

Genetic Evaluation

The first technology I will discuss is the genetic evaluation methods in estimating breeding values for all individuals. You are all familiar now with the Best Linear Unbiased Prediction (BLUP) using the animal model, with an equation for each animal. BLUP does what the breeder has always wanted by combining all the pedigree information and performance details for all relatives in the evaluation of the individual. This is usually expressed in beef cattle as the expected progeny difference (EPD) which is half of the estimated breeding value. BLUP helps to remove some of the biases, such as selective mating, and takes account of the genetic trend. It can be used to monitor the effects of selection within a herd predicting average breeding value of the next generation and so the within herd progress. Above all, it makes selection simple. Selection shall be for individuals with the best EPD. Their source, age, accuracy or other factors can be ignored as they have already been taken into account. If there are sufficient connections between herds, as is usually the case with partial use of AI, selection on EPD can be done on a breed basis. This greatly extends the opportunity for selection, from a within herd to a breed basis. It also leads to opportunities in establishing elite breeding units and to use of other technologies, such as embryo transfer to maximize response rates within them.

Elite Nucleus Breeding Units

A useful genetic lift (one step genetic improvement) may be obtained by forming an elite herd or grading up an established herd. It is wise to use the best breeding material available, rather than start with a built in handicap. Anyway it is usually cheaper to buy improvement than to create it. The obvious method is to use national (or world wide) EPD's to select the best males and females in the breed. The best males will usually be selected progeny tested sires with semen available. The size of a possible genetic lift for different Foundation policies using normal breeding and ET breeding is given in Figure 1. As in all breeding work, the response depends on the selection and effort. The choice of a Foundation system will depend on resources available and on the merit of the competition.

Continuation policies, after the elite herd has been established, are evaluated in Figure 2. Here the message is different. Although progeny testing is accurate it is limited in number of sires and takes time. Selection on EPD following performance test yields the fastest response. With embryo transfer, the selection intensity and generation interval of females are improved and responses increased. As before, the plan adopted will depend on the resources available and on the competition. Bob Kemp and I have put together these ideas on Foundation and Continuation policies for elite herds, in a series of articles entitled "Blueprint for the Progressive Beef Cattle Breeder".

Embryo Transfer

Embryo transfer (ET) is now widely used, not always wisely. The usage in the world and in Canada is given in Tables 4 and 5. Looking again at Table 1, we can see that the rates of genetic change in beef cattle can be increased by 50-100% by use of ET. This has been known since 1974 yet the technology has not been used by beef breeders. In the U.K. an ET nucleus herd has been established by the North of Scotland College of Agriculture and a group of Simmental breeders. An example of logistics of a nucleus MOET selected herd is given in Table 6. All males and females will be performance tested, selected and bred by ET to maintain a generation interval of two years. With 400 transfers per year, giving 100 males and 100 females at selection, 10 bulls and 50 females for donors will be selected. This would sustain a genetic response rate of about 1.5 to 2% of the mean per year with inbreeding less than 1% per year. There would be two sub-groups, one per year, with some migration between them. Thus with a limited but dedicated breeding unit, high rates of genetic response could be achieved. Surely there are some beef cattle breeders or breeding groups who can see the genetic and hence financial opportunity to dominate breeding in their breed over the next decade by use of MOET.

I have listed some of the advantages and disadvantages of nucleus breeding schemes in Table 7. There are also some difficulties with the ET techniques as shown in Table 8. The failure of some females to respond to flushing means that more donors must be selected. Rates should be better for dedicated ET schemes than for field ET work with many operators and locations involved. New methods of producing embryos by oocyte aspiration from the ovary at weekly intervals and *in vitro* fertilization may remove many of the difficulties with conventional embryo transfer.

Reproductive Technologies

A list of these and other reproductive technologies becoming available is given in Table 8. Semen sexing is not yet possible. Embryo sexing is possible but still on a limited scale. Both of these would affect sire use, for example by breeding beef males out of half of the dairy cows, but would have little effect on rates of genetic response. They would also affect breeding objectives within breeds if the breed roles changed. I have evaluated the impact which cloning might have on the genetic merit of beef animals, as in Table 9. All the steps in the production of clones have been achieved but their effectiveness needs to be greatly improved for commercial application. If we assume unlimited numbers of cheap embryos from selected clones, the improvement by clonal selection can be substantial (15-30% of the mean in one step). Genetic selection using larger numbers (30-50 of the best clones) can also be maximized while maintaining genetic variation.

Transgenes

Two other biotechnologies much discussed are the formation of transgenic stocks and the use of molecular genetic polymorphisms in selection. Transgenic livestock have been produced but none yet are of commercial value. There is lack of control of the insertion and the expression of the transgene. These problems are being studied with laboratory animals. With the production of the transgene, a large amount of breeding and testing work is needed, as for conventional stocks, to assess its overall economic value before release and use in industry. However, transgenes offer powerful methods in modifying and improving germ plasm and will be very important in the longterm.

Marker Assisted Selection

You will be hearing a lot about marker assisted selection in the future. A large number of genetic markers are being identified and their location on the genome map being determined. These markers, or groups of markers, will be used to locate the genetic loci affecting economic trait performance, the so called quantitative trait loci. This information can complement conventional performance information and can be used in selection. Major genes should be quickly discovered and can be effectively used. However, there is a lot of noise in the system, more so in outbred animal populations compared with inbred plant stocks where the techniques are being applied. As more polymorphic markers are available, the situation improves. Where current selection systems are effective the gains in response may be modest. The marker information will be especially useful for early screening of individuals for sex limited traits and for traits of low heritability.

The Message

The temptation in this talk was to speak about the esoterics of biotechnology. The BIF audience is a pragmatic one, so I have tried to keep my feet on the ground. My concern is that current methods for improvement of beef cattle are not being well used. Breed roles and breeding objectives need to be defined more clearly to answer the question "Where do we go?". The availability of EPDs makes breeding decisions simple and allows us to identify the best animals in the breed for economic merit. The advice must be to "go for the best" rather than start with a handicap. Having got the best material in an elite unit, then use of performance testing with embryo transfer seems to offer the best method of further improvement. The other technologies may offer more in the future and can be used once a technical base to the breeding scheme has been established. Opportunities are there for the progressive breeder.

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Table 1. Annual genetic change possible by selection (% of mean)[1]

	Cattle	Sheep	Pigs	Poultry
Growth-efficiency				
Normal reproduction	1.4	1.4	2.7	3.2
Embryo transfer	2.6	2.4		
Carcass leanness				
Normal reproduction	0.5	0.9	1.6	2.2
Embryo transfer	1.0	1.6		
	Milk Yield	Litter Size	Litter Size	Egg Number
Sex limited traits				
Normal reproduction	1.5	2.1	3.0	2.1
Embryo transfer	2.0	3.4		

1 From Smith, 1984.

Table 2. Annual genetic trends in meat livestock in North America

Species	Trait	Response %	Source[1]	
Broilers	8 week weight	6.5	C	Chambers (1981)
		5.2	US	Marks (1979)
Swine	Days to 90 kg	-0.5	C	Kennedy (1987)
	Backfat	-0.8		
Beef Cattle	Year weight	0.3	US	Willham (1982)
		0.1-0.5	C	de Rose (1988)

1 C = Canada, US = United States.

Table 3. Breeding objectives by breed role

	Terminal	Maternal	General Purpose
Calf calving ease	+++	+	++
Growth rate	+		+
Feed efficiency	+++	+	++
Carcass percent	+++	+	++
Leanness	++	+	++
Cow fertility	+	+++	+++
Cow calving ease	+	+++	+++
Mothering	+	+++	++
Small mature size		+++	+

Table 4. Numbers of cattle embryo transfers in 1987

Country	Number
Australia	20,000
Canada	10,800
France	9,600
Germany	7,800
Italy	3,500
Netherlands	5,000
Other European	2,600
United Kingdom	7,500
United States	89,000

Table 5. Growth in embryo transfer activity in Canada

Year	Number of Transfers
1979	500
1980	2,000
1981	3,500
1982	3,900
1983	4,250
1984	5,100
1985	6,000
1986	7,500
1987	10,800

Table 6. Example of a nucleus MOET selection herd

Performance testing males and females.
Generation interval - 2 years, 2 breeding groups.
Response rate 1.9% per year, inbreeding 1% per year.

	Per Year
Test males	100
Test females	100
Bulls selected	10
Females selected	50
Transfers	400

Table 7. Nucleus breeding schemes

Advantages
Genetic lift at the start
Faster rates of genetic change
Control over husbandry
Effective selection for economic merit
Food efficiency and other traits
Possible use of new technologies
Lower costs/earlier benefits
Different sets of breeding objectives
Disadvantages
Risk of disease, loss
Concentration of breeding resources
Genotype x environment interactions
Accuracy of selection vs genetic merit

Table 8. Literature summary of effectiveness of MOET techniques[1]

Technique	No. of Studies	Average	Hasler et al. (1987)
Donors not responding	19	22%	---
Number of embryos per flush	59	7.3	8.0
Number of transferable embryos	41	5.2	---
Pregnancy rate	11	62%	72%
Estimated progeny per flush	--	3.2	(5)

1 From Boon, 1989.

Table 9. New reproductive technologies

Multiple ovulation and embryo transfer
Embryo sexing (semen)
In vitro fertilization
Oocyte aspiration
Oocyte culture
Embryonic stem cells
Chimeras
Embryo splitting
Cloning

Table 10. Cloning in beef cattle[1]

		Genetic Change
Unlimited numbers		
Commercial embryo transfer		
Production traits (terminal clones)	Conventional	1.1-1.3%/year
	Clonal selection	14-24%
	Genetic selection	2.7-3.2%/year
Reproduction traits (maternal clones)	Conventional	0.3-1%/year
	Clonal selection	26-36%
	Genetic selection	0.8-2.8%/year

1 From Smith, 1989.

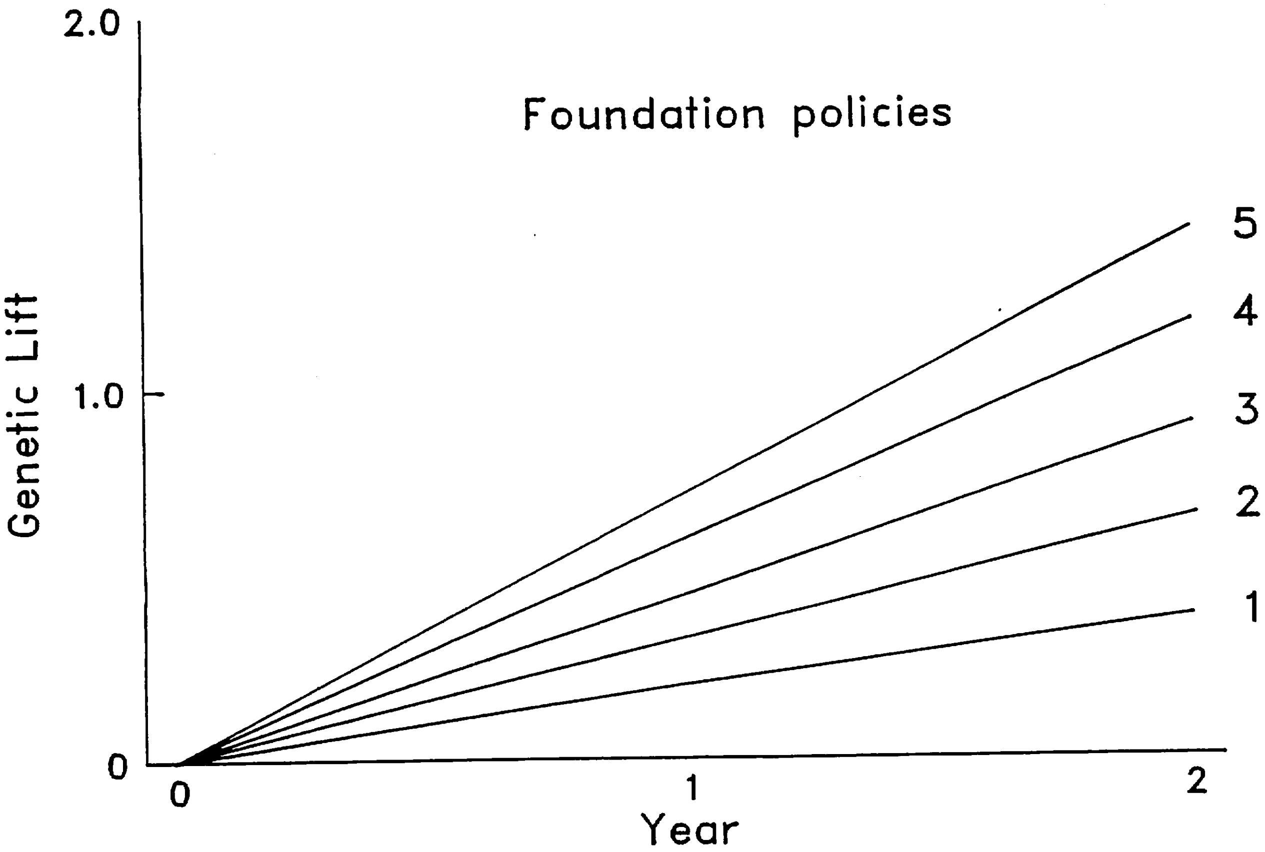

Figure 1.

Predicted genetic lift in dollar index (in standard deviation units) with different foundation policies. All policies assume no initial genetic differences between herds. (The genetic lift will be larger if there are genetic differences between herds.)

1. Genetic improvement possible with performance testing and natural mating.
2-5. Use of best progeny tested sires in the breed.
2. Natural mating.
3. Embryo transfer of best 50% of females in the herd.
4. Embryo transfer of best 10% of females in the herd.
5. Embryo transfer of best 1% of females in the breed.

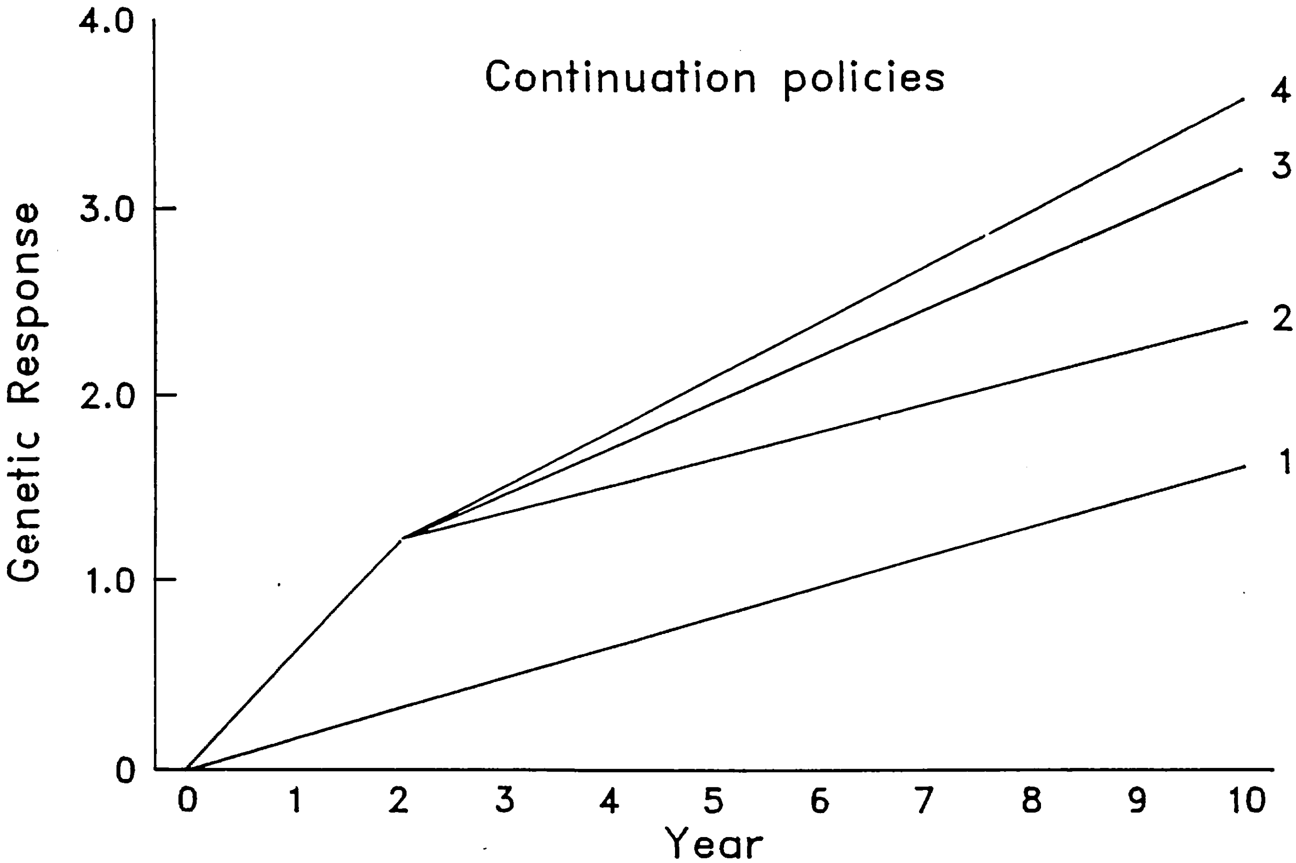

Figure 2.

Predicted genetic response in dollar index (in standard deviation units) with different continuation policies.

1. Genetic improvement possible with performance testing and natural mating.
2-4. Foundation policy 4, embryo transfer in the herd.
2. Use of progeny tested sires from the breed.
3. Use of performance testing in the herd, with subsequent progeny testing of top 50% bulls.
4. Use of performance tested males and females.

BEEF IMPROVEMENT CONFERENCE
MAY 25, 1990
HAMILTON, ONTARIO

WHAT THE CONSUMER WANTS

Carolyn McDonell
National Co-ordinator
Beef Information Centre
Toronto, Ontario

I am very pleased to have this opportunity to speak to you today. As someone who was raised in the purebred cattle business, it's always a pleasure to speak to groups like this and of course it's especially nice to have you here in Canada.

The Beef Information Centre is the promotion and consumer education division of the Canadian Cattlemen's Association. Our function is very similar to the Beef Industry Council of the National Livestock & Meat Board in Chicago with one significant difference - the Beef Industry Council is not affiliated with the National Cattlemen's Association whereas we are actually part of the Canadian Cattlemen's Association. B.I.C. is responsible for all of the advertising and promotion for fresh beef in Canada and as part of that role we conduct extensive consumer research.

It was in the fall of 1982 that we commenced our first national advertising campaign for beef and throughout that period of time we have conducted an annual consumer tracking study to monitor changes in consumer attitudes. In '87 we conducted a national study into beef quality from the consumer perspective and recently followed that up with a study on the consumer acceptability of various levels of marbling. These research projects have provided the beef industry in Canada with a very good awareness of consumers needs and attitudes. The challenge is now to find a way to meet those needs on a consistent basis.
The 80's ushered in a new type of consumer - one that was very health and

nutrition conscious. Fat, cholesterol and sodium were evil while fibre and oat bran were wonderful. And these attitudes translated into behaviour - red meat sales went down, poultry went up, produce sections flourished and we started eating oat bran in everything.

In Canada, the fact that our grading system had been changed in 1972 to encourage the production of leaner beef, put us on a somewhat better footing than our U.S. counterparts. Canadian beef is similar in fat content to chicken and is actually 13% lower in cholesterol than chicken. The problem was no one knew it - not even the government. All of our official nutrient information was based on U.S. product. It took 3 research projects and several years to get the government to update the tables. The revised government tables told the facts, our beef was 50% leaner and 21% lower in cholesterol, than the previous data indicated. The challenge was then to get this information out to the media, health professionals and the public and that has been B.I.C.'s major goal for the past 6 years. It hasn't been easy since our media and health professionals are exposed to so much information from the U.S., but our tracking study results show that the message is getting through.

The leaner beef message is having other interesting results. Consumers are associating the leaner beef with better quality e.g., when we compare '87 research results with current research, we see that 31% of people today feel beef is better quality than 10 years ago compared with 25% saying that just 3 years ago. Today 28% feel beef is poorer quality compared with 32%, 3 years ago. The fact that it's leaner is the main reason given for being better quality.

How does Canadian beef compare with U.S. beef? Certainly U.S. product has been getting leaner but Canadian Grade A beef is presently 20 lower in fat and has 20% less cholesterol than USDA Choice.

So what about the taste. If the beef is lean haven't we lost the taste. Our industry was very concerned about this question, thus our major study on beef quality 3 years ago. And what we discovered was that consumers were far more concerned with tenderness than taste. We asked what one characteristic was most important to them when determining eating satisfaction three times as many said tenderness as taste. Also when asked what would motivate them to buy beef more often, consistent tenderness ranked near the top, considerably higher than taste.

We could relate this to the milk or even the poultry industry. Ask any dairy producer and they'll tell you that skim or 1% milk is no better than water. Who among them would prefer that tasteless stuff. And old timers will tell you today's chicken has no taste compared to years ago, but the younger generation loves that mild taste - it allows them to use it with a variety of sauces, herbs and spices and some even prefer the taste to beef! So times change and tastes change and we must be prepared to move with them.

But tenderness is something consumers are not willing to compromise on. And we're not doing our job in this respect. To illustrate this, I'd like to review the results of a recently completed national study which assessed consumers preferences for 4 different levels of marbling.
Strip loin steaks of similar size and weight and trimmed identically but with 4 different levels of marbling were placed in supermarket counters and their sales monitored. Consumers generally selected the steaks with less marbling with 36% selecting trace marbling, 27% selecting slight, 23% small and 14% modest. But there were regional differences, Quebecer's had a much stronger preference for lean while all but modest marbling was quite well accepted in both Ontario and Alberta. In fact, 37% nationally selected the small or modest levels. Our current production of these is only 22%, indicating a greater demand than we can currently fulfil and that does include the demand from the foodservice industry where the higher levels of marbling are preferred. Proposed changes to Canada's grading system, will establish a minimum level of trace marbling for the A Grade. The challenge will be to create a system that will stimulate greater production of the small level of marbling.
On the other hand, the majority of consumers visually preferred very lightly marbled product because of its lean appearance. This tendency was strongest in Quebec as I mentioned, among women and among lighter users of beef.

But the response was the opposite when it came to eating preference. Phase 2 of the study consisted of a blind taste test with 750 consumers in the 3 centres - Toronto, Calgary and Montreal. 96% of all respondents noticed a difference between the samples - obviously consumers can detect the difference marbling makes. The trend definitely indicated a eating preference for more marbling but it seemed to level off after small, there being virtually no difference in preference between small and modest marbling. Therefore there seems to be no advantage to modest especially when retail sales showed a definite decline at this level.

However one-third of all respondents found trace marbling unacceptable from an eating standpoint while one-quarter found slight marbling unacceptable. And this unacceptability was not due to lack of taste but to toughness. 93% of those who rejected the trace sample did so because of toughness and 84% of those who rejected the slight said it was tough; compared to only 19 and 17% response for lack of flavour. (Note that some gave duplicate responses).
It should be noted that this was product that had been aged 10-12 days. Since aging has been demonstrated to improve tenderness, obviously there would be even greater dissatisfaction with product aged 3-5 days as we often find in our supermarkets. Trace and slight marbling currently represents 78% of our national production. With at least one-quarter to one-third of the population finding this product unacceptable, it then becomes extremely important for the beef industry to find ways to improve the tenderness of these leaner carcasses.

So how do we deal with this marketing dilemma of providing our customers with lean but tender beef. Well let's look at
steps we can take all along the marketing chain:
a) at the producer level - Before you can do much you need to know what causes toughness - is it genetics, feeding, are some breeds more tender, are younger animals on accelerated feeding regimes more tender. To give you many of these answers, we need a way to objectively measure tenderness in the carcass. This information could then be fed back to the producer to help him determine the breeding and feeding systems that give him the best results. We have the world's leading expert in probe technology here to speak to you about how this might be done, so I won't go into this any further.

b) at the processing level - We do know that it is possible to take a relatively tender carcass and toughen it through post-mortem handling practices - rapid spray chilling, no electrical stimulation, little or no aging - all these things we're doing today. Dr. Jones, is currently working on Phase 3 of the marbling study to determine the interaction between marbling, electrical stimulation and aging and he'll bring you up to date on findings in this area. Needless to say, there is much we can do to improve tenderness through improved processing.

c) at the retail level - Two things to keep in mind. Many cuts can be mechanically tenderized at retail using a special machine with long piercing needles that penetrate the connective tissue. This process speeds up both marinating and cooking. It's used extensively in Quebec and in fact they take an Eye of Round roast, tenderize it and sell it as Chateaubriand - at a very attractive price. Caution must be taken to keep the machine very clean and sanitary but because no chemicals are used, it's very attractive to consumers. Secondly, we must remember that not all consumers are alike - as they say, different strokes for different folks! Some of us want a more highly marbled, premium quality aged product and are prepared to pay for it. We should have a section of the retail counter for connoisseur steaks and roasts. On the other hand, we have consumers who are very lean and nutrition conscious. For these, we merchandise our trace and slight marbling but we ensure that it's tender. And let's not forget those in a hurry - we need to do far more to merchandise quick and convenience cuts, microwaveable products etc. B.I.C. is working with retailers and processors in this area but that's the subject for another talk.

Before I finish, I do want to briefly discuss another major issue affecting consumer attitudes towards beef, food safety. We've been monitoring food safety concerns for a number of years and what we find is that the number of people who say they have reduced their consumption because of concerns about chemicals, but have not reduced consumption, have been increasing and this years tracking study showed these concerns to out number concerns about fat and cholesterol. When asked what would encourage them to serve beef more often, reassurance that it did not contain harmful chemicals consistenly ranks near the top.

But let's see how we fare compared to other foods. In a current study, consumers gave beef a rating of 8.07 on a scale of 10 for safety and wholesomeness. Fruits and vegetables scored slightly higher at 8.26, while both fish and poultry were lower at 7.5. Salmonella and water contamination were viewed as serious problems with poultry and fish respectively. This study also showed a much more positive response to meat inspection than previous studies with 87% saying they had confidence in the meat inspection system.

Most of the consumer concerns in this area are misconceptions - e.g., 56% of people believe beef is coloured meat and it's a very difficult job to convince them otherwise. And the solution is not to go natural or organic. This tends to reinforce their concerns; by simple logic, if this product is natural and doesn't contain chemicals than the rest of the product is unnatural and does contain chemicals. Our research has shown stronger consumer concerns in areas where natural product is available.

The answer is to:

a) ensure that we are producing safe and wholesome beef
   - always use drugs according to label directions
b) continue to education consumers about our meat inspection and residue testing programs and work on the development of rapid residue testing procedures so that virtually all carcasses are tested
c) public relations and education programs that keep consumers informed on all issues relating to food safety
d) steps taken such as a recent recommendation from the Canadian Council of Grocery Distributors that food safety not be used as a marketing tool.

And so to conclude: the Canadian consumer, and I'm sure it's the same for the U.S. consumer, wants:

Safe, wholesome
Lean,
Flavourful
Tender Beef - all the time.
It's up to us to deliver!

SATISFYING THE CONSUMER ON A CONSISTENT BASIS

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Beef has been the most preferred meat compared to other protein foods in North America since records have been kept. However, over the last 20 years there is clear evidence in consumer purchasing behavior that the beef:poultry ratio is decreasing. In the last 10 years (1978-1988) the beef:poultry carcass disappearance ratio in Canada has changed from 2.1:1 to 1.3:1. People in North America are eating less beef and beef's market share is being gradually eroded by poultry. While several reasons are given for this rather dramatic change in the market-place, the most important are probably price, fat and cholesterol, fears of drug residues, convenience and quality. There is now sound information to show that Canadian beef is low in fat content and cholesterol per serving, and the random tests conducted by Agriculture Canada on residues indicate there is close to 100% compliance with established tolerance levels for a wide range of products (antibiotics, hormones, heavy metals etc.). These two areas require a continued major effort by the beef industry to satisfy consumers that beef is a wholesome and healthy food. The questions of price and quality are more difficult ones to answer. In my opinion, beef will always be more expensive to produce than poultry since generation intervals are long in beef cattle and only a single offspring is usually produced per breeding unit which then takes in excess of 12 months to produce a finished carcass. While efficiency can be increased leading to lower costs of beef production, it is highly unlikely that advances will lead to price equivalency of poultry and beef. We have to face up to the fact that beef will always be more expensive than poultry, and alternative measures will be required to keep beef in its most preferred status.

Recent information collected in Canada suggests that in excess of 30% of the beef produced is considered to be unacceptable by the consumer (McDonnell 1990). Quality factors such as tenderness and taste were the most important reasons for dissatisfaction. Quality is something that can be improved and it will be a vital area for industry response to maintain its existing market share.

The beef industry must also be aware that the consumer and markets are changing. Examination of population growth alone shows that population will plateau in Canada by 2030 at a total size of 28 million persons. Thus, the traditional growth in beef demand fostered by a rising standard of living and an increasing population size will not be a factor from the 1990's through into the next century. The population is also aging and older people eat less meat. Families are becoming smaller, along with the rising percentage of women in the work force. In 1989, approximately 60% of women were working or actively seeking work, whereas by the end of the 1990's, 85% are predicted to be in the work force. These demographic changes will have a profound effect on the North American beef industry. If one was optimistic, a 10% decline in beef consumption over the next 20 years would not be unrealistic. However, the consumer of tomorrow is almost certain to have more disposable income and should be willing to pay for a quality product.

Factors influencing beef quality

Muscle quality is influenced by a wide range of factors from the live animal through to the cooking of the final product. In the last 20 years the main emphasis in beef carcasses has been towards a reduction in carcass fat content. The Canadian beef grading system introduced in 1972 clearly identified carcasses into 4 yield categories (A1-A4) with the result that the industry soon began to discount the fatter carcasses (A3 and A4). Since 1972, the Canada A1 grade has increased from 40% of A grade cattle to 60%, A2 carcasses have decreased from 38% of the A grade to 30%, and A3 and A4 carcasses have declined from 20% of the A grade to 10% of the total A grade. The highest carcass prices are now paid for the A1 grade with the net result that this has become the target grade for most feedlot operators. Feeding cattle to achieve between 4-10 mm of carcass fat has therefore become the challenge for feedlots.

There are relatively few factors under the control of the feedlot operator which have a major bearing on meat quality. While it is well recognized that animals should be young to achieve a consistent product, the majority of animals in North America are slaughtered before they are 2 years old. A short period of grain feeding prior to slaughter has been linked with improved muscle quality in several studies (Aberle et al. 1981; Rompala and Jones 1984). The explanation for this finding is that animals in a rapid growth phase synthesize a relatively large quantity of poorly crosslinked collagen (gristle) which tends to dilute out the older and tougher fibres. Therefore, a minimum period of grain feeding of at least 80 days to give rapid growth prior to slaughter is without doubt a quality assurance procedure for beef. The genetic variation in meat quality characteristics has not been actively persued due to the lack of simple technique to assess meat palatability. The large breed evaluation trials conducted in North America have generally found few meaningful differences across a wide range of breeds and crosses. The only exception is the Brahman where studies have shown a decrease in tenderness as the proportion of Brahman was increased in crossbred cattle (Huffman et al. 1962). However, if breed evaluation trials are closely examined, there is a wide range in quality traits for animals fed and slaughtered under similar conditions. Therefore, the genetic basis to meat quality traits requires further study and live animal techniques (eg. DNA probes) to select breeding animals with superior muscle quality would be very useful. Other live animal factors influencing muscle quality include the gender of the animal (entire males vs castrates and heifers) and the degree of stress an animal undergoes prior to slaughter. Recent work at Lacombe has shown that short periods of transportation and holding prior to slaughter can markedly increase shear values.

It has generally been recognized that the events after the animal has been slaughtered exert a major influence on the eating quality of meat. The most important factors are carcass chilling, the use of electrical stimulation, the marbling present in the meat and the aging of meat before retail sale.

There has been a trend over the last decade to move towards more rapid chilling of beef carcasses through the installation of chilling systems with a higher capacity and the use of water sprays. These developments have no doubt decreased carcass shrinkage (Jones and Robertson 1988), but may have influenced product quality. It was discovered nearly 30 years ago that pre-rigor muscle (pH>6.0) chilled below 10^{o}C would shorten (contract) and produce tough meat. This phenomenon was called cold shortening. Based on models developed by James and Bailey (1989), cold shortening is possibly a problem in loin muscles where efficient chilling is combined with lean carcasses (<8mm fat). In practice the process of electrical stimulation shortens the time period for rigor to occur and the possibility of cold shortening can be markedly reduced or eliminated. Other work has shown that the slower the rate of cooling the more tender the resulting muscle (Lochner et al. 1980). More recent work has suggested that tenderness is also related to glycolytic rate post-mortem independent of carcass temperature (Marsh et al. 1987). Fat carcasses that were electrically stimulated and slowly chilled had tougher meat than from similar carcasses that were also slowly chilled but not electrically stimulated.

There are many studies available which show that aging of carcasses or cuts will enhance consumer acceptability. Smith et al. (1978) conducted an elegant study which showed that tenderness and flavor were optimized in 11 days in US Choice carcasses. In contrast, Martin et al. (1971) concluded that 6 days of aging was sufficient to give a high degree of consumer acceptability. Since high voltage electrical stimulation in most cases has significantly increased tenderness and this advantage has been maintained over non-stimulated sides in the first week of aging (Savell et al. 1981), it would appear that aging requirements can be reduced when high voltage stimulation is used.

Marbling has been traditionally considered an essential component of high quality meat. It was dropped as a requirement from Canadian beef grading standards in the mid-1980's. The research data collected on marbling and its relationship with eating quality is extensive (Jeremiah 1978). Most of this research has been conducted in the US. Unpublished work from the Lacombe Research Station (Jeremiah and Martin) showed that fat thickness was significantly related to consumer acceptability, while marbling was only related to tenderness by a trained taste panel.

The Canadian Beef Grading System.

Beef grading was fundamentally changed in 1972 and the system has remained largely unchanged for the last 28 years. Carcasses are initially assessed for maturity using the appearance and degree of ossification in the thoracic, lumbar and sacral vertebrae, to place them into one of three maturity classes. Maturity class 1 carcasses are youthful and qualify for the A or B grades. These generally include carcasses with a chronological age up to 30 months. Maturity class 2 carcasses are of intermediate age and qualify for the C grades. These generally include carcasses with a chronological age ranging from 30-48 months. Maturity class 3 carcasses are mature and qualify for the D and E grades, and usually exceed a chronological age of 4 years. The D grades are mainly for culled cows whereas the E grade is mainly for culled breeding bulls.

Following the assessment of maturity, the section of the loin eye muscle at the 12th rib is examined for quality. A minimum of 10 minutes is required between ribbing and grading to allow the muscle to brighten up or "bloom". Standard lighting conditions are specified in the grading regulations (Anonymous 1985). Muscle color is examined with bright red only being acceptable for the A grade. Fat is also assessed which must be white or slightly tinged with a reddish or amber color for the A grade. Muscling or muscle thickness is appraised for the hip (or round), chuck, loin and ribs and must be free from marked angularity. Fat at its minimum point of thickness is assessed at the 12th rib. Carcasses with less than 4mm fat (0.2 inch) do not have enough fat cover to ensure consistent eating quality and would not qualify for the A grade. There are 4 yield classes for meat in the A grade (A1-A4) with A1 being the leanest and A4 the fattest. The specifications for fatness for the 4 yield categories are as follows: A1 from 4-10mm, A2 from 10-15mm, A3 from 15-20mm and A4 greater than 20mm.

The majority of carcasses from market weight steers and heifers fall into the A1 and A2 grades. Carcass weights for steers average about 320 kg, whereas those for heifers average 300 kg.

Proposed changes to Canadian beef grading system

Value-based has been a term which has been increasingly used in the North American meat industry to describe the changes that are needed to make the grading system more responsive to the market-place. In Canada, the existing system does have some elements of value-based marketing since premium prices have been paid for A1 carcasses, while the other A grades have been progressively discounted. However, within the existing A1 grade there is still a wide variation in carcass lean content. The standard deviation for lean content is about 4% within a grade indicating that an 8% range about the mean would be quite common. To address these concerns, a proposal is now in the discussion stages to evaluate carcass lean content directly using fat thickness, loin eye area and carcass weight. Carcasses would then be paid on the basis of their total lean content rather than on a fat range (eg. 4-10mm). Fat thickness and loin eye area would be assessed using computerized calipers. If adopted and at this stage there is general support by the industry, it would result in a much stronger value-based signal than is the case at present.

The second major change being actively discussed to Canadian beef grading regulations is the inclusion of marbling as a quality trait. As North American trade becomes more integrated in the next decade and the Canadian industry is about one tenth the size of the US beef industry, it has become clear that Canadian meat processors need to be able to trade into the US market on a grade equivalency basis. Within the existing Canadian grades there is a range of marbling levels from traces up to modest. The recent study on marbling conducted in Canada and reported in the previous presentation has shown that marbling does provide quality assurance at the consumer level. For these reasons, marbling will likely be re-introduced in the Canadian grading system at the traces, slight and small levels. However, all 3 marbling levels will be within the A grade, but terminology for these new grades has not been finalized. For example, one suggestion was to indicate traces, slight and small as A, AA, and AAA, and another has been to use A1, A2 and A3.

Future perspectives

Carcass grading regulations can only provide quality assurance to a rather limited number of factors that can influence meat palatability. The proposed changes to the Canadian system will emphasize carcass lean content, but will also provide an assessment of marbling. This in turn should give cattle breeders the challenge to identify cattle that have high yields of lean meat, but at the same time have some potential for the development of marbling fat.

To address overall quality problems will require an industry wide effort. Individual companies could develop specifications for feeding and transportation of market cattle combined with a post-mortem quality assurance program that might include electrical stimulation and controlled rates of carcass chilling. The program could be linked up with the Food Service and Retailing sections to provide guarantees for aging and with the producer funded groups (eg. BIC) to provide the consumer with information on cooking procedures. Quality involves a commitment from all the players in the industry, and we will not satisfy the consumer on a consistent basis until an industry wide approach is taken.

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INSTRUMENTATION IN DETERMINING CARCASS MERIT

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Introduction

The beef industry of the future will probably have (1) a high level of automation for slaughtering, dressing and meat cutting, (2) on-line quality control and sorting of the product, and (3) a diverse market for beef of different quality levels. Changes may be rapid in companies affected by international competition but much slower in geographically protected sectors. Eventually, however, instrumentation for the determination of carcass merit might become extremely important.

I have been asked to give an introductory presentation on the points listed as subject headings below. Technical details of the technology are available elsewhere (Swatland, 1989).

Paying for carcass merit

In the old days, a butcher would inspect an animal on the hoof or a carcass on the rail before it was purchased. From background information concerning the origin of the carcass and its appearance (muscling, fat cover, rib-eye area, marbling, degree of maturity, etc.) a purchase price would be agreed within the context of the current market situation, which often fluctuated by the time of day and with the immediate weather. Those with the skill to do this flourished, while others fell by the wayside. This approach still accounts for much of the beef consumed in rural areas and by beef producers themselves.

To maintain a high standard of paying for carcass merit in the tradition of the master butcher of old, our only hope in supplying large urban centers is to improve the meat grading system by the incorporation of new technology. The key things, the three R's, we are looking for are at present are:

(1) Reliability in detecting <u>tough</u> meat,

(2) Repeatability of the measurement, and

(3) Rapidity of measurement.

If we ever develop a system to do this, then we can start working on the <u>taste</u> of the meat. The colors of the lean and fat in cattle raised primarily for beef production have little or no connection with beef taste and tenderness and they need little further attention. We can already measure color very accurately and rapidly on-line and the only implementation that would be worthwhile is screening for dark-cutters.

How instrumentation can be used in determining carcass merit

Apart from the obvious use in meat grading, there will be many other in-house applications for successful instrumentation to measure beef quality. As we all know very well, the taste and tenderness of beef improve with aging, but aging is expensive. We need instrumentation that will enable us to select carcasses that have an inherently superior quality. After aging, these carcasses can then safely be sold at a premium. Instrumentation to check the final quality of the aged beef would also be very useful and would enable the application proper quality control procedures. Instrumentation to measure beef quality also would greatly facilitate research in genetics, nutrition and husbandry.

Current status of instrumentation for beef and other species

Purpose	Status
For color of beef muscle (dark-cutters & white veal)	Already available
For color of beef fat (yellowness)	Already available
For intramuscular fat	Prototype works
For intramuscular collagen	Prototype works
To predict fluid losses	Prototype works
For sarcomere length	Waiting for a break-through
For meat taste	Science fiction, but not impossible

As yet, there has been no attempt to make a multipurpose probe and to combine it with a fat depth probe to estimate yield, but this is an obvious way to go.

What research is being conducted

There is little information in the published literature on the development of meat quality sensors, perhaps because publication prevents discoveries being patented.

What is needed during the next ten years

(1) Much progress needs to be made with consumer education. We should explain to consumers that we could guarantee the taste and tenderness of their beef if they did not expect it to be bright red when they bought it. This is the groundwork required to establish a major market for premium beef that has been preselected by new instrumentation and then aged to perfection.

(2) It is most important for us to maintain a balanced view of what may be possible in the way of new instrumentation and how it should be used. I seriously doubt that any totally reliable system could ever be developed to measure meat quality. What may be possible, however, is a series of partly successful systems that could be progressively improved. It is important to identify the threshold point at which the system can implemented to improve profitability. Up to this threshold point, we need to nurture the technology and to develop a secure theoretical foundation for the subject. Once we reach the threshold, future developments may be empirical and driven by market forces.

Conclusion

Very little research so far has been undertaken to develop instrumentation for determining beef carcass merit. However, meat color, water holding, intramuscular fat and fat color can already be measured rapidly and without perceptible damage to the carcass. It may be possible to predict directly the connective tissue component of beef toughness and to by-pass the traditional meat grading operation of guessing animal age at time of slaughter. Developments in this area may radically change the way we grade, distribute and market beef carcasses.

Reference

Swatland, H.J. 1989. Objective measurement of physical aspects of meat quality. 42nd Annual Reciprocal Meat Conference of the American Meat Science Association. pp. 65-74. National Livestock and Meat Board, Chicago.

Central Test Committee Minutes

The Central Test Committee was called to order at 3:30 pm on May 24, 1990 by Ron Bolze. The major business of the committee was to discuss methods of categorizing test station bulls for traits like calving ease, growth rate and optimum milk.

John Pollak of Cornell presented information on the threshold model for calving ease used in the 1990 Simmental summary. A threshold model has been adopted because of several problems that occur with calving ease scores. Calving ease scores (1,2,3 and 4) are discrete data. The wide range covered by each score makes linear models inappropriate. There is a larger difference in calving difficulty between male and female calves in heifers than in mature cows. The threshold model handles these interactions better than the linear models that were used. The new threshold models also include birth weight in the analysis. As compared to the old system the threshold model tends to spread out young bulls and pull the EPD's on old bulls closer together. Rank correlations between the two systems were high. It was recommended that calving ease EPD's be used as the criteria for identifying calving ease Simmental bulls in test stations.

Keith Bertrand of the University of Georgia presented information on using birth weight EPD's. This information is included in the 1990 BIF Proceedings.

Reports were made from stations that classified low birth weight EPD bulls. In West Virginia, Angus and Polled Hereford bulls were labeled "Calving Ease" in the sale catalog when birth EPD's were below +1.5. Tennessee and Wisconsin had lower requirements for low birth weight EPD bulls while Ohio tests had the same growth requirements for both low and high birth weight bulls.

Ron Bolze reported on a survey sent to central test stations. Approximately 50 surveys were distributed and 23 were returned. Twenty of the 23 stations responding printed EPD's in their sale catalog. The most popular method was to report birth, weaning, yearling and pure milk. Only four stations print an EPD distribution table.

Of the 23 states responding, only six indicated that they had designated calving ease/low birth weight bulls in the past. Seventeen indicated that there is a need for such a designation. Fifteen said these bulls should be called "Low Birth Weight EPD" and 18 chose birth weight EPD as the criteria to use in designating these bulls.

When asked about designating growth bulls at central tests, 16 station managers did not think it was necessary. The most common reason given was that test stations already emphasize growth rate. Nineteen did not feel a need to designate "milk" bulls. The major reason given was that milk needs vary from herd to herd and the buyer should define his or her own needs. In addition the opinions were expressed that too many designations would confuse things and that it is better to educate buyers in the use of performance data so they can make there own decisions. The meeting was adjourned following the report.

Respectfully Submitted,
Ronnie Silcox, Secretary

Identifying Easy Calving Bulls at Central Test Stations

By Keith Bertrand and Ronald Silcox
The University of Georgia

In a survey of Angus breeders conducted in 1988, 34.4 and 22.8% of respondents identified calving ease or birth weight, respectively, as the most important criteria that their commercial bull buyers use to select a bull. In order to meet the needs of bull buyers, many central test stations are or will be identifying bulls that have the potential to be easy calving sires. Many breeds in the U.S. do not have calving ease expected progeny differences (EPDs) available. However, most breeds do have birth weight EPDs available on young bulls.

Figures 1 and 2 illustrate the relationship between birth weight EPDs of sires and calving ease using the Polled Hereford breed as an example. These two figures present the relationships between the birth weight EPDs of the sires and ease of calving of cows and heifers in terms of assisted or unassisted births. First, as illustrated by figure 1, older cows do not experience a great deal of calving difficulty until they are bred to bulls with extremely high birth weight EPDs. Second, as illustrated by figure 2, calving difficulty in heifers increases as the birth weight EPDs of the bull they are bred to increases. Therefore, selecting low birth wt. EPD bulls to breed to heifers can reduce calving difficulty. However, even when heifers were bred to bulls with very low birth wt. EPDs (below -4.0), there was still 12% of the heifers that required some assistance at calving.

Young bulls at central test stations will have a nonparent or a pedigree EPD available. A nonparent EPD uses the birth wt. of the bull plus pedigree information to predict an EPD for the animal. Table 1 presents correlations between several young bull measures and the birth wt. EPD for three breeds of beef cattle when the same bull has at least 20 progeny. The nonparent EPD has the highest correlation with the parental EPD in all the breeds examined. The pedigree estimate was also better correlated with future progeny performance than the actual birth wt. or the contemporary group ratio. It follows then that central test stations should use the nonparent EPD when available or the pedigree estimate when no birth weight record is available to help producers identify young bulls that have the potential to be easy calving sires. A word of caution: <u>EPDs can not be used to compare bulls across different breeds.</u> At the present time, EPDs can only be used to compare bulls within a breed.

Even though the nonparent EPD is the best predictor of the future progeny performance of a young animal, there is still some risk involved with using young bulls. If one were to take a group of 1,000 young bulls that had a group birth wt. EPD average of 1.0 based on nonparent EPDs and examine them later when they were all proven sires, the group would still average close to 1.0. However, some bulls in the group would have gone up and others would have gone down. This is the idea behind the accuracy value. A lower accuracy value means that a bull is more likely to change when it has additional progeny than a bull with a higher accuracy value. Again using the Polled Hereford breed as an example, there's a 68% probability that a young bull with a nonparent EPD of 1.0 and an accuracy of .10 lies between -2.5 and 4.5, and a 95% probability that it lies between -6.0 and 8.0. A proven bull with an accuracy value of .90 and an EPD of 1.0 has a 95% probability of ranging between 0.2 and 1.8. Therefore producers need to be very careful when putting young bulls with heifers since there is a greater chance compared to using older proven sires that the true birth wt. EPD could be higher than the predicted value.

Identifying calving ease sires is important to the industry. Central test stations can help do this by listing nonparent or pedigree birth wt. EPDs and calving ease EPDs for all bulls and educating bull buyers on how to use these predicted genetic values.

TABLE 1

CORRELATION OF BULL BIRTH WT. EPD
WITH
SEVERAL NON-PARENTAL BIRTH VALUES

	BWT	RATIO	PEDIGREE	NPEPD
ANGUS (N=870)	.58	.52	.72	.77
LIMOUSIN (N=184)	.42	.39	.70	.74
BRANGUS (N=43)	.46	.43	.61	.66

Minutes of the Genetic Prediction Committee Meeting

May 24, 1990

Beef Improvement Federation
Hamilton, Ontario, Canada

L. Cundiff - Chairman L. Benyshek - Acting Secretary

Interbreed EPDs

Presentation by Dave Notter:

Proceedings will contain Dr. Notter's paper. His general proposals were: 1) to consolidate existing data which may be useful in studying procedures for determining breed effects adjusted for genetic trend, 2) to consolidate literature heterosis estimates and 3) to increase the educational effort.

General Discussion:

Questions were asked about the possibility of a central data base which is primarily experiment station and USDA data. There appeared to be a consensus that field data must be collected to support interbreed EPD research. There was concern expressed for funding such projects.

It was suggested that there were a number of problems with National Cattle Evaluation to be solved within breeds. The question was asked: Is there a need to set priorities with respect to EPD research?

Presentation By Dick Spader:

Mr. Spader discussed the U.S. Beef Breed's Council resolution concerning interbreed EPDs. He expressed the purebred industry's concern about different breed comparison tables being prematurely released. He suggested that the educational effort be increased concerning EPDs.

Major points of the Beef Breed's Council resolution are: 1) add more data to the existing database, 2) research the concept more thoroughly, 3) no data be released until the impact could be determined on each breed with an existing NCE program and 4) BIF develop appropriate guidelines concerning interbreed EPDs.

NC 196 Proposal

Richard Willham's paper concerning the usefulness of NC196 data for developing interbreed EPDs will be in the proceedings.

Common Base

A motion by John Pollak to provide in the next analysis for each breed two sets of EPD results 1) adjusted to 1982 base and 2) ordinary base used by a breed. This would provide a comparison which would be helpful in deciding whether to use a common base.

Second by Dale Van Vleck. Motion passed.

Threshold Model for Calving Ease

Discussion by John Pollak.

New Model for Interbreed Analyses

Discussion by Bruce Golden to be included in proceedings.

Age of Dam Adjustments

Discussion by Larry Benyshek to be included in proceedings.

Discussion From the Floor

Motion by Henry Gardner to accept the U.S. Beef Breeds Council's resolution on interbreed EPDs. Second by Bob Krop. Motion amended by Bob Schalles to consider each point by separate question. Second by Dave Notter. All four points passed. There was considerable discussion of point three because of its possible effect on publication of research results.

Committee chairman Larry Cundiff recommended the appointment of a subcommittee to develop guidelines for interbreed EPDs. Subcommittee to be chaired by Richard Willham with at least the following members: Larry Benyshek, Jim Brinks, John Pollak, and Larry Cundiff.

Meeting adjourned at 5:30 p.m.

Submitted,
Larry Benyshek
Acting Secretary

INTERBREED EPDs: A STATUS REPORT

D. R. Notter
Virginia Polytechnic Institute and State University

Introduction

Since the discussion on interbreed EPDs began in earnest at the 1989 B.I.F. Meeting in Nashville, considerable evolution of the concept has occurred. The idea has caught the imagination of many cattle people, but serious misconceptions remain, and it is likely that the number of breeders who would regularly use interbreed EPDs is far smaller than the number that will use traditional, intrabreed EPDs. To some extent, the call for interbreed EPDs represents a backlash by some who find current EPDs confusing, do not truly understand them, and have become convinced that a single set of interbreed EPDs for the whole beef industry would make everything easier to understand. They are probably wrong in that conviction.

On the other hand, we see more and more breeders who are interested in potentially utilizing the full array of cattle genetic resources, both within and among breeds. For these breeders, sound predictions of breed performance are just as important as access to within-breed EPDs, and some form of interbreed EPDs becomes absolutely necessary to their breeding programs. These breeders also must acquire a thorough understanding of the genetics of crossbreeding, including such concepts as heterosis (and the extent to which it is retained or lost in different kinds of crosses), general combining ability (i.e., the average performance of a breed in crossing) and specific combining ability (i.e., the performance of a specific pair of breeds when they are crossed). Unfortunately, these concepts are not well understood by many cattle people.

The Perceived Problem

The generally sympathetic response to the concept of interbreed EPDs among commercial bull buyers suggests that we do have a problem as an industry with the presentation and interpretation of EPDs. These problems may not be perceived, and indeed may not exist (but probably do), for individuals working with a single breed. Each of the purebred sire summaries is, in general, readily interpretable to those willing to invest a reasonable amount of time and effort. The breed associations and the universities with which they work deserve commendation for their efforts to educate their breeders on the understanding and use of EPDs. Introductory materials prefacing the sire lists provide comprehensive statistics on genetic trends and distributions of EPDs which do much to clarify the positions of individual animals relative to current breed averages.

As an industry, however, we are increasingly presenting EPDs separate from the introductory material that is so critical to their interpretation. In bull test catalogs and other offerings of animals of multiple breeds, EPDs are regularly presented, but lack context or point of reference and largely presume that buyers can appropriately interpret the EPDs of the various breeds that they may wish to consider. Merchandising abuses are invited when poorly understood genetic bases allow substantial positive EPDs for animals that are well below current breed averages. Many A.I. organizations use supplemental classifications of their sires (e.g., "heifer bull", "for replacement females", etc.) to assist their customers in selection.

When commercial bull buyers are told that "a plus EPD doesn't necessarily mean an animal is above average" or, upon looking at bulls of two different breeds, are warned that EPDs provide no information to compare them, it is easy to sympathize with their frustration. It is also easy to understand why a system that would rank all the cattle together, within and across breeds, seems so simple and useful.

But such a system would create problems, even if it were computationally feasible. The implication would be that all cattle belong to the same population and that their likely performance in any system is adequately reflected by their arrays of EPDs. Breed characteristics not directly reflected in current EPDs, such as the leanness of the Limousin, or the subtropical adaptation of the Brahman derivatives, or the generally modest mature cow sizes of the British breeds would be devalued. The implication would be that any pair of animals with the same set of EPDs are the same, even if one were a Brahman and one were a Charolais. Designed crossbreeding programs would likewise be devalued, and haphazard crossing of animals of different breeds would be encouraged. Today, in my opinion, we see no support among thoughtful cattle people for a single, comprehensive national EPD listing of sires without regard to breed.

Yet the problems that suggested just such a quick fix remain and should be addressed. Their ultimate answer, of course, lies in education, but that plea has a hollow ring, especially as we move from the purebred breeders to commercial bull buyers. A more logical goal is for increased standardization of EPDs and accompanying information across breeds and for improved communication of this information to commercial cattle people. A standardized base for calculating EPDs for all breeds is being considered and would be a useful step, but if a fixed base is used, knowledge of within-breed genetic trends is still also necessary to interpret current EPDs. If current supplemental, interpretive information (trends, EPD distributions) could be standardized among breeds, that information could perhaps be combined into an annual B.I.F. Commercial Bull Buyers Guide. Such a publication would be useful even if it contained no direct breed comparisons.

The Real Problem

Behind all the confusion and perceived problems associated with interbreed EPDs, there does exist a real problem to be addressed. Simply stated, it is the question of how to use genetic variation within and among breeds in the design of breeding programs. If a breeder wishes to use, or to consider use of, animals of more than one breed, that breeder needs to have an accurate picture of the expected performance levels of the candidate breeds. If one opens an A.I. sire catalog, one finds relative performance rankings (EPDs) for all the bulls of breed A and for all the bulls of breed B, but no comparable estimate of the mean difference in performance between breeds A and B. Yet to the crossbreeder this information is fully as important as the within-breed differences among the sires. We readily recognize that within-breed EPDs have imperfect accuracies and may change somewhat from herd to herd due to genotype x environment interaction, but generally accept these EPDs as valid predictors of mean performance. Comparable breed EPDs, indicative of breed mean performance levels, are needed. The accuracy of such breed EPDs can be at least approximated in terms of the standard error, or possible change, of the breed means, and should be estimable with much greater accuracy than are within-breed EPDs. Genotype (breed) x environment interactions can be addressed when comparative breed information is obtained from several environments, but data for estimation of breed EPDs will admittedly be available in fewer management units than those used for within-breed EPDs.

A large number of breed comparison experiments have been conducted, and each can be used to derive at least some information on breed EPDs. The results of such experiments are much more valuable when the EPDs of the sires used in the experiment are known, in order to allow objective adjustment of experimental results for sire sampling and genetic trends. Existing efforts in this direction have been limited to single-location studies and need to be made more comprehensive. Field data sets will in general be less useful than experimental data sets for estimation of breed EPDs because of the structured crosses that are usually necessary for estimation of breed effects, although notable exceptions may exist and should be pursued. In particular, purebred data will likely be of limited value in calculation of breed EPDs due to confounding of direct and maternal effect. If breed EPDs are to be used in designing crossbreeding programs, estimation of additional genetic parameters required to predict crossbred performance will also be required. These include mean levels of heterosis as well as parameters involved in specific crosses. For example, breed EPDs for birth weight in Brahman crosses would have to specify if the Brahman was the maternal or paternal parent.

Interbred EPDs of some form will become especially important to individuals involved in the production of hybrid seedstock. Interest in hybrid and composite sources of germplasm is increasing, and such animals may be a valuable resource for the beef industry. For such animals to be appropriately used, it will be necessary to develop a mechanism to objectively compare then with other sources of germplasm. Such a comparison will necessarily involve consideration of breed and heterosis effects.

Plan of Action

A reasonable plan of action at the current time would appear to involve:

1. Consolidation of pertinent existing data (both university and industry) to allow prediction of breed mean performance levels. Critical voids in existing data should be identified and plans made to fill those voids.
2. Consolidate estimates of heterosis effects for major performance traits and conduct a critical assessment of the importance of general and specific combining ability in beef cattle.
3. Begin educational efforts on use of genetic resources (within and among breeds) in cattle production.

Postlude

It is important to appreciate that the current emphasis on within-breed EPDs in the U.S. is directly attributable to the paramount role of the breed associations in genetic evaluation. This model has, as a whole, worked well and he interests of the purebred breeders and of many of their customers have been well served. But a new clientele of commercial breeders and non-purebred seedstock producers is emerging with its own unique needs for across-breed genetic information. New structures may be needed to serve these groups and mechanisms to responsibly blend new and preexisting structures should be encouraged.

Presentation
to
Genetic Predictions Committee of BIF
May 24, 1990
by
Richard L. Spader

I want to thank Dr. Cundiff, chairman of the Genetic Predictions Committee, for the invitation to express the views of the U.S. Beef Breeds Council on the subject of Interbreed or Across Breed EPDs. Also, I'd like to express my confidence in the forum here at BIF where we have the opportunity to review potential programs and policies as we work toward uniform guidelines for breed and industry performance programs.

I was asked today primarily to review the subject of Interbreed EPDs and the resolution of the U.S. Beef Breeds Council relative to Interbreed EPDs adopted at their January 1990 meeting. To start, the subject of Interbreed EPDs surfaced at BIF in 1988 and Dr. David Notter presented a review of the USMARC data on the subject at the 1989 BIF meeting at which time the subject was tabled pending review by the U.S. Beef Breeds Council. USBBC, representing 18 of the major U.S. beef breeds, discussed the subject in January 1990 and developed the attached resolution. The subject was again reviewed by USBBC last weekend with no changes to the original resolution.

In the meantime several articles and tables have surfaced on the subject along with more than one version of Dr. Notter's conversion table.

This has raised concern with members of the U.S. Beef Breeds Council for more than one reason but primarily because the Council has felt greater efforts were needed to validate the existing data base before information was released. Also, that communication or education on the subject be handled in a very understandable and meaningful way.

At this time I would like to review the resolution of USBBC bearing in mind that my position today will be one of wearing two hats - one as chairman of USBBC and the other as a representative of the American Angus Association.

I think it's important to point out that USBBC endorses the concept of Interbreed EPD research and the first part of the USBBC resolution reads as follows:

> **THEREFORE BE IT RESOLVED, the USBBC supports the concept of across breed EPD research subject to the following:**

At this point the Beef Breed Council members felt

1. **Greater efforts be made to add to the data base under consideration which would be used to develop these predictions.**

I would like to change hats at this time and talk to you as the Angus Breed Association reporesentative.

As we have reviewed the original USMARC data and according to Dr. Cundiff a total of 34 different Angus sires were used in the initial research project at USMARC. Of these 34 sires 13 sires had EPD generated from progeny data or expressed interim EPD.

^ Of these 13 sires, 10 expressed EPD for birth weight. Of these 10, two expressed interim values, thus = 8 sires for birth weight EPD

^ Four bulls had interim EPD for weaning weight = 9 sires for weaning weight EPD

^ Four bulls had interim EPD for milk
= 9 sires for milk EPD

^ Two bulls had interim EPD for yearling weight and two bulls had no EPD for yearling weight
= 9 sires for yearling weight EPD

Four bulls were born in 1970, two in 1969, five in 1968 and two in 1967.

I must therefore surmise that Dr. Notter's across breed EPD conversion chart was based on birth weight EPD from eight Angus sires, and weaning, milk, and yearling data from nine Angus sires.

My first contention is "Can nine sires from a population of 42,000 sires, 514,000 dams, and 191,000 non-parent animals three years old or less, adequately represent that population?"

Secondly, even though genetic trend was used in adjusting the data, do these values establish a credible base?

Thirdly, has the concept been evaluated for accuracy outside the boundaries of MARC?

The second step of the USBBC resolution states:

> **2. Research personnel, in cooperation with the Beef Improvement Federation (BIF), continue to examine the concept, evaluate the implications and appraise the industry about the appropriate manner in which to interpret and utilize this information.**

I believe one of the main concerns here is evaluating the implications. For the past five to fifteen years, depending on the breed represented, associations have worked diligently at establishing the highest credibility and confidence in our sire summaries. Along with that, huge investments in computers, people time and breeder time has been invested in these efforts. A tremendous amount of education has also been directed to the seedstock and commercial industry to that very fact.

The result has been an industry wide acceptance of National Cattle Evaluation as a new barometer of the value of registered seedstock and the role the seedstock industry plays in profitable cattle operations. All of us in breed association work have observed a new and objective basis upon which pedigree and performance values have been established in recent years.

My point is simply this. Interbreed EPDs have been promoted as a necessity for the commercial industry and they may be. But can we be satisfied with preliminary data as a basis on which to send the commercial industry a message of interbreed comparisons without the same scrutiny that we give our own individual sire reports? I think not.

It also needs to be pointed out that on a within breed basis there is no need for interbreed EPDs at all. This concept is directed to the commercial industry and primarily the utilization of multiple breeds in commercial production.

The third part of the USBBC resolution states:

3. **That no data be released until all breeds who are members of the USBBC with Sire Summaries be examined for utilization, application and inclusion in the published reports.**

By this the Council felt that all breeds with sire summaries should be included in a conversion table for the benefit of the entire commercial industry. That inclusion of all breeds does not exist with Dr. Notter's conversion table.

And last,

4. **BIF develop appropriate industry guidelines for the uniform application of a methodology to produce across breed EPDs under the conditions cited in 1, 2 and 3.**

In summary, I believe there are three basic points:

1. BIF has the responsiblity and has been given the responsibility to lead us in the right direction on Across Breed or Interbreed EPDs.

2. The confidence and integrity of our Sire Evaluation efforts over the past 15 or more years is on the line with Interbreed EPDs. If these comparisons aren't accurate, we all have the potential of suffering with loss of confidence in our Sire Evaluation programs.

3. Roll of BIF is to get this information, if it's approved, into a uniform format and then communicate this information in an understandable way for the layman or cowman using data from more than one breed.

I believe this is our challenge - and I hope we can all accept this challenge as it relates to a very important issue for our industry today.

Thank you.

Attachment 1

January 28, 1990

RESOLUTION OF THE UNITED STATES BEEF BREEDS COUNCIL

WHEREAS, members of the United States Beef Breeds Council (USBBC) have had a long standing record of encouraging, funding, developing and producing Expected Progeny Differences (EPDs) for our respective memberships and the industry; and

WHEREAS, the commercial segment of the industry has expressed confidence in, and the desire to use, EPD information; and

WHEREAS, the need exists for better understanding of individual breed EPDs by producers involved with more than one breed in commercial production; and

WHEREAS, there are proposals which were discussed at the 1989 Genetic Predictions Workshop to accomplish a comparative analysis between breeds based upon at least a portion of the existing data base within the industry; and

WHEREAS, concern exists over the utility and accuracy of the current data base being considered for this purpose,

THEREFORE BE IT RESOLVED, the USBBC supports the concept of across breed EPD research subject to the following:

1. Greater efforts be made to add to the data base under consideration which would be used to develop these predictions.
2. Research personnel, in cooperation with the Beef Improvement Federation (BIF), continue to examine the concept, evaluate the implications and appraise the industry about the appropriate manner in which to interpret and utilize this information.
3. That no data be released until all breeds who are members of the USBBC with Sire Summaries be examined for utilization, application and inclusion in the published reports.
4. The BIF develop appropriate industry guidelines for the uniform application of a methodology to produce across breed EPDs under the conditions cited in 1, 2 and 3.

A COMMON BASE

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Introduction

Genetic evaluations in the form of EPDs are currently being provided by most breed organizations to their membership and the commercial industry as tools to aid in making selection decisions. EPDs are reported as deviations. They represent the genetic merit of a particular animal for a trait as a deviation from the average genetic merit of what is described as a base group of animals. The average genetic merit of this base group is zero.

It is important to point out before any further discussion that the choice of a base group of animals is completely arbitrary. Although the choice does influence the magnitude of each EPD, it does not influence the comparison between two EPDs. For example, a base may be selected such that the EPD of Bull A is +30 and the EPD of Bull B is +20. The difference between these two is 10 units. A second base may be chosen such that the evaluation of Bull A is +5, and the evaluation of Bull B is -5. Certainly the magnitude of the EPDs has changed, even to the point where B has been "cursed" with a negative value; however, the difference, 10 units, is still the same.

EPD stands for expected progeny difference. The key word is difference, suggesting a comparison should be made. Using EPDs in comparisons avoids any confusion about what the base is for a particular breed. However, comparisons can only be done within breed. An issue today is using across breed EPDs. This issue has motivated discussion on setting a common base for all breeds because one reason comparisons cannot be made across breeds is that each breed is using a different base. However, this is not the only reason why EPDs cannot be compared across breeds. An excellent review of why EPDs cannot be used across breeds can be found in a paper presented by Notter at the BIF convention in 1989.

Currently, several methods are being used to set a base in the U.S. evaluations. In some breeds, the animal model is used, and in this analysis, the base is automatically set such that the average genetic merit of "base" animals equals zero. The definition of a base animal is an individual for which parentage is not known. The problem encountered when allowing the system to set the base is that as additional information becomes available each year, new base animals may be identified. If more animals are added to the base, the average genetic merit of the group changes, and in a sense, the fixed base floats. In other evaluations, the base is fixed by identifying a group of animals (for example, individuals born in 1978) and <u>forcing</u> their evaluations to average zero. This is done each time the evaluation is run. In Canadian evaluations, a rolling base is used. The base is called rolling because the group used in setting the base changes from year to year. The oldest animals in the previous year's definition are dropped out and the newer animals are added to the definition. This is one form of a floating base.

One can see that there is a whole host of questions, options, and concerns regarding the concept of a base. The objective of this paper is to discuss some of these options and make a recommendation, at least for consideration in the U.S. evaluations of beef cattle, for a common base. The idea of a common base was brought forward in the discussion of across breed EPDs. Although it is not necessary to have all breeds on a common base to achieve across breed EPDs, it may be desireable to at least have the definition of a base consistent in enhancing the understanding of EPDs themselves.

Genetic trend

Before discussing the options and considerations regarding the base group of animals, let's first consider the influence of genetic trend on EPDs. As examples, I will use the genetic trends for weaning weight of the Angus and Polled Hereford populations both for all animals born and for sires by their birth year (Figures 1 and 2). Notice that in early years, i.e., between 1972 and 1976 in both breeds, very little change took place in the population. Since then, steady increases in this trait have been observed in the average EPDs of the progeny born. Note also during this time period that the sires selected from each year's progeny group exceed the average of all progeny born that year by 2 to 6 lb. This difference between the average EPD of sires born and the average of all animals born in a particular year appears to have increased from the 1970s to the 1980s. This increase suggests both an increase in desire to change the characteristic and the ability to identify superior animals to meet the objective. Genetic trends observed in these breeds are an excellent example of what can be accomplished when the desire to change a population exists and when the tools to make this change are available.

Why is genetic trend important? One can see from these figures that the choice of a base will have a marked influence on the magnitude of the EPDs. If the year 1985 was selected as a base such that the average of all animals born in that year was set to zero, it is not hard to envision that a majority of the animals evaluated would have evaluations of zero or less. Conversely, if a base was set such that the average of individuals born in 1972 was set to zero, then again, it is not hard to understand why most of the evaluations for current animals would be positive. There is nothing wrong with selecting either one of these years as a base. The selection will not influence the difference between two EPDs nor will the selection of a base change the ranking of animals or selection decisions. However, the impact of the choice of base on the ability to market animals causes great concern for the selection of a base or in decisions on changing the base. A negative value for most traits (excluding birth weight) carries a negative connotation. Seed stock producers struggle to explain what a negative value means, and uninformed buyers often use the negative sign to eliminate individuals without realizing that may not be necessary.

Figures 1 and 2 show the trend for Angus and Polled Hereford for weaning weight. The trend in Herefords is quite similar. In Simmentals, however, there was a period for which little change occurred in the population for this trait. This time period between 1976 and 1982 corresponded to the time when the breed was placing emphasis on lighter birth weights. The point is that the direction and magnitude of genetic change by year does reflect the desire of the breeders to change a trait and the amount of emphasis placed on achieving that objective. Not all breeds should be selecting for the same traits with the same emphasis. Hence, genetic trends will differ in each breed.

Fixed versus floating bases

As previously mentioned, there are two basic types of bases. One is fixed, and the other is floating. A fixed base is one in which the base stays the same from one evaluation to the next. That is, a zero EPD individual is the same from one evaluation to the next. A floating base is one in which the group of animals representing the base may change from one year to the next. If there is genetic trend in the population, then the zero EPD animal is different from one evaluation to the next in the expected performance of their progeny.

There has been much debate in the dairy and beef industries over setting bases. A central theme of that debate usually is whether to have a fixed or floating base. The advantage of a fixed base is that the EPDs mean the same from one evaluation to the next. That is, a producer can set standards of say +10 lb weaning weight and keep those standards because a 10-lb individual is the same from one evaluation to the next. Conversely, an advantage of the floating base is that the base keeps up with the genetic trend in a population. As such, a breed does not end up in the situation where all individuals may be positive for a particular characteristic, and the extreme animals do not have numbers that in a sense are unrealistic.

Selecting animals to represent the base

For either a fixed base or a rolling base, a decision has to be made as to which animals to use in defining the base. For example, if a particular year is chosen, the choice may be to set the average of all animals born that year to zero or the average EPD of sires or of parents born that year to be zero. One can see from Figures 1 and 2 that the choice will make a difference in the value used to set the base. For example, with Polled Herefords, sires born in 1982 have EPDs about the same as the average of all individuals born in 1987. In populations where effective genetic trend is observed, this will usually be the case. Sires lead the population and hence in a particular year have higher average EPDs than their contemporaries born in the same year.

A common base

The purpose of this presentation is to discuss and recommend a common base to be used by all breeds. The intent would be to have one definition of a base used by all breeds. It is not intended to select a base that produces the same distribution of EPDs, for example, equal numbers of negatives and positives for a trait in each breed. Rather a period of time is recommended to be used by all breeds as a base, and the differential trends for each breed in each trait would then determine the distribution. The advantage of a common base is the advantage of uniformity. One critical factor in the expanded use of and the reliance placed on EPDs is a better understanding of what they represent. Much of the education involved in the use of EPDs is in the hands of extension agents and other individuals who have no affiliation to a particular breed but do get involved in explaining the evaluations of all breeds. Using a common base seems desirable to enhance understanding of EPDs.

Since the definition of a base is arbitrary, there are an infinite number of possibilities. **However, the recommendation put forth in this presentation is to set the base as the average genetic merit of all animals born in the year 1982 to zero.** This would be a fixed base. It would use the EPDs of all animals born in the year, not just the sires selected from that group. The year 1982 was chosen as a compromise. It seems reasonable that the base should be composed of relatively current animals so that unrealistically large numbers do not appear in the sire summaries. Also, several breeds do not have data that go back far enough to establish bases in the mid or early 1970s. Conversely, some breeds have made dramatic changes in their populations since the mid 1970s and have their bases set back in times prior to this. As such, selecting a base in more recent years than 1982 would mean dramatic shifts in their average published EPDs. The contrast between two EPDs would still be the same; however, the perception of large drops in the EPDs would exist and would cause concern for producers in those breeds. The year 1982 would precipitate a drop in EPDs in these breeds. However, by setting it to the average of all animals born in that year and choosing a year approximately midway between when the trend started and now, the change would not be as large as defining the base in a more current year or by using sire EPDs.

It is also recommended that in the upcoming sire evaluations for each breed, an auxiliary evaluation be created using this new base. The breeds would still publish the evaluations from the standard genetic evaluation run; however, they would also have at their disposal the evaluations as they would have been had this base been selected for all traits. There are many traits published in many breeds using many different selection criteria. The only way to get a feel within each breed of how the new base will impact a sire summary or calf crop report would be to run concurrent evaluations. This does not require separate evaluations since setting a base can be accomplished using the EPDs from the published evaluation; hence, it is easy to do. The decision as to whether to adopt the recommended base set forth here or some modification of it could then be made with the realization of how it will influence the evaluations, and the necessary educational materials could be prepared for producers in advance.

Figure 1. Genetic trends in Polled Herefords for weaning weight EPDs

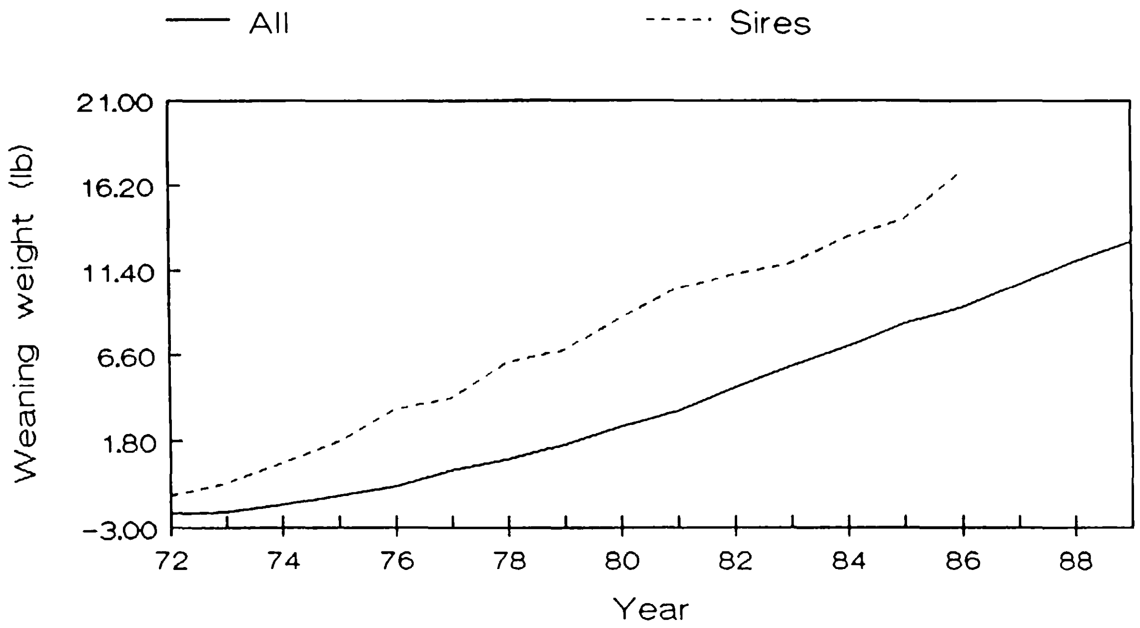
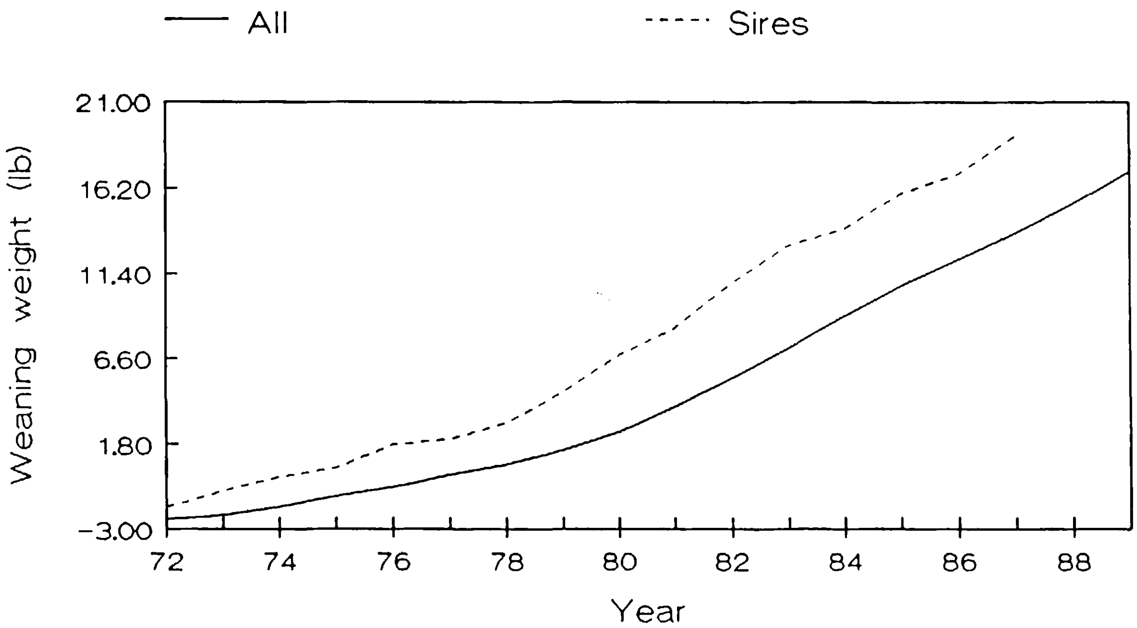


Figure 2. Genetic trends in Angus for weaning weight EPDs



A BREED TABLE [1]

R.L. Willham
Iowa State University

"Then was born the idea of the experiment station, and after a full quarter of a century of practical failure the Hatch Act was passed providing for research and the publication of the results 'direct to farmers'. That was the center shot, 'direct to farmers' whether they could read the bulletins or not. From that day, colleges of agriculture went definitely on a scientific basis and from that day forward they began to succeed."

"Farmers began to feel that the college man must know some things not generally known and had ways of finding out things not possessed by the man between the corn rows or in the feedlot."

"Accordingly they (college men) were in great demand at farmers' meetings....we shall never again see the day when farmers grew so fast, when investigators kept so close to farm problems, and when the farmer and the station were so close together as in those early days when the investigator came into personal contact with the farmer, showed what he was doing and discussed its meaning, not only in formal lecture but personally in hotel lobby or on the trains and when waiting at junctions for connections."

"These acquaintances were the greatest promoters of the scientific spirit and of agricultural welfare that the world has ever seen."
(DAVENPORT, 1925)

These "acquaintances" are what has made BIF work. They are the "greatest promoters" of the scientific spirit the world has ever seen. One must go overseas to really comprehend what BIF has accomplished. But Davenport was dead wrong when he said, "...we shall never again see the day when...." As a part of BIF, we are privileged to "see the day" every annual meeting, workshop, and committee meeting. The first publication from the GPE research at US MARC was eagerly anticipated and utilized by the beef industry as have been many results presented first at the symposia of BIF.

As interbreed EPDs were being considered (Notter, 1989), the need for a BREED TABLE arose as the second step needed to fairly compare the EPDs of sires of different breeds. What took us so long? The development of an accurate, current table from which the performance of breeds can be compared fairly will stand alone all by itself. Such a table would be of benefit in the design and conduct of a commercial breeding program. Yes, there really are difficult statistical problems to solve and data from an optimum design are lacking. However, we (breeders and academics) have grown together in the development of EPDs. First, performance was only a within herd

[1]A paper for the genetic prediction committee meeting of the 1990 annual BIF meeting.

tool. Second, performance became a tool for across herd evaluations within a breed. And now performance can become a tool for both across breed and within breed evaluation. This appears to be a logical extension. As Cundiff (1989) has noted numerous times the genetic variance within the beef population is roughly half breed differences and half within breed differences for some economic measures of performance. And there is hybrid vigor as well. Thus, to exploit the available genetic variance in a systematic crossbreeding program for commercial production accurate breed comparisons would aid in the design. Periodically, livestock publications have attempted such breed tables which documents the need.

Breed differences are an asset to the beef industry. But to compare breeds has been taboo until very recently. To develop a breed table with the cooperation of the associations responsible for the promotion of their breed really requires an attitude change from maximum being the best in all measures to a clearly defined purpose for each breed in the schemes of commercial production. Optimum will replace maximum. Such a table will focus attention on the traits that need to be improved by specific breeds. Ample evidence exists that breeds can change genetically and have changed. It is possible that figures in a breed table, that suggest that a breed can best contribute to commercial production in a specific way, will cause the leadership of commercial producers to better advertise the breed to the rest than all the slick paper ads can do.

Talk is cheap. If such an accurate, current BREED TABLE is to be developed, who is going to do it? It requires more than saying BIF should do it. BIF does not do the genetic predictions. There is one funded beef breeding research project left when there were three. Project NC-196 is national in scope and is focused on the genetics of body composition. It involves some 20 cooperating research stations and plans are being made to develop a data base contributed to by the stations. All performance data could be included. The first objective is to develop breed and breed cross differences in body composition which is very like the problem of developing a total breed table. To this academic, it appears to be a natural to be the entity that develops the breed table and keep it current. To produce a real breed table will take the collection of more data than just that from the stations and this will require cooperation from the commercial producers (who are the beneficiaries) as well as help from the breeds. All innovations have their time. This concept of a breed table may have arrived.

In summary, there is a need for an accurate, current BREED TABLE to address the needs of commercial producers in the design and conduct of creative breeding programs, especially those designed to produce a specification product. The new national research project (NC-196) could produce such a table with the support of the beef industry. To quote from Davenport was irresistible.

LITERATURE

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A NEW MODEL FOR THE ANALYSIS OF MULTIBREED DATA

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Introduction

Mixed models used in the analysis of multibreed data need to consider three additional factors not normally considered in the analysis of data from purebred beef populations. The three additional factors are 1) foundation populations may have different means, 2) foundation populations may have different variances, and 3) heterosis may be present. Methods have been described by several for accounting for the first and second factors (Westall, et al, 1988; Elzo, 1990). Methods have also been proposed for accounting for heterosis. However, these methods either do not account for different degrees of heterozygosity within a group or do not reasonably handle more than 2 breed crosses. The approach described here may account for heterosis if a linear relationship with degree of heterozygosity is assumed. The method can be modified to account for non-linear relationships between heterozygosity and heterosis.

A substantial amount of data collected by beef cattle breed associations includes multibreed data. Models used in National Cattle Evaluation have not completely accounted for the special considerations involved in analyzing multibreed data. No grouping equations for the additive differences between breeds are included. Groups are not included for heterosis effects. Usually contemporary groups are separated for large percentage differences. For example, a contemporary group may be split into two groups, those animals that are at least eighty seven percent of the pure breed will form one sub-group, and those animals that are less then eighty seven percent of the pure breed will be in another. This method does not only incorrectly account for the amounts of heterosis, but also consumes excessive degrees of freedom and can reduce accuracy of predictions estimates for animal effects.

Methods

An example of the model proposed for animals with records and the single trait case for a trait with no maternal effects is,

$$y = X\beta + Zu^* + Qg + Ph^* + e$$

with

$var[u^*] = \sigma_a^2 A$, and $var[e] = \sigma_I^2$

Where,

y is the vector of observations,

X relates observations in y to fixed effects in β,

Z relates observations on y to additive random effects of animal, u^*, of the animal observed not including the additive breed effects,

Q relates the proportion of each breed of the individual observed in y to the additive breed effect, g,

P relates the product of the proportions of a given breed in the sire and dam of the individual observed in y to the breed combination effect h^*,

e is error.

The Qg component of the model comes from a similar treatment given by Westall, et al. (1988) or Elzo (1990).

The total additive breeding value for animal j should then be,

$$\hat{u}_j = \hat{u}_j^* + \Sigma \hat{q}_{jr}\hat{g}_r$$

where r refers to a given foundation group.

The Ph^* component comes from a method Bourdon used in his newest simulation model. In this model he simulates heterosis effect, t_j on the observation of animal j as,

$$t_j = s'Hd$$

where s is a vector of length n containing the proportions of breeds 1 through n of sire of animal j and d is a given vector of the same proportions for the dam of animal j. H then is the set of heterosis effects of the F_1 breed combinations.

In our 3 breed example,

$$H = \begin{bmatrix} 0 & h_1 & h_2 \\ h_3 & 0 & h_4 \\ h_5 & h_6 & 0 \end{bmatrix}$$

where,

$$h^* = \begin{bmatrix} h_1 \\ h_2 \\ h_3 \\ h_4 \\ h_5 \\ h_6 \end{bmatrix}$$

What this amounts to is the one minus amount of backcrossing equation normally used for accounting for heterosis from two breed backcrossing schemes. This method estimates the heterosis effects as a linear relationship to the amount of outcrossing. This method allows for the distinction between the specific cross effects including reciprocal cross effects. One could rearrange the model to eliminate the reciprocal cross equations, but only three equations are needed to account for them in this example. However, these equations can be dense.

P would look like,

$$P = \begin{bmatrix} s_{12}d_{11} & s_{13}d_{11} & s_{11}d_{12} & s_{13}d_{12} & s_{11}d_{13} & s_{12}d_{13} \\ s_{22}d_{21} & s_{23}d_{21} & s_{21}d_{22} & s_{23}d_{22} & s_{21}d_{23} & s_{22}d_{23} \\ \cdot & & & & & \cdot \\ \cdot & & & & & \cdot \end{bmatrix}$$

Results

Sample results from simulation. Simulated data were analyzed to determine the ability of the method for separating the effects. The data were generated using the model described above and the same model was used in a mixed model analysis to produce predictions of animal effects and estimates of other effects. Three foundation groups were simulated with a total of 30 sires and 150 dams. The mating scheme was random and dams were replaced at a rate of twenty percent. A total of 1000 animal were generated. Results of an example simulation are described in tables 1 and 2. Parameters for H and g effects are described in table 2. The population parameters were $\sigma_e = 20$, $\sigma_g = 10$, $h^2 = .2$

TABLE 1. CORRELATIONS OF PREDICTIONS WITH TRUE VALUES FOR AN EXAMPLE SIMULATION.

	Simple	Rank
u with $\hat{u}$	.654	.635
$.5(u_s + u_d)$ with $\hat{u}$	.630	.612
θ with $\hat{u}$	.267	.251
True H with $\hat{H}$	.940	.614
True g with $\hat{g}$	.999	1.0
u with $\hat{u}^*$	.993	.992

TABLE 2. POPULATION PARAMETERS AND THEIR ESTIMATES FOR AN EXAMPLE SIMULATION.

$$H = \begin{bmatrix} 0 & 5 & 4 \\ 5 & 0 & -9 \\ 4 & -9 & 0 \end{bmatrix} \qquad \hat{H} = \begin{bmatrix} 0 & 3.53 & 10.44 \\ 9.05 & 0 & -6.46 \\ 6.68 & -7.53 & 0 \end{bmatrix}$$

$$g = \begin{bmatrix} -30 \\ -2 \\ 0 \end{bmatrix} \qquad \hat{g} = \begin{bmatrix} -29.5 \\ -3.5 \\ 0 \end{bmatrix} \qquad \hat{g}^* = \begin{bmatrix} -25.1 \\ -4.6 \\ 0 \end{bmatrix}$$

As an additional comparison the breeding values were predicted without including the equations for H. The average difference between the solutions and the true values was -.214, with a variance of .527. The range in difference between true value and prediction was -2.27 to 1.82.

Discussion

Many have demonstrated heterosis to be important components of observations of beef cattle performance. Heterozygosity exists in high levels in beef cattle breed association data sets. It is important to include equations to account for these effects. The equations described here may be able to improve the predictions of animal genetic merit. These equations have the potential to yield predictions to be used in determining interbreed EPD's.

Age of Dam Correction Factors

A.H. Nelson, L.L. Benyshek, M.H. Johnson and J.K. Bertrand

Correcting the weaning weight of a calf for age of dam is an adjustment all breeds use, but several breed associations have raised questions concerning their current age of dam adjustments. Breed associations, such as Hereford, Angus and Limousin feel significant genetic trend has occurred and their adjustments may need to be updated. Other associations, such as Brangus have used BIF standard adjustments and now have enough data to compute correction factors specifically for their breed.

In several breeds, there are significant age of dam effects even after adjustment for age of dam. The younger age of dam classes, especially the two and three year old classes, show the largest differences between the classes. These younger classes also carried the most bias within classes. New adjustment factors were obtained using a reduced animal model and fitting an age of dam by sex interaction as a fixed effect. These new adjustments reduced the differences among classes; however, a bias within each class still remained, primarily in the younger age of dam classes. This bias is a direct result of classification. When classifying a continuous variable such as age of dam the problem arises of where to end one class and begin the next class. For instance, two dams may actually be born a day apart but due to the classification into years they may become an entire year apart in age classification. This problem is magnified when the year classification happens to fall in a peak of the distribution of age of dam in days. A solution to the problem of classification is to use a regression approach to adjust for age of dam in days rather than year classes.

Breeding values (BV's) were obtained using a reduced animal model and fitting a three way interaction of age of dam by sex by dam birth year as a fixed effect. Weaning weight adjusted to 205 days was then adjusted for contemporary group effects and genetic effects for weaning direct and weaning maternal, using BV's obtained from the above analysis. Theoretically this adjusted value should be free of genetic trend and environmental effects, and leave only an age of dam effect.

The plot of this adjusted value by dam age in days is nonlinear. In Brangus, a set of four linear regressions were found to adjust all ages to a mature cow age. However this technique was time consuming and often did not yield the best results for other breeds. Since the curve was nonlinear, a nonlinear method of estimation was needed. Linear and quadratic regression coefficients were found using a nonlinear method of analysis in Statistics Analysis Systems (SAS). The NLIN method fits nonlinear regression models by least squares, where starting values are chosen for the model and continually improved upon using an iterative process, in this case Gauss-Newton, until the error sum of squares is minimized.

These regression coefficients were used to adjust age of dam in the Hereford data. Overall, weaning weight adjusted for age of dam using regression coefficients obtained using nonlinear procedures had less bias between classes and within classes than adjustments obtained by classifying age of dam into years. Decreasing the bias within and between age of dam classes by using more precise age of dam adjustments to correct weaning weights to a mature cow age basis will provide more accurate predictions of breeding worth.

BIF Systems Committee Meeting
Burlington Room
Royal Connaught Hotel
Hamilton, Ontario
May 24, 1990

Chairman Strohbehn called the Systems Committee meeting to order at 3:30 p.m.

There are several different micro-computer programs now available for processing performance data for commercial beef producers. It has been noted that many of these programs yield somewhat different results due to different methods used in calculations.

The objective of this meeting was to have a representative for each package to describe capabilities and methodologies of his program. Each was to provide attendees with copies of reports generated from test data for two calf crops. Test data was supplied by Strohbehn in advance.

Measures of particular interest were percent calf crop, calving distribution, and calving interval.

Representatives of five different programs attended and provided summaries of the programs. They also distributed copies of the output generated by their programs based on the sample data sets supplied by Strohbehn.

The discussion did reveal some differences in the way various measures were calculated. Most notable were results for percent calf crop weaned. The results varied 20 percentage units among the programs.

This session was designed to determine the need for standardization of procedures. It appears from the discussion that there may be a need for the Systems Committee to address standardization of methods for micro-computer programs in future meetings.

For further information on any of these programs, please contact:

BEEFWEAN -	Triangle Software Associates P. O. Box 13193 Research Triangle Park, NC 27709 (TSA requests no phone calls, please)
Colorado Program -	Dr. Garth Boyd Colorado State University Department of Animal Science Fort Collins, CO 80523 303/491-6233

CHAPS - Dr. Chris Ringwall
North Dakota State University
Box 1377
Hettinger, ND 58639
701/567-5326

Florida Program - Dr. Robert Sand
University of Florida
231 Animal Science Bldg.
Gainesville, FL 32611
904/392-1916

Auburn Program - Dr. John Hough
Auburn University
Animal Science Department
Auburn University, Al 36849
205/844-4376

Respectfully submitted:

Roger L. McCraw
Secretary

Daryl Strohbehn
Chairman

1990 Ultrasound Certification at Auburn University, Auburn, Alabama

John Hough and William Jones
Auburn University

The 1990 Ultrasound certification exam was conducted at Auburn University, Auburn, Alabama on February 18 and 19, 1990. There were eleven participants from nine states - Alabama, Arizona, California, Florida, Georgia, Iowa, North Carolina, Pennsylvania and Texas.

On Sunday night, February 18, a written exam was administered to all participants, with all meeting minimum requirements. On Monday morning, February 19, 30 steers and heifers were evaluated through 6 chutes. Monday afternoon, 29 head were scanned a second time with identification tag numbers being changed. Fat thickness and ribeye area measurements were taken on all cattle by all participants. All cattle were slaughtered the following day at the John Morrell and Company plant in Montgomery, Alabama.

Carcass measurements were collected by Jim Wise from the USDA and Bill Jones from Auburn University. Official measurements were the average of the following for each side - grid in plant, grid of tracing and planimeter measure of tracing.

Minimal economic loss occurred from handling the cattle and therefore, each participant will be returned approximately $150 of their registration fee. Tapes and interpretations were returned in a timely fashion and original data analyzed within two weeks after the certification.

Eight values were used to evaluate participants for both fat (FAT) and ribeye area (REA) proficiency. The following are codes and definitions of each variable. CARC_DEV = absolute value of difference between ultrasound (US) and carcass measurements (in or in^2), CARC_R = product moment correlation between US and carcass measurements, US12_DEV = absolute value of difference between first and second US measurements (in or in^2) and US12_R = product moment correlation between first and second US measurements. Mean, best (minimum for deviations, maximum for correlations) and worst (maximum for deviations, minimum for correlations) values are given in table 1.

After much deliberation of the certification committee members, it was decided to attempt further evaluation of the participants. A copy of one participant's tape from the 1989 certification was sent to each participant for REA interpretation. Results from those interpretations are given in table 2. Interpretations were compared to the actual carcass measurements, not those of the participant who made the tape.

At the present time, the certification committee has been unable to convene in order to determine which participants will be certified. These decisions should be made by June 5, 1990.

Table 1. Mean, best and worst values for FAT and REA from the 1990 certification.

	FAT			REA		
	Mean	Best	Worst	Mean	Best	Worst
CARC_DEV	.086	.049	.112	1.445	.895	3.100
CARC_R	.830	.959	.762	.342	.655	.340
US12_DEV	.047	.023	.072	.886	.176	1.777
US12_R	.915	.979	.728	.727	.968	.022

Table 1. Mean, best and worst values for REA using a 1989 certification tape.

	Mean	Best	Worst
CARC_DEV	1.035	.516	1.486
CARC_R	.715	.924	.637
US12_DEV	.965	.555	1.664
US12_R	.767	.945	.457

Recommendations for Future Ultrasound Certification Guidelines

John Hough and William Jones, Auburn University

After hosting the 1990 ultrasound certification at Auburn University, Auburn, Alabama, we have reached some conclusions regarding the process. Our recommendation for future certification of ultrasound technicians is to abandon current guidelines and adopt new procedures.

There are several problems associated with the current procedures. The major difficulty stems from the fact that results are not consistent from one certification to the next. Different cattle are utilized each year and results are dependent on the type and number of cattle being scanned. Also, no reference technicians have been used to relate results across years. Currently the certification has been offered only once per year in the early spring, therefore some technicians may have had a lengthy wait to get certified. The certification process is fairly expensive. The fee is currently $500, with additional costs associated with travel, lodging, etc. The current program is time consuming for the participants, committee members and host institution. In addition, possibly not enough cattle are being utilized in the certification process for an adequate statistical evaluation of the participants.

The following is a list of our recommended guidelines for future ultrasound certification procedures.

- Participant will notify the committee chairman of his intent in becoming certified.
- Participant will then be sent written exam for evaluation of his knowledge of ultrasound theory, techniques and applications.
- The completed written exam will be returned and graded by the committee chairman.
- The participant will then send 3 copies of tape containing 30 cattle scans and associated estimates of fat thickness and ribeye area to the committee chairman.
- The committee chairman will then forward one anonymous tape to 3 certified technicians.
- Each certified technician will subjectively evaluate image quality and interpret the scans for fat thickness and ribeye area.
- The certified technicians will return their estimates of fat thickness and ribeye area, along with their opinion of the quality of the images to a statistician on the committee.
- The statistician will compare the participant's estimates to the average of the estimates of the certified technicians. Minimum requirements will be set for correlation to and deviation from these averages. Maximum deviation for fat thickness could be .12 in, while maximum deviation for ribeye area could be 1.5 in^2. Minimum correlations for both fat thickness and ribeye area could be .75.

- The chairman will then send a copy of the "official certification tape" to the participant. This tape will contain 300 images of 150 cattle, with 2 different images of each animal. All images would be in random order. All cattle will have been slaughtered and carcass information collected.

- The participant will interpret these images and return estimates of fat thickness and ribeye area to the committee statistician.

  The statistician will analyze the deviation of the estimates from carcass or repeated values and the correlation between estimates and the carcass or repeated values. Maximum deviation from carcass fat thickness could be .16 in, while maximum deviation from carcass ribeye area could be 1.75 in^2. Minimum correlations to both carcass fat thickness and carcass ribeye area could be .7. Maximum deviation from repeated fat thickness could be .12 in, while maximum deviation from repeated ribeye area could be 1.5 in^2. Minimum correlations to both repeated fat thickness and repeated ribeye area could be .75. Failing any 2 of these 8 measures of proficiency will constitute failure in certification. If the participant meets minimum standards outlined, certification will be granted.

- Certification will be granted for a two year period, at which time a technician will be required to be recertified.

These procedures have several associated disadvantages. The evaluation of participant's images by certified technicians is subjective. Although, subjectivity may be minimized with three certified technicians performing the evaluations. The participants do not interpret their own images with interpreting images from the "official tape". There would be no measure of entire process of data collection, organization and interpretation. The images on "official tape" may not be of as high a quality as those collected by the participant. The probe utilized collecting the "official tape" scans may be different than that used by the participant. Although, different versions of the "official tape" could be made with different probes. The image orientation of the "official tape" or other factors may be different from what the participant is accustomed. The participants may typically take some measurements when scanning cattle. This would not be possible when utilizing the "official tape". Repeatability (correlation between repeated records) would only measure consistency of image interpretation, not coupled with image collection.

These procedures have several associated advantages as well. The certification evaluation procedures would be consistent from one person to the next and also one year to the next, since only one group of cattle will be scanned for the "official tape". The participants would not be required to be certified in a group. Whenever a participant considers himself competent, he could initiate the certification procedure. Participants could attempt certification more than once per year, if necessary. Cattle losses would not occur, therefore expenses would be reduced and cost of certification would be markedly reduced. Also, effort and expenses expended by the certification committee and host institutions would be drastically reduced.

REVIEW OF THE RESEARCH RELATING TO CARCASS EPDS

Doyle E. Wilson, Gene Rouse and Dave Duello

Iowa State University
Ames, Iowa

A significant portion of the beef cattle animal breeding and production research ongoing at Iowa State University is associated with end product. This includes research on effects of dietary intake on the carcass composition of bulls and steers, production methods of producing steer and bull beef for specification markets, and new methods for genetically evaluating sires for body composition.

The purpose of this presentation is to provide a general overview of the research that relates directly to genetic improvement of body composition through carcass Expected Progeny Differences (EPD). The review includes sire evaluations of carcass merit for the American Angus Association and current efforts in live-animal evaluation using real-time ultrasound.

American Angus Carcass Evaluation

Iowa State University (ISU) has worked with the American Angus sire evaluation for carcass merit since its inception in 1974. The carcass evaluation program has followed procedures of a structured reference sire testing program. The American Angus Association assists a breeder in finding commercial cow herds to use in testing bulls and provides a list of bulls that can be used as reference sires (basically any sire previously tested for carcass merit). A large portion of carcass data has been collected by USDA graders through the Beef Carcass Evaluation Service and the Beef Carcass Data Service (orange tag program).

The genetic evaluations were run on an annual basis through 1987; since 1988 evaluations have been run twice annually with growth and maternal traits. Although the program has existed for 16 years, only 524 Angus beef sires have been genetically evaluated for carcass merit. This number is a stark contrast to the more than 42,000 Angus sires evaluated for weaning weight (1990 Spring Angus Sire Evaluation Report). On an encouraging side, 44 new sires were added to the Spring 1990 Carcass Evaluation, much to the credit of Mr. John Stowell, Director of Supply Development, Certified Angus Beef (CAB) Program, as he added a considerable amount of CAB carcass data to the existing data base. The carcass data base currently includes data collected on 55 bull, 1,119 heifer and 7,561 steer carcasses.

Through 1985, genetic evaluations were conducted using a single-trait sire mixed model. EPDs were calculated for carcass cutability expressed in percent, quality grade to one-third of a grade and retail yield. Carcasses were not adjusted to a common end point prior to running the evaluation.

In 1986, a new format for genetic evaluation was implemented. New procedures were used in an attempt to remove confusion associated with sire EPD for carcass traits and the subjectivity associated with the yield grading system. The new format adjusted carcasses to common end points to account for the wide ranges in age-at-slaughter and carcass weight. Sires were evaluated for external fat thickness in inches, ribeye area in square inches and marbling score, major variables that go into yield grade and determine quality grade for young A-maturity carcasses. The new format uses multiple-trait mixed model procedures that accounts for genetic correlations between the three traits.

In the 1986 evaluation, all sires whose progeny carcass weights averaged less than 685 pounds were put into one evaluation category (A); sires whose progeny averaged more than 685 pounds were put into a second evaluation category (B). In category A, the three carcass traits were adjusted to an age-at-slaughter of 470 days and a carcass weight of 625 pounds. In category B, the three traits were adjusted to an age-at-slaughter of 496 days and a carcass weight of 750 pounds. EPDs were not directly comparable between the two categories.

Plans for the summer 1990 genetic evaluation for carcass merit include adjusting all carcasses to a constant backfat end point of .4 inches and age-at-slaughter of 470 days. This procedure will allow all sires to be evaluated in the same analysis, eliminating weight designations. Table 1 summarizes steer carcass trait adjustments to .4 inches of backfat. Table 2 summarizes phenotypic averages for steer carcass traits. Although the average backfat thickness is not .4 inches, the adjustment to this end point should not "stretch" the data too far as illustrated in Figure 1. The adjustment of .4 inches was selected because it reflects a more acceptable end point to the packing and retail industries than does .5 inches. Table 3 lists genetic parameters for the 1990 summer genetic evaluation.

Figure 2 presents a historical perspective of the American Angus program for genetic improvement in carcass merit. The program has not been more successful for at least two reasons. First, Mr. John Crouch, Director of Performance Programs for the Angus Assoc., indicates that the cost to get a sire evaluated for carcass merit is between $3,000 and $5,000. Second, breeders have never been paid for carcass merit. Therefore, because of the large expense and no payback, there has been little incentive for breeders to participate on a large scale in the carcass evaluation program.

Widely publicized changes in consumer eating habits and dietary concerns about fat in red meats have caused the cattle industry to take a hard look at the end product. There appears to be a renewed interest in programs to change the end product through genetic improvement. This interest is demonstrated by the willingness of major beef breed associations to fund research aimed at finding a better method of evaluating beef animals for carcass merit. The following section briefly outlines research activities at ISU, currently sponsored by two beef breed associations.

Current ISU Research on Carcass Merit

Current research efforts at ISU relating to the genetic prediction of carcass merit in beef animals was reviewed at the Third BIF Genetic Predictions Workshop held in November, 1990 in Kansas City, Mo. Therefore, the following discussion will be very cursory in nature.

Current ISU research efforts are focused on looking for low-cost alternatives to progeny carcass testing. Live-animal evaluation is one method that can offer significant improvements over collecting carcass data if accurate measuring techniques and low-cost equipment can be developed. Preliminary work has been done with serial biopsy in the live-animal to measure intramuscular fat in the ribeye area. This initial work seemed promising until follow-on testing showed little correlation between ether extract of biopsy samples taken in the live animal and actual marbling score and percent ether extract after slaughter. The live-animal evaluation research at ISU now centers on using real-time ultrasound.

Real-time ultrasound (RTU), if engineered to provide accurate live-animal body composition measurements, could provide several opportunities for effective selection tools. It is conceivable that RTU could be used to accurately measure the relative rates of fat/lean deposition in different parts of the carcass as animals mature and/or are finished in the feedlot. For example, it could be possible to measure intramuscular (marbling) and intermuscular (seam) fat deposits as well as external fat cover. Having EPDs for these two traits would be of tremendous benefit to beef cattle breeders seeking to genetically change carcass composition. It is also possible that RTU could be used to measure muscle groups other than the ribeye to provide measures of lean mass that are more closely correlated with total percent of retail product.

The RTU research at ISU currently has four objectives:

(1) Characterizing changes in body composition (fat and lean) in both steers and bulls.

(2) Determining genetic parameters, heritabilities and genetic correlations associated with measured traits of body composition.

(3) Developing procedures for collecting RTU measurements as a part of national genetic improvement programs.

(4) Helping to push adoption and engineering of RTU equipment for genetic improvement needs of the beef cattle industry.

Research at ISU on RTU is currently sponsored by the American Angus Association, the American Simmental Association and the Iowa Beef Industry Council. ISU cooperates with Patsy Houghton of Kansas State University (Angus data) and Iowa-based cooperator herds, including: Nichols Farms, Inc. (Simmental data), Jim Bradford (Angus data) and Connie and Wilbur Grieg (Simmental data). The research also uses beef cattle resources from the ISU Beef Breeding Project that includes three different frame size synthetics. Table 3 summarizes the numbers of cattle serially scanned from these projects.

The general protocol includes having 5-15 progeny per sire, doing 3-5 scans at 30-40 day intervals during gain tests. The cooperator herds/years are tied by reference sires. All animals are scanned at the 12/13 ribs for backfat thickness and ribeye area. Images for tissue characterization (marbling) are also collected at the 12/13 ribs. Weights and hip heights are taken with 1-3 days of when the cattle are scanned. Diet energy levels are also recorded.

Carcass data that cannot be accurately adjusted to a range of end points has little value to breed improvement programs for carcass merit. It is hoped that the data being collected will become part of a non-perishable data base that has flexibility with respect to different end points and/or changing end points as dictated by the market. The main goal of the various research programs ongoing is the development of EPDs for body composition that will allow breeders to make directional change in both magnitude and uniformity. A second goal is to provide EPDs that will allow commercial producers to select bulls that will satisfy given end point specifications.

Image Analysis and Database Management System

Without question, current abilities to analyze images of live-animal scans using current B-mode RTU technology for tissue characterization are little more than rudimentary. Histograms of shades of grey are currently provided by the Aloka 633 RTU unit. However, none of the data going into development of the histogram is available for additional statistical analysis. ISU is under contract with Woods Hole Educational Associates, PO Box EM, Woods Hole, MA 02543, to develop the capability to store the number of pixels at each shade of grey (64 on the Aloka 633) within any given area of the image. This information will be used to determine if various statistical properties of the histogram correlate with fat deposits in the ribeye. In addition, ISU plans to explore the potential of high-level graphical and imaging analysis capabilities of the Digital Equipment Corporation 5000 PXG series work station computer.

Currently, when an image is scanned in the field and the histogram function is desired, then the function must be executed at the time the image is made. There is no ability to take a previously stored video image and perform the histogram function. Running the histogram takes from one-two minutes and slows the scanning process to a rate of four minutes per animal.

Woods Hole is developing a software package (called MedMorph) that will speed field scanning operations and assist in the laboratory analysis of images. This new software being developed incorporates a frame grabber, allowing the histogram function to be executed in the laboratory on stored video images. After an image retrieved from a VHS video, the image can be "grabbed" and frozen for the operator to trace the ribeye area and measure backfat thickness. The histogram function can be exercised and the pixel counts per shade of grey are stored into the MedMorph database.

The MedMorph system has several pre-defined data structures and report formats that can be chosen by the user from a menu-driven system. The user has the ability to customize data storage structures along with report writing functions. The data files are compatible with transfer requirements to the mainframe computer, other microcomputers and high performance workstations. MedMorph can be used with any RS 170 video image and can be calibrated to work with a number of different probes. An AT-type microcomputer with 640K random access memory, 1.2M floppy disk storage, and a 40Meg internal hard disk are included as a part of the MedMorph system.

Other Related Research at ISU

Dr. Dave Carlson, Department of Biomedical Engineering at ISU, is investigating ultrasound A-scan backscatter as a means of measuring levels of intramuscular fat in the ribeye. This procedure does not produce an image for interpretation like real-time B-scan ultrasound technology. Dr. Carlson is investigating four different backscatter signal processing algorithms that may have application for measuring the amount of fat in the ribeye. One algorithm, referred to as a modified Botros, results in a curve fitted model of the form Af^B. From test results on beef samples, the coefficient B is seen to decrease with increasing percentage of fat content. In a second algorithm, the ultrasound backscattered signals are obtained at different depths in the beef sample and applied to a log spectral difference method and then curve fitted using the quadratic model, Af^2+Ff+C. The test results show that the coefficient C of the model decreases with increasing fat content in the beef sample.

Proposed Research

On March 8, 1990, the National Cattlemen's Foundation requested proposals from University Experiment Station Directors and Animal Science Departments in the areas of: (1) Instrument Assessment of Carcass Characteristics and (2) Genetic Evaluation for Beef Carcass Merit. Funds for the research are provided through the $1 national beef checkoff. All proposals are to undergo a technical review and screening process. Successful proposals will probably be announced this fall, hopefully by August or September.

Iowa State University has teamed with the University of Georgia and Cornell University in submitting a cooperative research proposal to the National Cattlemen's Foundation for Objective 2 of the request. Dr. Larry Benyshek, Univ. of Georgia, has given leadership to the development of the cooperative proposal from these three universities. The goal of the research proposal is to provide the beef cattle industry procedures for a national genetic evaluation program specific for carcass characteristics similar to procedures now in place for growth and maternal ability.

If funded, the main objectives of the cooperative research proposal will be to: (1) determine effectiveness of the live animal measurements in predicting carcass genetic merit, 2) describe the genetic and environmental variances and covariances for several breeds, 3) develop mathematical models and computer applications necessary for implementation of a national program and 4) evaluate correlated responses in noncarcass traits to selection for carcass traits.

Concluding Comments

Research at ISU and other universities has shown that RTU can be used to accurately measure external backfat and ribeye area in the live animal. Results from ISU research have shown a correlation to cooler measurements of .86 and .76 for backfat and ribeye area, respectively. Research at ISU has also demonstrated the ability of RTU to measure differences in ribeye marbling, but at a much lower correlation (.20-.40). The challenge is to develop the engineering and/or image analysis enhancements that will improve this correlation to the .75 or higher level.

The current equipment being used in ISU's ultrasound research has been optimized for use in human medicine (an Aloka 633), not for tissue characterization of ribeyes in live beef animals where major variations in hide and fat cover exist. To date, developers of RTU equipment have spent few corporate dollars in adapting human medicine equipment to the needs of the animal industry. Such investment in research and development of equipment is unlikely unless the potential for a lucrative market exists.

Although the potential exists for developing EPDs for carcass merit on a large national scale, two things must happen. First, the necessary research must become high priority and funded at a commensurate level. Second, breeders must be convinced that an economic incentive exists before investing the time and expense required to collect the data.

TABLE 1. ADJUSTMENTS FOR ANGUS STEER CARCASSES

	AGE-470, DAYS		FAT-.4, IN.	
TRAIT	L*	Q	L	Q
Ribeye area	-.0071		.62137	
Carcass weight	-.76425	.001202	-133.066	112.295
Marbling score	-.004376		-1.05599	1.00368

*Linear (L), Quadratic (Q)
EXAMPLE: ADJUSTED RIBEYE AREA (RA) =
RA -.00071(AGE-470)+.62137(FAT-.4)

TABLE 2. ANGUS STEER CARCASS DATA BASE*

PARAMETER	MEAN + STD
Age, days	477 ± 60
External fat, in.	.50 ± .17
Ribeye area, in^2	11.81 ± 1.30
Marbling score	5.14 ± 1.04
Carcass weight, lb	677 ± 87

*7,561 Carcasses, Ages <300 and >700 days deleted.

TABLE 3. GENETIC PARAMETERS

	CW	MS	RA
Carcass Wt (CW)	.27	-.09	.53
Marbling Score (MS)	.04	.33	-.07
Ribeye Area (RA)	.47	-.02	.35

h^2-Diagonal; Genetic correlation-Upper diagonal; Phenotypic correlation-Lower diagonal.

TABLE 4. NUMBERS OF CATTLE BEING SCANNED

	YEAR		
BREED	1989	1990	1991
SYNTHETICS	169	298	300
SIMMENTAL	48	100	100(?)
ANGUS	451	550	100(?)
TOTAL	668	948	500(?)

FIGURE 1. ANGUS CARCASS DATA BASE

DISTRIBUTION BY BACKFAT THICKNESS

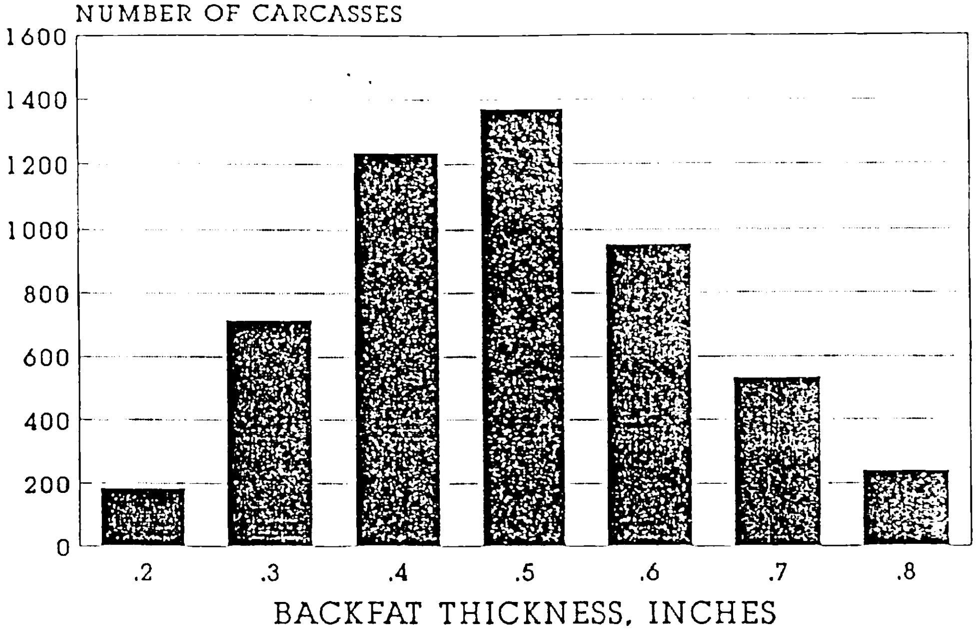
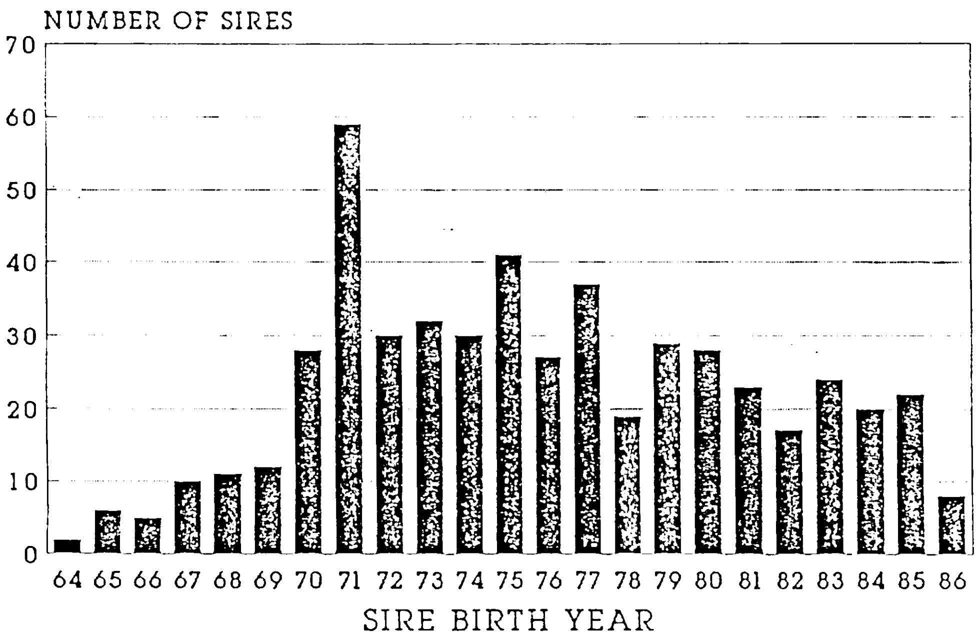


FIGURE 2. ANGUS CARCASS DATA BASE

NUMBER OF SIRES BY BIRTH YEAR



Real-time Ultrasound Equipment Specifications

May 1990

Gene Rouse, Doyle Wilson and Dave Duello
Iowa State University

Table 1 summarizes specifications for fifteen ultrasound machines that are currently available and could have application for live animal or carcass evaluation.

Based on information available and correspondence with Dr. Jim Stouffer, who has an excellent working knowledge of real-time ultrasound equipment, seven of these machines are currently being used for beef and pork evaluation.

Tissue characterization is being used to evaluate marbling. The project being conducted at Iowa State University utilizes a machine that characterizes 64 shades of grey. The distribution of these grey scale values is being analyzed. However, considerably more research needs to be conducted in this area and the number of shades of grey required is unknown.

Width of view is determined by transducer length. The evaluation of the cross sectional area of the longissimus dorsi muscle requires a field of view of at least 172 mm or a split screen and a guide.

Following the table is a list of real-time ultrasound equipment manufacturers that corresponds to the list of machines discussed.

Ultrasound Equipment Specifications

Manufacture - Model	Animal Evaluation	Unit Wt (Kg)	Tissue Characterization (grey scale)	Split Screen	Width View (mm)	Imaging Frequency (MHz)
Medison Co., SA-88		Portable	16		120	3.5
Acoustic Imaging, AI 5200		Not portable				3.5
Tokoyo Keiki, LS 1000	√	Not portable	64	√	102	3.5
Toshiba, SAL-32B	√	14	16	√	108	2.0-9.0
Pie Medical, Scanner 400/450	√	8	32	√	105	3.5
Shimasonic, SDL-32		7		√	100	3.5
Ausonics, Micro Imager 1000		14.2				3.0
Philips, SDR 1200		9	32	√	102	3.5
Color Scanning Scope USL-21	√	21	Not Real Time			2.0 Pulse Emission
Corometrics 210	√	8	16	√	125	3.0
500V	√	10	64	√	125 (172)[1]	3.5-7.0[2]
633	√	90	64	√	125	3.5-7.0[2]
General Electric RT-50		Portable			102	3.5
Hitachi, EUB-200		9		√	128	3.5
Picker, LS 3000		Not portable	16	√		3.5-5.0

[1] Corometrics has designed a 172 mm prototype probe.

[2] Variable frequency.

REAL-TIME ULTRASOUND EQUIPMENT MANUFACTURES

Machine		Address
1	SA-88	Medison Co., Ltd. 7th Floor Sungho Bldg., 829-1 Yeoksam-Dong, Kangnam-Ku Seoul, Korea (Tel) 2-556-9200 (Tlx) K23989 HANRE (FAX) 2-554-3027
2	AI5200	Acoustic Imaging 4666 South Ash Avenue Tempe, Arizona 85282 (Tel) 1-800-541-8174
3	LS-1000	Tokyo Keiki Co., Ltd. Distributor: Products Group International, Inc. 2121 Bluebell Avenue Boulder, Colorado 80322 (Tel) (303) 939-9380
4	SAL-32B	Toshiba Corporation 1-1 Shibaura 1-Chome Minato-KU Tokyo, 105 Japan (Tel) 457-3273 (Tlx) J22587 Toshiba (FAX) 457-2049
5	Scanner 400/450	Pie Medical USA BV 3535 Route 66 Parkway 100-Spruce Building Neptune Township, New Jersey 07753 (Tel) 1-800-722-6400 (Tel) 201-922-4888
6	SDL-32	Shimasonic Shimadzu Corporation International Marketing Division 3 Kanda-Nishikicho 1-chome Chiyoda-Ku Tokyo, 101 Japan (Tel) (03) 219-5641 (Tlx) 0232-3291 (SHMDT J) (FAX) (03) 219-5710

7	Micro Imager 1000	Ausonics Corporation 301 West Vogel Avenue Milwaukee WI 53207 (Tel) (414) 747-1030 (Tel) 1-800-558-6120 (Tlx) 191-116
8	SDR 1200	Philips Medical Systems, Inc. 2722 South Fairview Street Santa Ana, CA 92704 (Tel) (714) 556-7608 (Tel) 1-800-854-3935
9	Color Scanning Scope, Model USL-21	Kaijo Denki Co., Ltd No 19.1 Chome, Kanda Nishikicho, Chiyoda-Ku Tokyo, 101 Japan (Tel) (03) 295-5609 (FAX) (03) 294-7663 (Tlx) 022226245 Kaiden J
10	Aloha 210 500 v, 633	Corometrics Medical Systems, Inc. 61 Garnes Park Road North Wallingford, Connecticut, USA 06492 (Tel) (203) 484-4630 (Tel) 1-800-624-7265
11	RF-50	General Electric Company Medical Systems Group Milwaukee, WI 53201 (Tlx) 269679
12	Model EUB-200	Hitachi Medical Corporation Overseas Division Hitachi Hagoromo Bldg. 1-2-10 Uchi-Kanda Chiyoda-Ku, Tokyo, Japan (Tlx) 222404 (Tel) 03-294-3851
13	LS 3000	Picker International Universal Medical Systems, Inc. 349 St. Johns Ave Younkers NY 10704 (Tel) 914-423-1597

BIF REPRODUCTION AND GROWTH COMMITTEE

May 24, 1990
Hamilton, Ontario

The Reproduction and Growth Committee met in conjunction with the BIF Annual meeting. Chairman, Keith Vander Velde distributed an agenda and updated the committee on previous recommendations to the board. The committee's guidelines for pelvic measurements and adjustments have been approved and are included in the 1990 BIF Guidelines. BIF now recommends that age adjustments for pelvic area be .25 cm^2/day for bulls and .27 cm^2/day for females.

Discussion concerning scrotal adjustments followed with many groups currently using .033 cm/day as the adjustment factor. Prior to recommending this adjustment factor as a BIF standard, a committee made up of experts in this field was appointed to make a recommendation to the committee. Those appointed to the committee were: Chairman Walter Johnson, Glen Coulter, Jim Brinks and a representative of MARC. This group will circulate a summary of their report to the committee chairman for circulation to the committee. At next year's meeting the committee will decide on a recommendation to the BIF board.

Lengthy discussion centered around gestation length, and the factors affecting it. Many felt it should be studied and variation reported in beefbreed association sire summaries. This will be a topic for discussion in 1991.

Expected progeny difference for pelvic area, scrotal circumference and gestation length were discussed. With BIF having adjustment factors it was felt that beef breed associations will encourage the reporting of this data in the optimal columns and that it will be included in future national cattle evaluation summaries.

Doug Hixon and Tom Troxel were asked to develop a questionnaire for mailing to breed associations inquiring about their data base and what information was stored. Of the data stored the committee would like to know what new EPDs do Breed Associations plan on generating in the future.

EPDs for reproductive traits were discussed with no final recommendation made. This will be a topic of discussion in 1991.

Dr. Walter Johnson addressed the group on some of the research being conducted in Canada in the area of reproduction.

Advances in Ultrasonics for Beef Cattle Evaluation

Dr. James R. Stouffer
PLUS Services Inc.
Ithaca, NY

Real-time linear array ultrasonic equipment (Aloka 210) was first used for beef cattle evaluation in North America in 1984. At that time a 12.5cm 3.0 Mhz transducer was used to produce a cross sectional image of the ribeye with a split screen technique. The transducer was first located over the medial half of the ribeye producing an image that was frozen on the left half of the screen. Then the transducer was moved to the lateral position and the resulting image was frozen on the right half of the screen. Fat thickness was measured directly on the screen with an eltronic caliper. The ribeye image was traced on clear acetate film and the area measured by grid or planimeter. Good results were obtained by this method which has been used for 5 years although further refinements were needed before ultrasound would be practical for routine live animal evaluation.

A major breakthrough came about in 1990 when the Aloka 500V real-time scanner became available with a 17cm 3.5Mhz transducer. An entire ribeye area could be imaged on a single screen with improved resolution with this equipment. Also contributing to the production of a quality image was the development of a PVC stand-off guide that fitted the cuvature of the beef animals back on the bottom and the straight edge of the transducer on the top. These guides had proven useful for the split screen technique earlier but are more significant with the 17cm probe.

The ultrasonic images are recorded on video tape with a small, portable, 4 pound, 8mm VCR. These images are subsequently played back and displayed on a monitor and interpreted with a PLUSMorph image analyser. The PLUSMorph image analyser is a software program, frame-grabber and track-ball in a 20 pound portable 286 computer with a 20meb hard disk. The images are thus interpreted and measured for fat thickness and ribeye area and the data printed out without requiring anything to be handwritten. Even the animal ID can be entered by key at the time of scanning. PLUS Services also offers a report program by which groups of animals can sorted and summarized for raw data as well as 365 day standardized weight and ribeye area and ratio of ribeye area/cwt if appropriate dates and weights are supplied.

In summary a convenient, portable and accurate beef cattle ultrasonic evaluation system was demonstrated. The Aloka 500V scanner with the 17cm probe and guide can produce and record on video tape quality ribeye images of cattle at 20 to 60 per hour. These images can be interpreted subsequently with the PLUSMorph image analyser. A complete report can be generated and printed for the rancher before the operator leaves the premises. This system is available as a service or the components can be purchased. We certainly anticipate new developments in the future but are glad that with recent developments that progressive cattlemen have this current technology available for making valuable decisions.

EMBRYO TRANSFER: THE LATEST TECHNOLOGIES

Dr. Walter Johnson, Ontario Veterinary College

1. INTERNATIONAL TRANSPORT

The international movement of embryos has increased rapidly in the past several years. The transport of embryos, rather than the transport of live animals, has the advantages of reduced cost and reduced risk of disease spread. Research indicates that the potential to transport disease causing organisms on the embryo is negligible, provided proper embryo handling procedures are followed, thereby reducing the potential risk of introducing serious diseases with the embryo. Embryo movement is facilitated by improved cryopreservation procedures resulting in good embryo survivability and high pregnancy rates.

2. SUPEROVULATION

The ability to consistently superovulate donor cows has been a major limiting factor to the success of embryo transfer. New superovulatory products with controlled hormonal constituents have been introduced to the market resulting in more consistent superovulation results. Research utilizing an LHRH antagonist to delay ovulation allowing oocyte maturation, and the use of bovine somatotropin in the superovulation protocol hold promise in increasing the superovulatory response.

3. EMBRYO SEXING

The determination of the sex of the embryo is now possible with laboratory techniques and tremendous effort is being expended to discover practical, field procedures. Presently, embryo cells, or blastomeres, are surgically removed from the embryo and the chromosomes analyzed by either chromosome spread or DNA probes. The perfection of this technology will have tremendous influence on the embryo transfer industry as it will allow production of calves of the desired sex.

4. MICROSURGERY OF EMBRYOS

Microsurgical procedures have the potential to produce large numbers of identical animals. Simple splitting of embryos into two halves will result in twins, however the transfer of blastomere nuclei to recipient oocytes will potentially result in the production of very large numbers of identical calves.

5. IN-VITRO MATURATION, FERTILIZATION AND CULTURE

In-vitro production of embryos involves the collection of oocytes from developing ovarian follicles, culture of the oocytes to maturation, exposure to sperm cells to induce fertilization, culture of the fertilized egg to the morula stage embryo, following which it is transferred to a surrogate animal, or frozen for later transfer. Ovaries from slaughter house cows may be collected, from which huge numbers of oocytes may be recovered, resulting in a comparable huge number of embryos. Oocytes may also be collected from the ovaries of infertile, live animals, thereby salvaging the genetics of otherwise infertile cows.Very large numbers of calves may be produced by this method.

SUMMARY OF BULL TEST GENETIC EVALUATION WORKSHOP

R.A. Kemp
Animal Industry Branch
Ontario Ministry of Agriculture & Food
May 25, 1990

This workshop focused on genetic evaluation of young bulls in the Ontario Bull Test Program. The workshop emphasized the actual method of computing across breed comparisons (ABC) and expected progeny differences (EPD) complete with examples. The other area emphasized during the workshop was the future of central testing of bulls in genetic evaluation of beef cattle.

ABC allow direct comparison of all evaluated bulls within the Ontario Bull Test Program regardless of breed. Both ABC and EPD are reported for each bull, except crossbred bulls which do not receive EPD. This allows producers, both seedstock and commercial, to utilize either within or across breed genetic evaluation for 140 day post-weaning gain in bull selection.

Central bull test programs in Ontario have a bright future because of their value to beef cattle genetic improvement. Traits currently being considered for measurement and evaluation deal with feed intake and carcass/meat quality. These traits, in general, cannot be measured on-farm and could provide useful information to beef producers. The other important aspect of central test programs is to "tie in" to other genetic evaluation programs. Currently, central test programs operate independently from herd and progeny test programs. Methods of correctly incorporating central test data into other programs are under development. Research is proceeding on methods of including herd and progeny test genetic evaluations into central test evaluations and vice versa. The long range goal is to have one integrated beef genetic evaluation program incorporating herd, central and progeny testing phases.

MINUTES OF BEEF IMPROVEMENT FEDERATION
BOARD OF DIRECTORS' MEETING

Holiday Inn - KCI
Kansas City, Missouri
November 2-3, 1989

The BIF Board of Directors held its mid-year board meeting at the Holiday Inn - KCI in Kansas City, Missouri on November 2 and 3, 1989.

Board members present for the meeting were Jack Chase, president; Jim Leachman, vice-president; Charles McPeake, executive director; Ron Bolze, Doug Hixon, and Daryl Strohbehn, regional secretaries; Paul Bennett, Glenn Brinkman, John Crouch, Bruce Cunningham, Loren Jackson, Steve McGill, Marvin Nichols, Keith Vander Velde, Wayne Vanderwert, Gary Weber, Leonard Wulf and Paola deRose.

Also attending the meeting were three Canadians, Cathy Lasby, Brian Pogue and Rick Richard.

Board members not in attendance were Larry Cundiff, Glynn Debter, Bob Dickinson, Jim Spawn and Darrell Wilkes.

President Chase called the meeting to order at approximately 8:30 a.m. on Thursday, November 2, 1989, and the following items of business were transacted.

President Chase welcomed Paola deRose to the board as the Canadian representative replacing Bruce Howard.

Minutes of the Last Meeting. Copies of the minutes of the board meeting held May 11 and May 13, 1989, in conjunction with the annual convention at the Hyatt Regency in Nashville, Tennessee, were distributed by McPeake prior to the board meeting. Daryl Strohbehn moved that the minutes be accepted as written. Bruce Cunningham seconded and the minutes were approved.

Membership Report. McPeake distributed copies of the membership report. A copy is attached. The report showed that 33 state organizations, 22 breed associations and 20 other firms or organizations had paid membership dues as of September 30, , 1989.

McPeake reported that approximately four memberships had been paid since convention time in May, 1989.

Financial Report on 1989 Convention. McPeake provided directors with a copy of the financial report on the 1989 annual convention. A copy is attached.

The report showed a net cost to BIF for the convention of $5,449.58. Although the 1989 convention is much less that the 1988 convention cost still there may be room for improvement in the form of reduced numbers of speakers in committees and possibly some limit in terms of total expenses per speaker. Frank Baker moved that speakers to serve as a committee speaker be approved by Executive Director . Daryl Strohbehn seconded and the motion carried. Strohbehn added that symposium speakers were different from committee speakers. Leachman commented that actually the convention costs were in line with the budgeting. Baker suggested a $500 limit on committee speakers.

Financial Statement for 1989 to Date. McPeake provided copies of the financial statement to date. A copy is attached. The report as corrected showed total assets of $47,270.83 with total income and total expenses unchanged from mid-year 1989 financial report. Frank Baker moved approval of financial report as corrected. Leonard Wulf seconded. Motion passed. Daryl Strohbehn asked if an audit had been done and suggested a copy be mailed to the board.

Budget for 1990. McPeake distributed copies of the proposed budget for 1990. Minor changes were made from the previous year with one major deficit or the omission of printing of new BIF Guidelines. After discussion of how to minimize cost of printing the Guidelines, Glenn Brinkman moved that for each membership dues paid that the membership would receive 1 copy per $10 portion. Example, $100 membership would receive 10 copies of the Guidelines. One designated State Extension Specialist per state would be given 10 copies at no charge. Extra copies would cost $3.00 to members and $5.00 to individual non-members. John Crouch seconded and the motion passed.

Jim Leachman moved that a news release be prepared promoting the sale of Guidelines on a continual basis, these releases should include how to order and the cost. With a second by Loren Jackson the motion carried.

Keith Vander Velde calculated that it takes 1520 copies to meet member commitments. Keith moved to print 5000 with an increase as viewed appropriate by the Executive Director. Frank Baker seconded and the motion passed.

Baker moved to table final approval of budget until the convention budget was reviewed or presented later. Leonard Wulf seconded and motion passed.

Nominating Committee. President Chase appointed the following nominating committee; Keith Vander Velde, chairman; Daryl Stohbehn and Leonard Wulf.

Awards Committee. President Chase appointed the following awards committee: John Crouch, chairman; Wayne Vanderwert, Frank Baker and Paola de Rose.

Convention Site for 1991. The Executive Director informed the board that Texas has invited BIF to hold the annual convention possibly in the San Antonio area. John Crouch moved to accept the invitation from Texas to host the BIF convention. Jim Leachman seconded and the motion passed.

It was suggested that Brent Buckley be contacted concerning the 1992 convention with Hawaii as a possible site and possibly check with other states for the future.

BIF factsheets. Daryl Strohbehn brought the board members up to date on factsheet revision and reviewed distribution. They are sent to many different organizations as camera ready copies. It was suggested that a factsheet dealing with milk EPD be written: Daryl Strohbehn coordinating, with assistance from Keith Vander Velde, John Crouch and Doyle Wilson.

National Livestock Electronic I.D. Board Meeting. Gary Weber gave a summary of the meeting and concluded by saying he thought electronic I.D. had great merit but it was not without problems. He added that it warrants evaluation by BIF. Weber was asked to coordinate with NCA and inform the President. The President in turn with assistance from Jim Leachman and Keith Vander Velde would study and compose proper articles to send through appropriate channels.

Convention Plans for 1990. President Chase welcomed Cathy Lasby, Brian Pogue and Rick Richard to the Mid-year board meeting. Rick Richard discussed plans for the general agenda. Brian Pogue presented program plans with detailing in terms of topics and speakers for the symposium section of the convention. Cathy Lasby gave a line item budget for hopeful contributions plus convention costs.

Jim Leachman proposed that the Canadians have the choice of topics and speakers with most speakers possibly coming from Canada with one exception, a U.S. speaker to deal with and describe the U.S. beef cattle performance evaluation program. Suggested speakers for the topic included John Pollack, Larry Benyshek and Ike Eller.

Suggestions were that symposium be held on Thursday morning, committee meetings in the afternoon with a caucus at 3:30 p.m.. In addition, Cathy Lasby asked if BIF might not be able to do the awards programs a little differently. She suggested the complete awards program be held at the banquet rather than part of the recognition at the luncheon and the winner later at the banquet. They would prefer entries be called to the front with a winner named at the banquet.

Standing Committees and chairman for the convention and year will be:

Reproduction & Growth - Keith Vander Velde
Live Animal - John Crouch
Genetic Prediction - Larry Cundiff
Systems - Daryl Strohbehn
Central Test - Ron Bolze

After much discussion of programing, tourism options and special programs in connection with the convention the general feeling was to let the hosts make appropriate decisions.

For convention business Glenn Brinkman moved and John Crouch seconded that the convention have a profit or loss to BIF of no more that $5,000.00. Motion carried.

Frank Baker moved for approval of convention budget as written with a pre-registration fee of $75.00 and $100.00 at the door. Airport shuttle service would be a separate cost and with the Executive Director having the final acceptance and budget approval. Bruce Cunningham seconded. Motion passed.

The BIF mid-year board meeting reconvened on November 3, 1989, and was called to order at approximately 8:30 a.m..

Frank Baker moved to remove the tabled motion of no refunds for convention participants. Seconded by Keith Vander Velde. Motion passed.

John Crouch moved to amend motion to include, unless in case of catastrophic circumstances. Loren Jackson seconded. Amendment passed.

Motion as amended of no refunds for convention participants unless in case of catastrophic circumstances was voted on and passed.

Frank Baker moved for approval of 1990 BIF budget. Seconded by Keith Vander Velde. Motion carried.

BIF Update. After discussion of latest version of Update, Baker suggested contacting the Livestock Publications Council for additions of publications to the existing mailing list. In addition, Gary Weber advised that since Paola deRose is a new board member from Canada and we do not have news from Canada that it might be appropriate to ask Paola to write an article for the Update.

Reproduction. With Keith Vander Velde as chairman discussion was started dealing with recommendations for adjustments on pelvic area and scrotal circumference. discussion continued on whether or not to recommend an age adjustment (preferred) or a weight adjustment. The question to reproduction was asked if the frame score factor had been studied. Within committee it had not been addressed.

Keith Vander Velde stated that recommendations would be put together for the new guidelines and distributed hopefully by December 1, 1989 and for sure they would have to be in final form approved by the board by January 15, 1990 or they would not make the deadline for printing of new guideline.

Glenn Brinkman suggested a need for data on the Brahman based breeds so they might be included.

Verbiage continued on pelvic recommendations for the new edition of the Guidelines, pros, cons and relationships.

Central Test. Ron Bolze reported that he had rewritten the central test portion for the guidelines and presented the board members with a copy. Basically the rewrite was more concise and thus shorter. He asked for changes additions or corrections be sent to him for incorporation.

Live Animal Evaluation. John Crouch suggested a disclaimer be included for page 5-1. The frame score formulation on page 5-3 is based on data to 21 months of age and may not apply to Bos Indicus and Bos Indicus bred cattle.

John was to also revise carcass information with inclusion from ultrasound group. He will distribute to the board.

Commercial Cow-Calf Production. Doug Hixon is rewriting the section, the major changes will be to shorten the condense with perhaps a disclaimer in the front or introduction of the section.

Genetic Prediction. Frank Baker discussed with the board for Larry Cundiff an update of what had transpired in the committee. Frank also discussed survey results as compiled by Jim Gibb and suggested they be included in the Guidelines. After discussion of proper form for the results and to keep current updates Jim Leachman moved and John Crouch seconded that they be make available in factsheet form. Motion passed.

Frank Baker added that Gary Weber and he were going to meet in early December to discuss Guidelines preparation and that hopefully camera ready copy could be sent to the Executive Director for printing. Discussion continued on binding with general consensus that costs factors would determine the binding with final decision being left to the Executive Director.

Board meeting at the convention would state at 6:00 p.m. with dinner included.

Frank Baker suggested mid-year board meeting be left up to the Executive Director since some options would perhaps give more bargaining power in terms of rates.

Wayne Vanderwert, Jim Gibb and numerous Extension Specialists are interested in standardizing the form or way information in front of sire summaries are presented. Wayne will be working on this as a recommendation to board in the near future.

Genetic Prediction Workshop. Frank Baker gave an update on the workshop with the options available in at least starting to evaluate EPD's across breeds.

1. Central location for data analysis
2. Breed conversion tables
3. Base period standardization

John Pollack had been asked to chair a committee to study the least trauma period in standardizing base years and have a prepared statement at convention time.

There being no further business the meeting was adjourned.

BEEF IMPROVEMENT FEDERATION

FINANCIAL STATUS
January 1, 1989 - December 31, 1989

Assets

Checking Account	9,430.55
Certificate of Deposit	35,000.00
TOTAL	44,430.55

Income

Dues	10,211.68
Proceedings	505.21
Guidelines	42.00
Interest	2,594.09
Miscellaneous	446.00
TOTAL	**13,798.98**

Expenses

Donations	1,000.00
Accounting Service	1,695.00
Salaries & Taxes	701.82
Postage (Office, Proceedings, Guidelines)	193.28
Printing	233.16
Office Supplies	837.34
Awards	78.00
Directors Travel	332.75
Miscellaneous Expense	40.57
Bank Charges	7.50
Board Meeting	1,793.90
Convention	8,575.74
TOTAL	**15,489.06**

AGENDA
BIF BOARD OF DIRECTORS MEETING
ROYAL CONNAUGHT HOTEL
HAMILTON, ONTARIO, CANADA
Wednesday, May 23, 1990

1. Clear Agenda - Chase
2. Minutes - McPeake
3. Treasure's Report - McPeake
4. Membership Report - McPeake
5. Report on Canadian convention - Cathy Lasby and Brian Pogue
6. Plans for 1991 Convention in Texas - Steve Hammack
7. Future Convention Invitations - McPeake
   a. North Carolina
   b. Oregon
   c. Hawaii
8. Standing Committee Reports - Plans for the Convention
   a. Live Animal and Carcass Evaluation - John Crouch
   b. Central Bull Test - Ron Bolze
   c. Genetic Prediction - Larry Cundiff
   d. Systems - Daryl Strohbehn
   e. Reproduction and Growth - Keith Vander Velde
9. Guidelines Revisions Update - Frank Baker
10. Election of Directors - McPeake
11. Survey Information for Uniform Sire Summaries - Vanderwert
12. U.S. Beef Breeds Council Recommendation - Cundiff
13. Central Regional Secretary Position - Chase
14. Need for new ideas to generate new and revised factsheets - Strohbehn
15. Discussion of EPD slide set from Kentucky - Strohbehn
16. A change may be needed in BIF Updates - McPeake
17. Change of Address of BIF office - McPeake
18. Elect New Officers - Nominating Committee: Keith Vander Velde, Chr.
19. New Business

MINUTES OF BEEF IMPROVEMENT FEDERATION BOARD OF DIRECTORS MEETING

Royal Connaught Hotel
Hamilton, Ontario, Canada
Wednesday, May 23, 1990

The BIF Board of Directors held its convention board meeting at the Royal Connaught Hotel in Hamilton, Ontario Canada on May 23 and 25, 1990.

Board members present for the meeting were Jack Chase, president; Jim Leachman, vice-president; Charles McPeake, executive director; Ron Bolze, Doug Hixon, and Daryl Strohbehn, regional secretaries; Paul Bennett, Glenn Brinkman, John Crouch, Bruce Cunningham, Loren Jackson, Steven McGill, Marvin Nichols, Keith Vander Velde, Wayne Vanderwert, Leonard Wulf, Paola de Rose, Larry Cundiff, Glynn Debter, Bob Dickinson and Jim Spawn.

Board members not in attendance were Gary Weber and Darrell Wilkes.

Also attending the meeting was Don Boggs and for convention presentations Cathy Lasby, Brian Pogue and Steve Hammack.

President Chase called the meeting to order at approximately 6:15 p.m. on Wednesday May 23, 1990 and the following items of business were transacted.

Minutes of the Last Meeting. Copies of the minutes of the board meeting held November 2, and 3, 1989, a mid-year board meeting in Kansas City, were distributed by McPeake prior to the board meeting. John Crouch moved that the minutes be accepted as written. Keith Vander Velde seconded and the minutes were approved.

Treasurer's Report. McPeake provided copies of the treasurer's report for th calendar year 1989 and for 1990 from January through May 17. Copies of the reports are attached. After explaining the financial report, Bob Dickinson moved and Keith Vander Velde seconded for acceptance of the treasurer's report.

President Chase introduced Don Boggs of South Dakota State University to the board and explained Don's attendance at the board meeting with more information to follow.

Membership Report. McPeake distributed copies of the membership report. A copy is attached. The report showed that 31 state organizations, 25 breed associations and 16 other firms or organizations had paid membership dues as of May 15, 1990.

Convention Plans. Cathy Lasby and Brian Pogue welcomed the board to Canada and gave a review of the plans for the convention. Cathy and Brian were applauded for their efforts.

They indicated there were 290 pre-registrations with another fifty to sixty expected. Fifteen to twenty graduate students were present. They are primarily from Cornell, Guelph and Georgia. In addition, nine of the ten provinces in Canada were present plus six people from Australia.

Jim Leachman commented that he was duly impressed with the $20,000 Canadian support of the convention. The board again applauded Cathy and Brian.

Future Convention Invitations. McPeake gave in sequence the states that had invited BIF and host a convention in the respective state. (1) North Carolina, (2) Oregon, (3) Hawaii.

Frank Baker moved to table any decision until the mid-year board meeting concerning prioritizing order until finances had been discussed with each.

Keith Vander Velde discussed and expounded on zero budgets for conventions.

Glen Brinkman seconded and the motion passed.

Guidelines Revision Update. Frank Baker gave a report on the many and varied changes and rewrites that have taken place on this particular Guidelines revision. McPeake added that it would be printed at Oklahoma State University at a cost of approximately $1.00 each.

After dinner and a break for the reception the board meeting was reconvened at 9:00 p.m.

Plans For 1991 Convention. Steve Hammack of Texas A & M University gave a report on the 1991 convention. He led in with a brief history of how the invitation was extended and followed with tentative planning. The dates of May 15-18, 1991 in San Antonio at the Wyndham San Antonio have been chosen as the time and location. Rooms are available at a $75 flat rate and the Wyndham is located not very far from the airport in suburban San Antonio. It included drive-in free parking. Probably the tours will be in the beginning of the convention format.

Standing Committee Reports. The standing committee reports were given by committee chairmen with preview of an excellent conference.

Director Elections. President Chase discussed elections and asked Keith Vander Velde to coordinate.

John Crouch - 2 terms - Breed Association - not eligible for re-election.
Jim Leachman - 1 term - Western BCIA - eligible for re-election.
Marvin Nichols - 1 term - at large - eligible for re-election.

In the respective caucuses and as one group, the following people were elected to serve terms.

Jim Gibb - Breed Association
Jim Leachman - Western BCIA
Marvin Nichols - At large

Central Regional Secretary Position. Daryl Strohbehn introduced Don Boggs from South Dakota State University and after describing Don's interests in being involved with BIF, further described strong capabilities. After discussion Daryl Strohbehn moved and Paul Bennett seconded that Don Boggs replace Daryl Strohbehn as Central Regional Secretary. Motion carried.

Survey For Uniform Sire Summaries. Wayne Varnderwert and Jim Gibb conducted a survey with results in the form of a handout. No formal recommendations were made but suggestions were:

1. Very important to be standardized.
2. Beef breeds council needs to be provided information.
3. Needs breeder input.
4. Needs commercial breeder opinions.

Factsheet Revision. Daryl Strohbehn discussed his quest to obtain factsheet revisions as a no win situation. He suggested the authors as being too busy. Everyone did and excellent job to get it started but difficult to get revisions. He suggested one author. Frank Baker suggested one author for each factsheet plus reviewers and put their names on the factsheets. Don Boggs, as Central Secretary, inherited educational materials and volunteered to coordinate authors, reviewers and materials.

EPD Slide Set From Kentucky. Daryl Strohbehn discussed in depth the EPD slide set from Kentucky. Logistics of promoting and distribution was included. In summary, it was agreed to help Carla Nichols and others from Kentucky distribute with BIF approval after reviewers have approved of the slide set. The reviewers will be:

Paul Bennett
Bruce Cunningham
Loren Jackson
Glenn Brinkman
Doug Hixon

Canadian Beef Improvement Meeting. Paola de Rose gave a summary of discussions and topics of interest and work included in the meeting just prior to the BIF convention. Main topics of how to integrate, standardize and put together herd records and bull tests.

BIF Update and News Releases. Several ways and means of distributing materials and information concerning BIF were discussed. Types of news releases was one. Where to obtain information is another. In addition, directors would be receiving a form to return providing biographical sketch information for the updates.

The meeting was adjourned until 6:30 a.m., Friday, May 25, 1990.

President Chase reconvened the meeting at 6:30 a.m. with Don Lawson and Don Nicol of Australia present. They gave a report on attempting to hold a joint meeting in Hawaii. Lawson had met with Brent Buckley concerning a joint meeting. Nicol expounded on the world beef situation and need for such a meeting. They wanted to co-host or co-share a meeting in 1992. They estimate 150 producers and 50 technical people would attend from Australia. After discussion, President Chase thanked both gentlemen for their presence and emphasized that this topic would be continued at the mid-year board meeting.

U.S. Beef Breeds Council. Larry Cundiff gave an update on the U.S. Beef Breeds Council Recommendation. Four points were made in the recommendation and the genetic prediction committee had approved these on the preceding day. Cundiff requested to appoint a subcommittee to handle these chores for the recommendation.

He appointed:
Larry Benyshek
Jim Brinks
John Pollak
Richard Spade (can appoint additional people)
Dave Notter
Larry Cundiff

Frank Baker stressed that it was Larry Cundiff's committee and not BIF endorsing the U.S. Beef Breeds Council. Several board members suggested that the U.S. Breeds Council wants BIF's input. It was added that the committee has the authority to proceed with the research. Keith Varnder Velde seconded and motion passed. Recommendation only for investigation.

Pollak proposed that after an association computer run in the National Cattle Evaluation that an additional run be made for investigation.

1. Utilize a fixed base of 1982.
2. Show the changes this would impact.
3. Each association would be involved.
4. Share information with BIF for study.

Send this proposal information to each breed association and BIF member.

Election of Officers. Keith Vander Velde, chairman of the nominating committee, recommended the present slate of officers to continue in a second year and moved that nomination. Bob Dickinson seconded. Motion carried. Jack chase, president; Jim Leachman, Vice President.

Convention Programs. Glenn Brinkman suggested time be arranged for committees to meet longer and at difference times to allow more participants. John Crouch added that the old policy of work committees was organized in that manner.

Mid-Year Board Meeting. The meeting was agreed upon to be held November 2 and 3, 1990 in Kansas City. Motel location will be determined later.

Awards at 1990 convention. The following awards were presented:

Seedstock Producer of the Year	- Doug and Molly Hoff, South Dakota
Commercial Producer of the Year	- Mike and Diana Hopper, Oregon
Continuing Service Award	- Robert Dickinson, Kansas
Ambassador Award	- Robert de Baca, Iowa
Pioneer Award	- Donn and Sylvia Mitchell, Manitoba Canada Hoon Song, Agriculture Canada Jim Wilton, Ontario Canada

There being no further business the meeting was adjourned.

Respectfully Submitted,

Charles McPeake
BIF Executive Director

BEEF IMPROVEMENT FEDERATION

FINANCIAL STATUS
January 1, 1990 - May 17, 1990

<u>Assets</u>

Checking Account	52,379.75
TOTAL	52,379.75

<u>Income</u>

Dues	9,319.00
Proceedings	56.50
Guidelines	60.55
Interest	1,767.44
TOTAL	**11,203.49**

<u>Expenses</u>

Accounting Service	815.00
Salaries & Taxes	735.54
Postage (Office, Proceedings, Guidelines, Convention brochures)	1,562.17
Office Supplies	91.80
Miscellaneous Expense	25.11
Bank Charges	25.65
TOTAL	**3,255.27**

PAID - BIF MEMEBER ORGANIZATIONS AND AMOUNT OF DUES FOR 1990
As of May 15, 1990

STATE BCIA'S	DUES
Alabama	$100.00
Buckeye Beef (Ohio)	$100.00
California	$100.00
Colorado	$100.00
Florida	$100.00
Georgia	$100.00
Hawaii	$100.00
Illinois	$100.00
Indiana	$100.00
Iowa	$100.00
Kansas	$100.00
Kentucky	$100.00
Minnesota	$100.00
Mississippi	$100.00
Missouri	$100.00
Montana	$50.00
New Mexico	$100.00
North Carolina	$100.00
North Dakota	$100.00
Oklahoma	$100.00
Oregon	$100.00
Pennsylvania	$100.00
South Carolina	$100.00
South Dakota	$100.00
Tennessee	$100.00
Texas	$100.00
Utah	$100.00
Virginia	$100.00
Washington	$100.00
West Virginia	$100.00
Wisconsin	$100.00
Wyoming	$100.00

Breed Associations

American Angus	$500.00
American Beefalo	$50.00
American Brahman	$200.00
American Chianina	$200.00
American Gelbvieh	$200.00
American Hereford	$500.00
American Int'l Charolais	$300.00
American Polled Hereford	$500.00
American Red Poll	$100.00
American Salers	$200.00
American Shorthorn	$200.00
American Simmental	$300.00
American Tarentaise	$100.00
Beefmaster Breeders	$300.00
Canadian Charolais	$200.00
Canadian Hereford	$100.00
Canadian Simmental	$100.00
Int'l Brangus Breeders	$300.00
North American Limousin	$300.00
Red Angus	$200.00
Salers Assoc. of Canada	$100.00
Santa Gertrudis Breeders	$200.00

Others

American Breeders Service	$100.00
Barzona Breeders Association	$100.00
Beefbooster Cattle Ltd.	$100.00
Canadian Hays Converter Assoc.	$100.00
Great Western Beef Expot	$50.00
Manitoba Agriculture	$100.00
Nat'l Assoc. of Animal Breeders	$100.00
National Cattlemen's Assoc.	$100.00
NOBA Inc.	$100.00
Ontario Beef Cattle Performance	$100.00
Rancho Arboleda	$50.00
Ronald Schlegel	$50.00
Select Sires Inc.	$100.00
Taylors Black Simmental	$50.00
Turner Bros. Farms Inc.	$50.00
21st Century Genetics	$100.00
North American South Devon	$100.00

New Members

Connors State College (OK)	$100.00

BIF MEMEBERS WHO HAVE NOT PAID MEMBERSHIP DUE FOR 1990
As of May 15, 1990

State BCIA's

Idaho	$50.00
New York	$100.00
Northeast Kentuckty	$100.00

Breed Associations

Canadian Aberdeen Angus	$50.00
Canadian Blonde D'Aqutaine	$50.00

Others

Agri. Business Research Inst.	$50.00
Australia Agriculture	$50.00
Business Research Institute	$50.00
Saskatchewan Livestock Assoc.	$50.00
Agriculture Canada	$100.00
King Ranch	$50.00
Caisse Nationale DeCredit Agricole	$50.00

THE SEEDSTOCK BREEDER HONOR ROLL OF EXCELLENCE

John Crowe	CA	1972
Dale H. Davis	MT	1972
Elliot Humphrey	AZ	1972
Jerry Moore	OH	1972
James D. Bennett	VA	1972
Harold A. Demorest	OH	1972
Marshall A. Mohler	IN	1972
Billy L. Easley	KY	1972
Messersmith Herefords	NE	1973
Robert Miller	MN	1973
James D. Hemmingsen	IA	1973
Clyde Barks	ND	1973
C. Scott Holden	MT	1973
William F. Borror	CA	1973
Raymond Meyer	SD	1973
Heathman Herefords	WA	1973
Albert West III	TX	1973
Mrs. R.W. Jones, Jr.	GA	1973
Carlton Corbin	OK	1973
Wilfred Dugan	MO	1974
Bert Sackman	ND	1974
Dover Sindelar	MT	1974
Jorgensen Brothers	SD	1974
J. David Nichols	IA	1974
Bobby Lawrence	GA	1974
Marvin Bohmont	NE	1974
Charles Descheemacker	MT	1974
Bert Crame	CA	1974
Burwell M. Bates	OK	1974
Maurice Mitchell	MN	1974
Robert Arbuthnot	KS	1975
Glenn Burrows	NM	1975
Louis Chesnut	WA	1975
George Chiga	OK	1975
Howard Collins	MO	1975
Jack Cooper	MT	1975
Joseph P. Dittmer	IA	1975
Dale Engler	KS	1975
Leslie J. Holden	MT	1975
Robert D. Keefer	MT	1975
Frank Kubik, Jr.	ND	1975
Licking Angus Ranch	NE	1975
Walter S. Markham	CA	1975
Gerhard Mittnes	KS	1976
Ancel Armstrong	VA	1976
Jackie Davis	CA	1976
Sam Friend	MO	1976
Healy Brothers	OK	1976
Stan Lund	MT	1976
Jay Pearson	ID	1976
L. Dale Porter	IA	1976
Robert Sallstrom	MN	1976
M.D. Shepherd	ND	1976
Lowellyn Tewksbury	ND	1976
Harold Anderson	SD	1977
William Borror	CA	1977
Robert Brown, Simmental	TX	1977
Glen Burrows, PRI	NM	1977
Henry, Jeanette Chitty	FL	1977
Tom Dashiell, Hereford	WA	1977
Lloyd DeBruycker	MT	1977
Wayne Eshelman	WA	1977
Hubert R. Freise	ND	1977
Floyd Hawkins	MO	1977
Marshall A. Mohler	IN	1977
Clair Percel	KS	1977
Frank Ramackers, Jr.	NE	1977
Loren Schlipf	IL	1977
Tom & Mary Shaw	ID	1977
Bob Sitz	MT	1977
Bill Wolfe	OR	1977
James Volz	MN	1977
A.L. Frau		1978
George Becker	ND	1978
Jack Delaney	MN	1978
L.C. Chestnut	WA	1978
James D. Benett	VA	1978
Healey Brothers	OK	1978
Frank Harpster	MO	1978
Bill Womack, Jr.	AL	1978
Larry Berg	IA	1978
Buddy Cobb	MT	1978
Bill Wolfe	OR	1978
Roy Hunt	PA	1978
Del Krumwied	ND	1979
Jim Wolf	NE	1979
Rex & Joann James	IA	1979
Leo Schuster Family	MN	1979
Bill Wolfe	OR	1979
Jack Ragsdale	KY	1979
Floyd Mette	MO	1979
Glenn & David Gibb	IL	1979
Peg Allen	MT	1979
Frank & Jim Willson	SD	1979
Donald Barton	UT	1980
Frank Felton	MO	1980
Frank Hay	CAN	1980
Mark Keffeler	SD	1980
Bob Laflin	KS	1980
Paul Mydland	MT	1980
Richard Tokach	ND	1980
Roy & Don Udelhoven	WI	1980
Bill Wolfe	OR	1980
John Masters	KY	1980
Floyd Dominy	VA	1980
James Bryan	MN	1980
Charlie Richards	IA	1980
Blythe Gardner	UT	1980

Richard McLaughlin	IL	1980
Bob Dickinson	KS	1981
Clarence Burch	OK	1981
Lynn Frey	ND	1981
Harold Thompson	WA	1981
James Leachman	MT	1981
J. Morgan Donelson	MO	1981
Clayton Canning	CAN	1981
Russ Denown	MT	1981
Dwight Houff	VA	1981
G.W. Cornwell	IA	1981
Bob & Gloria Thoma	OR	1981
Roy Beeby	OK	1981
Herman Schaefer	IL	1981
Myron Aultfathr	MN	1981
Jack Ragsdale	KY	1981
W.B. Williams	IL	1982
Garold Parks	IA	1982
David A. Breiner	KS	1982
Joseph S. Bray	KY	1982
Clare Geddes	CAN	1982
Howard Krog	MN	1982
Harlin Hecht	MN	1982
William Kottwitz	MO	1982
Larry Leonhardt	MT	1982
Frankie Flint	NM	1982
Gary & Gerald Carlson	ND	1982
Bob Thomas	OR	1982
Orville Stangl	SD	1982
C. Ancel Armstrong	KS	1983
Bill Borror	CA	1983
Charles E. Boyd	KY	1983
John Bruner	SD	1983
Leness Hall	WA	1983
Ric Hoyt	OR	1983
E.A. Keithley	MO	1983
J. Earl Kindig	MO	1983
Jake Larson	ND	1983
Harvey Lemmon	GA	1983
Frank Myatt	IA	1983
Stanley Nesemeier	IL	1983
Russ Pepper	MT	1983
Robert H. Schafer	MN	1983
Alex Stauffer	WI	1983
D. John & Lebert Shultz	MO	1983
Phillip A. Abrahamson	MN	1984
Rob Bieber	SD	1984
Jerry Chappell	VA	1984
Charles W. Druin	KY	1984
Jack Farmer	CA	1984
John B. Green	LA	1984
Ric Hoyt	OR	1984
Fred H. Johnson	OH	1984
Earl Kindig	VA	1984
Glen Klippenstein	MO	1984
A. Harvey Lemmon	GA	1984
Lawrence Meyer	IL	1984
Donn & Sylvia Mitchell	CAN	1984
Lee Nichols	IA	1984
Clair K. Parcel	KS	1984
Joe C. Powell	NC	1984
Floyd Richard	ND	1984
Robert L. Sitz	MT	1984
Ric Hoyt	OR	1984
J. Newbill Miller	VA	1985
George B. Halterman	WV	1985
David McGehee	KY	1985
Glenn L. Brinkman	TX	1985
Gordon Booth	WY	1985
Earl Schafer	MN	1985
Marvin Knowles	CA	1985
Fred Killam	IL	1985
Tom Perrier	KS	1985
Don W. Schoene	MO	1985
Everett & Ron Batho & Families	CAN	1985
Bernard F. Pedretti	WI	1985
Arnold Wienk	SD	1985
R.C. Price	AL	1985
Clifford & Bruce Betzold	IL	1986
Gerald Hoffman	SD	1986
Delton W. Hubert	KS	1986
Dick & Ellie Larson	WI	1986
Leonard Lodden	ND	1986
Ralph McDanolds	VA	1986
Roy D. McPhee	CA	1986
W.D. Morris & James Pipkin	MO	1986
Clarence Van Dyke	MT	1986
John H. Wood	SC	1986
Evin & Verne Dunn	Can	1986
Glenn L. Brinkman	KS	1986
Jack & Gini Chase	WY	1986
Henry & Jeannette Chitty	FL	1986
Lawrence H. Graham	KY	1986
A. Lloyd Grau	NM	1986
Mathew Warren Hall	AL	1986
Richard J. Putnam	NC	1986
Robert J. Steward & Patrick C. Morrissey	OR	1986
Leonard Wulf	MN	1986
Charles & Wynder Smith	GA	1987
Lyall Edgerton	CAN	1987
Tommy Branderberger	TX	1987
Henry Gardiner	KS	1987
Gary Klein	ND	1987
Ivan & Frank Rincker	IL	1987
Larry D. Leonhardt	WY	1987
Harold E. Pate	AL	1987
Forrest Byergo	MO	1987
Clayton Canning	CAN	1987
James Bush	SD	1987
Robert J. Steward & Patrick C. Morrissey	OR	1987

Eldon & Richard Wiese	MN	1987	Sherm & Charlie Ewing	CAN	1989
Douglas D. Bennett	TX	1988	Donald Fawcett	SD	1989
Don & Diane Guilford	CAN	1988	Orrin Hart	CAN	1989
David & Carol Guilford			Leonard A. Lorenzen	OR	1989
Kenneth Gillig	MO	1988	Kenneth D. Lowe	KY	1989
Bill Bennett	WA	1988	Tom Mercer	WY	1989
Hansell Pile	KY	1988	Lynn Pelton	KS	1989
Gino Pedretti	CA	1988	Lester H. Schafer	MN	1989
Leonard Lorenzen	OR	1988	Bob R. Whitmire	GA	1989
George Schlickau	KS	1988	**Dr. Burleigh Anderson**	**PA**	**1990**
Hans Ulrich	CAN	1988	**Boyd Broyles**	**KY**	**1990**
Donn & Sylvia Mitchell	CAN	1988	**Larry Earhart**	**WY**	**1990**
Darold Bauman	WY	1988	**Steven Forrester**	**MI**	**1990**
Glynn Debter	AL	1988	**Doug Fraser**	**CAN**	**1990**
William Glanz	WY	1988	**Gerhard Gueggenberger**	**CA**	**1990**
Jay P. Book	IL	1988	**Douglas and Molly Hoff**	**SD**	**1990**
David Luhman	MN	1988	**Richard Janssen**	**KS**	**1990**
Scott Burtner	VA	1988	**Paul E. Keffaber**	**IN**	**1990**
Robert E. Walton	WS	1988	**John and Chris Oltman**	**WI**	**1990**
Harry Airey	CAN	1989	**John Ragsdale**	**KY**	**1990**
Ed Albaugh	CA	1989	**Otto and Otis Rincker**	**IL**	**1990**
Jack & Nancy Baker	MO	1989	**Charles and Ruby Simpson**	**CAN**	**1990**
Ron Bowman	ND	1989	**T.D. and Roger Steele**	**VA**	**1990**
Jerry Allen Burner	VA	1989	**Bob Thomas Family**	**OR**	**1990**
Glynn Debter	AL	1989			

SEEDSTOCK BREEDER OF THE YEAR

John Crowe	CA	1972	Bob Dickinson	KS	1981
Mrs. R.W. Jones	GA	1973	A.F. "Frankie" Flint	NM	1982
Carlton Corbin	OK	1974	Bill Borror	CA	1983
Leslie J. Holden	MT	1975	Lee Nichols	CA	1984
Jack Cooper	MT	1975	Ric Hoyt	OR	1985
Jorgensen Brothers	SD	1976	Leonard Lodoen	ND	1986
Glenn Burrows	NM	1977	Harry Gardiner	KS	1987
James D. Bennett	VA	1978	W.T. "Bill" Bennett	WA	1988
Jim Wolfe	NE	1979	Glynn Debter	AL	1989
Bill Wolfe	OR	1980	**Doug and Molly Huff**	**SD**	**1990**

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THE COMMERCIAL PRODUCER HONOR ROLL OF EXCELLENCE

Chan Cooper	MT	1972	Elmer Maddox	OK	1973
Alfred B. Cobb Jr.	MT	1972	Marshall McGregor	MO	1974
Lyle Eivens	IA	1972	Lloyd Mygard	ND	1974
Broadbent Brothers	KY	1972	Dave Matti	MT	1974
Jess Kilgore	MT	1972	Eldon Wiese	MN	1974
Clifford Ouse	MN	1973	Lloyd DeBruycker	MT	1974
Pat Wilson	FL	1973	Gene Rambo	CA	1974
John Glaus	SD	1973	Jim Wolf	NE	1974
Sig Peterson	ND	1973	Henry Gardiner	KS	1974
Max Kiner	WA	1973	Johnson Brothers	SD	1974
Donald Schott	MT	1973	John Blankers	MN	1975
Stephen Garst	IA	1973	Paul Burdett	MT	1975
J.K. Sexton	CA	1973	Oscar Burroughs	CA	1975

John R. Dahl	ND	1975	J.J. Feldmann	IA	1981
Eugene Duckworth	MO	1975	Henry Gardiner	KS	1981
Gene Gates	KS	1975	Dan L. Weppler	MT	1981
V.A. Hills	KS	1975	Harvey P. Wehri	ND	1981
Robert D. Keefer	MT	1975	Dannie O'Connell	SD	1981
Kenneth E. Leistritz	NE	1975	Wesley & Harold Arnold	SD	1981
Ron Baker	OR	1976	Jim Russell & Rick Turner	MO	1981
Dick Boyle	ID	1976	Oren & Jerry Raburn	OR	1981
James D. Hackworth	MO	1976	Orin Lamport	SD	1981
John Hilgendorf	MN	1976	Leonard Wulf	MN	1981
Kahua Ranch	HI	1976	Wm. H. Romersberger	IL	1982
Milton Mallery	CA	1976	Milton Krueger	MO	1982
Robert Rawson	IA	1976	Carl Odegard	MT	1982
William A. Stegner	ND	1976	Marvin & Donald Stoker	IA	1982
U.S. Range Exp. Sta.	MT	1976	Sam Hands	KS	1982
John Blankers	MN	1977	Larry Campbell	KY	1982
Maynard Crees	KS	1977	Lloyd Atchison	CAN	1982
Ray Franz	MT	1977	Earl Schmidt	MN	1982
Forrest H. Ireland	SD	1977	Raymond Josephson	ND	1982
John A. Jameson	IL	1977	Clarence Reutter	SD	1982
Leo Knoblauch	MN	1977	Leonard Bergen	CAN	1983
Jack Pierce	ID	1977	Kent Brunner	KS	1983
Mary & Stephen Garst	IA	1977	Tom Chrystal	IA	1983
Odd Osteross	ND	1978	John Freitag	WI	1983
Charles M. Jarecki	MT	1978	Eddie Hamilton	KY	1983
Jimmy G. McDonnal	NC	1978	Bill Jones	MT	1983
Victor Arnaud	MO	1978	Harry & Rick Kline	IL	1983
Ron & Malcolm McGregor	IA	1978	Charlie Kopp	OR	1983
Otto Uhrig	NE	1978	Duwayne Olson	SD	1983
Arnold Wyffels	MN	1978	Ralph Pederson	SD	1983
Bert Hawkins	OR	1978	Ernest & Helen Schaller	MO	1983
Mose Tucker	AL	1978	Al Smith	VA	1983
Dean Haddock	KS	1978	John Spencer	CA	1983
Myron Hoeckle	ND	1979	Bud Wishard	MN	1983
Harold & Wesley Arnold	SD	1979	Bob & Sharon Beck	OR	1984
Ralph Neill	IA	1979	Leonard Fawcett	SD	1984
Morris Kuschel	MN	1979	Fred & Lee Kummerfeld	WY	1984
Bert Hawkins	OR	1979	Norman Coyner & Sons	VA	1984
Dick Coon	WA	1979	Franklyn Esser	MO	1984
Jerry Northcutt	MO	1979	Edgar Lewis	MT	1984
Steve McDonnell	MT	1979	Boyd Mahrt	CA	1984
Doug Vandermyde	IL	1979	Don Moch	ND	1984
Norman, Denton & Calvin Thompson	SD	1979	Neil Moffat	CAN	1984
			William H. Moss, Jr.	GA	1984
Jess Kilgore	MT	1980	Dennis P. Solvie	MN	1984
Robert & Lloyd Simon	IL	1980	Robert P. Stewart	KS	1984
Lee Eaton	MT	1980	Charlie Stokes	NC	1984
Leo & Eddie Grubl	SD	1980	Milton Wendland	AL	1985
Roger Winn, Jr.	VA	1980	Bob & Sheri Schmidt	MN	1985
Gordon McLean	ND	1980	Delmer & Joyce Nelson	IL	1985
Ed Disterhaupt	MN	1980	Harley Brockel	SD	1985
Thad Snow	CAN	1980	Kent Brunner	KS	1985
Oren & Jerry Raburn	OR	1980	Glenn Harvey	OR	1985
Bill Lee	KS	1980	John Maino	CA	1985
Paul Moyer	MO	1980	Ernie Reeves	VA	1985
G.W. Campbell	IL	1981	John E. Rouse	WY	1985

George and Thelma Boucher	CAN	1985
Kenneth Bentz	OR	1986
Gary Johnson	KS	1986
Ralph G. Lovelady	AL	1986
Ramon H. Oliver	KY	1986
Kay Richardson	FL	1986
Mr. & Mrs. Clyde Watts	NC	1986
David & Bev Lischka	CAN	1986
Dennis & Nancy Daly	WY	1986
Carl & Fran Dobitz	SD	1986
Charles Fariss	VA	1986
David J. Forster	CA	1986
Danny Geersen	SD	1986
Oscar Bradford	AL	1987
R.J. Mawer	CAN	1987
Rodney G. Oliphant	KS	1987
David A. Reed	OR	1987
Jerry Adamson	NE	1987
Gene Adams	GA	1987
Hugh & Pauline Maize	SD	1987
P.T. McIntire & Sons	VA	1987
Frank Disterhaupt	MN	1987
Mac, Don & Joe Griffith	GA	1988
Jerry Adamson	NE	1988
Ken, Wayne & Bruce Gardiner	CAN	1988
C.L. Cook	MO	1988
C.M. & D.A. McGee	IL	1988
William E. White	KY	1988
Frederick M. Mallory	CA	1988
Stevenson Family	OR	1988
Gary Johnson	KS	1988
John McDaniel	AL	1988
William A. Stegner	ND	1988
Lee Eaton	MT	1988
Larry D. Cundall	WY	1988
Dick & Phyllis Henze	MN	1988
Jerry Adamson	NE	1989
J.W. Aylor	VA	1989
Jerry Bailey	ND	1989
James G. Guyton	WY	1989
Kent Koostra	KY	1989
Ralph G. Lovelady	AL	1989
Thomas McAvoy Jr.	GA	1989
Bill Salton	IA	1989
Lauren & Mel Shuman	CA	1989
Jim Tesher	ND	1989
Joe Thielen	KS	1989
Eugene & Ylene Williams	MO	1989
Phillip, Patty & Greg Bartz	**MO**	**1990**
John J. Chrisman	**WY**	**1990**
Les Herbst	**KY**	**1990**
Jon C. Ferguson	**KS**	**1990**
Mike and Diana Hooper	**OR**	**1990**
James and Joan McKinlay	**CAN**	**1990**
Gilbert Meyer	**SD**	**1990**
DuWayne Olson	**SD**	**1990**
Raymond R. Peugh	**IL**	**1990**
Lewis T. Pratt	**VA**	**1990**
Ken and Wendy Sweetland	**CAN**	**1990**
Swen R. Swenson Cattle Co.	**TX**	**1990**

COMMERCIAL PRODUCER OF THE YEAR

Chan Cooper	MT	1972
Pat Wilson	FL	1973
Lloyd Nygard	ND	1974
Gene Gates	KS	1975
Ron Blake	OR	1976
Steve & Mary Garst	IA	1977
Mose Tucker	AL	1978
Bert Hawkins	OR	1979
Jeff Kilgore	MT	1980
Henry Gardiner	KS	1981
Sam Hands	KS	1982
Al Smith	VA	1983
Bob & Sharon Beck	OR	1984
Glenn Harvey	OR	1985
Charles Fariss	VA	1986
Rodney G. Oliphant	KS	1987
Gary Johnson	KS	1988
Jerry Adamson	NE	1989
Mike and Diana Hooper	**OR**	**1990**

AMBASSADOR AWARD

Warren Kester	Beef Magazine	MN	1986
Chester Peterson	Simmental Shield	KS	1987
Fred Knop	Drovers Journal	KS	1988
Forrest Bassford	Western Livestock Journal	CO	1989
Robert C. de Baca	**The Ideal Beef Memo**	**IA**	**1990**

PIONEER AWARDS

Jay L. Lush	Iowa State University	Research	1973
John H. Knox	New Mexica State University	Research	1973
Ray Woodward	American Breeders Service	Research	1974
Fred Willson	Montana State University	Research	1974
Charles E. Bell Jr.	USDA-FES	Education	1974
Reuben Albaugh	University of California	Education	1974
Paul Pattengale	Colorado State University	Education	1974
Glenn Butts	Performance Registry Int'l	Service	1975
Keith Gregory	RHLUSMARC	Research	1975
Bradford Knapp, Jr.	USDA	Research	1975
Forrest Bassford	Western Livestock Journal	Journalism	1976
Doyle Chambers	Louisiana State University	Research	1976
Mrs. Waldo Emerson Forbes	Wyoming Breeder	Breeder	1976
C. Curtis Mast	Virginia BCIA	Education	1976
Dr. H.H. Stonaker	Colorado State University	Research	1977
Ralph Bogart	Oregon State University	Research	1977
Henry Holszman	South Dakota State University	Education	1977
Marvin Koger	University of Florida	Research	1977
John Lasley	University of Florida	Research	1977
W.L. McCormick	Tifto, Georgia Test Station	Research	1977
Paul Orcutt	Montana Beef Performance Assoc.	Education	1977
J.P. Smith	Performance Registry Int'l	Education	1977
James B. Lingle	Wye Plantation	Breeder	1978
R. Henry Mathiessen	Virginia Breeder	Breeder	1978
Bob Priode	VPI & SU	Research	1978
Robert Koch	RLHUSMARC	Research	1979
Mr. & Mrs. Carl Roubicek	University of Arizona	Research	1979
Joseph J. Urick	US Range Livestock Experiment Station	Research	1979
Byron L. Southwell	Georgia	Research	1980
Richard T. "Scotty" Clark	USDA	Research	1980
F.R. "Ferry" Carpenter	Colorado	Breeder	1981
Clyde Reed	Oklahoma State University		1981
Milton England	Panhandle A & M College		1981
L.A. Moddox	Texas A & M College		1981
Charles Pratt	Oklahoma		1981
Otha Grimes	Oklahoma		1981
Mr. & Mrs. Percy Powers	Texas		1982
Gordon Dickerson	Nebraska		1982
Jim Elings	California		1983
Jim Sanders	Nevada		1983
Ben Kettle	Colorado		1983
Carroll O. Schoonover	University of Wyoming		1983
W. Dean Frischknecht	Oregon State University		1983
Bill Graham	Georgia		1984
Max Hammond	Florida		1984
Thomas J. Marlowe	VPI & SU		1984
Mick Crandell	South Dakota State University		1985
Mel Kirkiede	North Dakota State University		1985
Charles R. Hendeson	Cornell University (Retired)		1986
Everett J. Warwick	USDA-ARS (Retired)		1986
Glenn Burrows	New Mexico		1987
Carlton Corbin	Oklahoma		1987
Murray Corbin	Oklahoma		1987
Max Deets	Kansas		1987

George F. & Mattie Ellis	New Mexico	1988
A.F. "Frankie" Flint	New Mexico	1988
Christian A. Dinkel	South Dakota State University (Retired)	1988
Roy Beeby	Oklahoma	1989
Will Butts	Tennessee	1989
John W. Massey	Missouri	1989
Donn and Sylvia Mitchell	**Manitoba, Canada**	**1990**
Dr. Hoon Song	**Agriculture Canada**	**1990**
Dr. Jim Wilton	**University of Guelph, Canada**	**1990**

CONTINUING SERVICE AWARDS

Clarence Burch	OK	1972
F.R. Carpenter	CO	1973
E.J. Warwick	DC	1973
Robert De Baca	IA	1973
Frank H. Baker	OK	1974
D.D. Bennett	OR	1974
Richard Wilham	IA	1974
Larry V. Cundiff	NE	1975
Dixon D. Hubbard	DC	1975
J. David Nichols	IA	1975
A.L. Eller, Jr.	VA	1976
Ray Meyer	SD	1976
Don Vaniman	MT	1977
Lloyd Schmitt	MT	1977
Martin Jorgensen	SD	1978
James S. Brinks	CO	1978
Paul D. Miller	WI	1978
C.K. Allen	MO	1979
William Durfey	NAAB	1979
Glenn Butts	PRI	1980
Jim Gosey	NE	1980
Mark Keffeler	SD	1981
J.D. Mankin	ID	1982
Art Linton	MT	1983
James Bennett	VA	1984
M.K. Cook	GA	1984
Craig Ludwig	MO	1984
Jim Glenn	IBIA	1985
Dick Spader	MO	1985
Roy Wallace	OH	1985
Larry Benyshek	GA	1986
Ken W. Ellis	CA	1986
Earl Peterson	MT	1986
Bill Borror	CA	1987
Daryl Strohbehn	IA	1987
Jim Gibb	MO	1987
Bruce Howard	CAN	1988
Roger McCraw	NC	1989
Robert Dickinson	**KS**	**1990**

ORGANIZATIONS OF THE YEAR

Beef Improvement Committee, Oregon Cattlemen's Association	1972
South Dakota Livestock Production Records Association	1973
American Simmental Association Inc.	1974
American Simmental Association Inc. (Breed)	1975
Iowa Beef Improvement Association (BCIA)	1975
The American Angus Association (Breed)	1976
The North Dakota Beef Cattle Improvement (BCIA)	1976
The American Angus Association (Breed)	1977
The Iowa Beef Improvement Association (BCIA)	1977
The American Hereford Association (Breed)	1978
Beef Performance Committee of Cattlemen's Association	1978
The Iowa Beef Improvement Association (BCIA)	1979

NOMINEES FOR SEEDSTOCK PRODUCER OF THE YEAR

Dr. Burleigh Anderson
Meadow Mist Angus Farm
Loysville, PA

Burleigh Anderson is a veterinarian by trade and a cattle breeder at heart. He has collected weaning and yearling weights on his calves for the past 25 years, and he has added birth weights and scrotal circumference in the past 10 years. The record of improvement in these records is exemplary. The bull calves have increased an average of 75 lbs. in weaning weight and 8.8 lbs. in weaning weight EPD in the past 10 years. Improvements for yearling weights are significant as well.

The selection program at Meadow Mist is a stringent one. The actual performance and predicted EPDs are used to develop 4 maternal lines. Two of the lines would be selected heavily on calving ease traits plus growth and the other two would be selected heavily on milk plus growth. Potential replacement heifers are ranked on their individual performance and then also ranked on their predicted EPDs. The top 10-15% of the "elite" cows in the herd are flushed and embryos are transferred to cull cows. In this manner top-performing females can be available to add to the herd, but only because of the predictability of performance that has been bred into the Meadow Mist herd. Conformation and structural soundness are included in the evaluations to help insure longevity and acceptability of his cattle. The success of this approach is apparent in the improvement that has occurred for performance in the herd. Additionally, it has all been done "at home" because the cow herd has been closed for 30 years.

He believes there are limits to performance in an environment and is concerned when he sees his average birth weights get above 90 lbs., yearling weights getting above 1400 lbs., and hip heights exceeding 52" at a year of age. He contends better performance is not for its own sake, but as a means to make the most of a herd of cows in the environment he can provide.

Meadow Mist Farm has been highly successful in using central test stations, and considers it a necessary tool to both test their genetic program against other breeders and to merchandise cattle on the farm. They have tested over 170 bulls in 4 states in the past 10 years. Their bulls have been the high indexing bulls at Wardensville, WV on six different occasions and at the Pennsylvania test once. The participation in central tests has created a steady appreciation in performance records from their customers and has contributed greatly to repeat buyers using the actual and predicted EPDs he provides to the customer.

Consistency, predictability, acceptability - all terms to describe the Meadow Mist herd and the breeding program of Dr. Burleigh Anderson. In a herd where "performance records make all the difference" it is fitting that Burleigh be Pennsylvania's nominee as the Seedstock Producer of the Year for the Beef Improvement Federation.

Nominated by Pennsylvania Beef Cattle Performance Association

Boyd Broyles
Broyles Simmentals
Somerset, Kentucky

Edith and Boyd "Buster" Broyles have farmed in partnership for 36 years. Their 200-acre farm is located in northeastern Pulaski County. They also lease 460 acres and rent 60 acres.

Pasture rotation is a strong attribute to the Boyles' operation. Pastures are utilized from late April to mid-November with a stocking rate of one mature animal per 2.5 acres. Hay quality is excellent due to good management. Usually the first cutting of alfalfa, along with all cutting of the grass/legume hay, is round baled and stored outside. The second, third, and fourth cuttings of alfalfa are square baled and stored inside.

Buster started performance testing in 1971. He has placed on the average of three Simmental bulls in the U.K. Central Performance Test since it was started. The herd has been recognized at the test several times for having the second highest average daily gaining Simmental bull. In 1983, the herd produced the highest selling bull in the Central Test. Since 1971, the 205 day weaning weight has been increased by 100 pounds.

A 95 percent calf crop is part of the excellent herd program that features herd health and good management practices.

The Broyles Family is the type that farm families are pictured and thought to be. Production from their farm has furnished their children the finances to attend college. Edith and Buster are proud of their success and for their outstanding role as producers and community leaders.

Nominated by Pulaski County Extension Service

Larry Earhart
Earhart Farms
Powell, Wyoming

Larry Earhart, co-owner of Earhart Farms with his brother Neil, has management responsibility for their registered Angus enterprise.

Earhart produces and markets twenty-five two year old bulls each year from a herd of ninety cows. The bulls are sold mainly by private treaty at home to commercial breeders, although a few are sold through consignment sales. Again this year, a few yearling bulls will be sold through the Midland Bull Test in Montana and the Wyoming Beef Cattle Improvement Association bull test in Wyoming. Earhart Farms bulls have been the fastest gaining Angus bulls two of the first four years of the WBCIA test.

The purebred herd originated in 1958 with Larry's 4-H project, three heifers. Performance statistics were first recorded in 1966 and the herd has been enrolled in the Angus Herd Improvement Records program since 1968. With the AHIR records as the selection tool and using better bulls by artificial insemination, average weaning weights have improved by 87 pounds and yearling weights by 237 pounds during the ensuing twenty years. Percentage of calf crop weaned has also improved to a level of 94% of cows exposed to breeding for 1989.

In addition to the purebred herd, Earhart Farms backgrounds approximately 800 calves on a custom basis and fattens 100 cull cows each winter. Crop production on 700 irrigated acres includes sugar beet, corn for grain and for silage, alfalfa hay, oats, potatoes, and malting barley.

Larry and his wife Sharon have two daughters, Andrea 12 and Erica 9 years old. The Earharts are active in community affairs. Larry is an elder in Union Presbyterian Church, president of Big Horn Basin Beet Growers Association, a director of The American Sugarbeet Growers Association, and a trustee of Northwest College. He was a member of Class I of the Wyoming LEAD program in 1984. Larry is a member of The Wyoming Stock Growers Association and of the National, State and Local Angus associations.

Nominated by Wyoming Beef Cattle Improvement Association

Steven Forrester
Progressive Angus
West Plains, Missouri

Steven Forrester of Progressive Angus, West Plains, Missouri received his Bachelor of Science in Animal Science from the University of Missouri in 1971. In 1980, he received his Masters of Science in Animal Breeding from the University of Arkansas. He has been an instructor at Southwest Missouri State for 3 years and an instructor with the Veterans Farm Program for 5 years.

He has been the Secretary, Sale Manager and Vice-President of the Heart of the Ozarks Angus Association which is now the state's largest local association.

Steven has consigned to 27 consecutive state performance tested sales and has bred 11 high indexing Angus bulls. He also co-owned the first homozygous Polled Charolais bull.

The Progressive Angus Herd currently consists of 51 females. The BIF Guidelines are followed in obtaining weaning, feed test and yearling weights data. Bulls are feed tested for optimal gain so that soundness is challenged and superior growth may be expressed. Females are not weighed beyond weaning due to the great environmental variances.

Steven states: "I enjoy the science, art and common labour of breeding and raising cattle. Of particular satisfaction is the change that can be made in 2 or 3 generations of selection, even when traits have unwanted co-relations, such as yearling weight and birth weight."

Nominated by the Missouri Beef Cattle Improvement Association

Doug Fraser
DM Fraser Ranch
Hussar, Alberta

Doug Fraser of Hussar, Alberta is the second generation of Frasers to be involved in the cattle business. Doug has been in the seedstock business for 45 years. Doug and his wife Sis and their two sons maintain a 265 - purebred Horned Hereford cow herd.

The DM Fraser herd has kept performance records ever since the Record of Performance Program began in the late 1950s. They joined the Federal/Provincial Record of Performance program in 1971 and continued until the Canadian Hereford Association's Total Herd Evaluation (THE) program began in 1981.

Prospective buyers of DM Fraser seedstock are provided with all performance information available, including data for EPDs, if requested. The results of semen tests, scrotal measurements and maternal breeding values are provided on all DM Fraser bulls. On sale days, buyers are also given a sheet listing indexes for birth, weaning and yearling weights. For the past 11 years, the DM Fraser operation has hosted a joint spring bull sale with a neighbouring breeder. There, about 30 DM Fraser bulls are sold as two year olds. During the past few years, another 10 sires have been annually sold through test centres at Bassano and Innisfail. The balance are sold privately as yearlings.

Fertility and structural soundness are their major selection criteria. The operation also tries to keep birth weights reasonable while still allowing for as much gain and carcass quality as possible. High maternal traits are also valued. Doug Fraser was President of the Alberta Hereford Association in 1979 and has chaired the Alberta Hereford Sire Progeny Test Program and the Bassano Hereford Sire Test Program. He was also part of the committee which built the Alberta Hereford Test Centre at Innisfail.

A member of the Canadian Hereford Association's board of directors for seven years, he served that organization as President in 1988-89.

Doug chaired the CHA's performance committee when the Total Herd Evaluation (THE) program was initiated in 1980. He is co-chairman of the research and education committee and has been instrumental in the development of the Association's Records Without Fuss program. He is currently active in an ambitious research project that seeks to identify genetic lines of Herefords which produce consistently high-quality beef.

Nominated by the Canadian Hereford Association

Gueggenberger & Edwards Charolais Ranch
San Juan Bautista, California

Gerhard Guggenberger was born in Austria in 1940, and from his youth was involved in raising Pinzgauer cattle with a small family operation.

After earning a business degree in Austria, he worked in the skiing industry there and in the United States after his arrival in 1967. In 1970 he settled in San Juan Bautista, California, with his American wife Cylda, where he took over a non-income producing family ranch and formed it into one of the most successful Charolais breeding establishments in the Western United States.

An ardent believer in the genetic potential to be contributed to American cattle by the continental breeds, it was natural for Gerhard to pick the Charolais breed, which had already proved its merit in Europe as the superior-performing beef breed.

Within two years Gerhard had the highest-indexing and grading range bulls at the Famosa, California Bull Sale and continued to hold that position for a number of years. From the inception of the new Cal Poly All Breed Yearling Bull Test up to the present, G & E bred bulls have dominated the top slots in the Charolais breed and all breeds.

To establish a market for his superior linebred females, Gerhard went to the National show ring, with excellent results, winning Denver and Houston Grand and Reserve Championships, culminating in a breed first: In 1989, at the Pacific National Roll of Excellence Show in Oregon, G & E won both Grand and Reserve Championships for both sexes. 1990 began with the winning of Reserve grand Champion Bull at Denver and Grand Champion Bull in San Antonio, Texas, as well as Fort Worth.

1990 has also brought Gerhard the recognition of his fellow Charolais breeders as winner of the Charolais Association's Seedstock Producer of the Year Award.

Nominated by the American International Charolais Association.

Douglas and Molly Hoff
Scotch Cap Angus Ranch
Bison, South Dakota

Henry and Ava Hoff began building an Angus herd 40 years ago, with son Doug entering the business and starting his own program ten years later. Today, Scotch Cap Angus consists of 250 registered cows. The herd has been enrolled in the American Angus Association's Angus Herd Improvement Record program for the past 18 years. Artificial insemination is used extensively. Comprehensive performance records, including all EPD, individual performance, dam summaries and pelvic and scrotal measurement are used as selection criteria. Weaning weights have increased by about 200 pounds and yearling weights have increased by about 400 pounds over the past 20 years. Many bulls produced by Hoff are listed in the Angus sire summary, with 15 bulls placed in major AI studs. Approximately 30 cows are leased to other Angus breeders for use in embryo transfer. Yearling bulls are very successfully merchandised through an annual production sale. Doug and his family have been very active in supporting area 4-H activities. Member of the American Angus Association. South Dakota Beef Cattle Improvement Association Seedstock Producer of the Year, 1989. South Dakota Young Farmer Award winner and member of several agricultural related board of directors.

Nominated by South Dakota Beef Cattle Improvement Association

Richard Janssen
Green Garden Angus
Ellsworth, Kansas

Richard Janssen owns and operates a 300 acre integrated farm that produces wheat, milo, oats and alfalfa and forage crops. A herd of registered Angus cows utilize the pasture and crop residues of this farm.

Janssen's goal, for the past 26 years, has been to provide the commercial cattleman with profitable, problem-free seedstock.

Since 1984, Janssen has been aggressively stacking pedigrees to improve the predictability in his systematic approach to seedstock selection. Systematic selection is simply putting parameters on breeding functions. The first function is calving ease. The breeding process is built around EPDs for birth weight and actual birth weights. The second function is mothering ability. Janssen in interested in pure milk EPDs that are breed average or above. The third function is growth. Janssen does not limit growth as long as the first two functions are maintained. Then, those cattle are separated into one of three different groups:

System 1 -Calving ease: Birth EPDs of -3.0 to +1.0; with actual birth weights of 65 to 80 lbs, and milk EPDs of +0 to +20 lbs.

System 2 -Combination: Birth EPDs of +1.0 to +4.0; with actual birth weights of 80 to 95 lbs, and milk EPDs of 0 to +15 lbs.

System 3 -Growth: Birth EPDs of +4.0 to +8.0; with actual birth weights of 95 lbs, and up; and milk EPDs of 0 to +15 lbs.

In addition, Janssen is developing a group of carcass cattle by stacking EPDs primarily for the marbling trait as identified by the carcass evaluation program of the American Angus Association.

Janssen feels this selection process gives his customers the opportunity to choose from a wider range of more predictable products that can more accurately target the needs of their cattle operation.

Nominated by Kansas Livestock Association

Paul E. Keffaber
Fuller Farms and Lazy K
Shelbyville, Indiana

Paul E. Keffaber is the Manager of Fuller Farms and the owner of Lazy K Farms at Shelbyville, Indiana, He has been in the seedstock business for 17 years.

He has been performance testing with Purdue University and the American Simmental Association for 20 years. The herd consists of 125 Simmental and Salers cows, plus 100 commercial cows that have been raised with the herd.

His program is based on spring and fall calving seasons. He sells 45 bulls annually through the Indiana Beef Evaluation Program (IBEP) auctions and private treaty. Approximately 90% are sold to commercial herds.

About 25% of the cows are bred AI, relying on sire summaries as the "bible" for bull selection. He emphasizes total performance including structural soundness, maternal traits, growth rate and extensive carcass evaluation. Paul tests about 75% of the bulls in IBEP test stations, having tested over 200 bulls and sire groups since 1977. Several bulls have been taken home to improve herd genetics. Seven sires are included in the national sire evaluation summary.

A 1990 genetic trait leader, home-bred and tested by IBEP, was the Indiana Sire of the Year. Paul has received 78 cow awards from the American Simmental Association and many get-of-sire awards at test station and performance carcass shows.

Paul Keffaber has held many leadership positions, including: President of the Indiana Beef Cattle Association; President of the Indiana Beef Evaluation Program; Chairman of many IBCA and IBEP committees; President of Extension Board; President of Ag Advisory Board; and Director of the Farmers' National bank.

In 1979, the Indiana Beef Cattle Association named him Indiana Cattleman of the Year. In 1982, his portrait was hung in the Indiana Livestock Breeders Hall of Fame at Perdue University.

Nominated by Indiana Beef Evaluation Program

John and Chris Oltman
Foggy Hollow FArm
Mt. Horeb, Wisconsin

Foggy Hollow Farm is located on 220 owned and 180 rented acres in the unglaciated hills of Southwestern Wisconsin. The first commercial cows were purchased in 1974 followed by Registered Polled Herefords in 1975. Currently the herd has 47 registered Polled Hereford and 6 commercial cows.

Performance records were used from the beginning, starting with Wisconsin Beef Improvement Association and going to the Guidelines Program through the American Polled Hereford Association. As cow herd EPDs became available, these were added as selection tools.

The top bulls have been tested at the SBIA Bull Test Station in Platteville since 1975-76. They had the top sire group and the top two individual bulls for the 1987-88 Test. John has been on the Board of Directors the past 6 years and is serving as president for 1990.

Since 1982, all bulls and heifers have been kept through to yearling, when selections are made based upon the yearling data and EPDs. The bulls not sent to the Central Test are tested on the farm.

Synchronization of the entire cow herd with SMB and A.I. have resulted in up to 81% A.I. conception rate. A.I. bulls are selected from the APHA Sire Summary on the basis of growth, maternal, then birth characteristics. The A.I. program has added 240 lbs. to the weaning weights, since 1983.

Beginning in 1986, a computer printout has been given as a handout to all potential buyers and visitors to the farm. It gives the On the Farm Bull Test information, the herd sire, cow herd and projected calf EPDs.

Nominated by Wisconsin Beef Improvement Association

John C. "Jack" Ragsdale
Sutherland Farms
Prospect, Kentucky

Jack Ragsdale could fairly be called the strongest supporter of performance testing in the Shorthorn breed and has filled that unofficial leadership role for many years. As manager of the famed Sutherland herd, located in Prospect, KY, Jack was one of the first seedstock producers to pursue breed improvement through the use of early performance testing programs.

Sutherland cattle have been tested on the farm for over 30 years, have participated in many bull tests, were evaluated in early association sponsored designed sire testing programs, and are among the most well documented cattle in the breed in the era of EPDs. There are 54 bulls with the Sutherland prefix in the 1990 Shorthorn Sire Summary, with 2 birth weight trait leaders, 1 weaning weight trait leader, 2 yearling weight trait leaders, and 1 maternal milk trait leader. Two former herd sires are also yearling weight trait leaders.

Jack and the Sutherland herd, which he and his son David now own, have always been competitive with their high performing cattle in the show-ring also. Rather than ignore that segment of the industry, the Sutherland cattle have been constant reminders that performance and that winning "style" are not mutually exclusive. In fact, the Champion Bull at the 1989 North American International, Sutherland Titleist x, is an A.I.-sired natural calf by a yearling weight trait leader in the 1990 Sire Summary.

Jack Ragsdale is one of the elder statesmen of the seedstock industry at this point in his career, yet is a fresh thinker, always striving to improve his cattle using the best technology available. A gentleman in the truest sense of the word he has always been a leader, rather than a follower, in the performance testing arena. His cattle and his influence have impacted the breed profoundly, and very positively, and show every indication of continuing to do so for a long time to come.

Nominated by the American Shorthorn Association

Otto and Otis Rincker
Rincker Brothers Simmentals
Strasburg, Illinois

The Rincker Brothers Simmental farm has always included cattle. They have raised cattle with their father, Dale, who has raised registered cattle since 1938.

In 1982, the Rincker Brothers Simmentals were started upon the retirement of their father. They continued to raise Simmental cattle. The Simmental herd was bred up from a registered Horned Hereford herd in the early 1970's.

The Simmental herd consists of 100 head of highly productive Simmental cows. They keep 95% of the heifers for replacement heifers and keep 20 to 30 bulls annually to sell. Ninety-eight percent of the bulls go to commercial buyers.

Rincker Brothers sell 4 bulls each year in the Illinois Beef Performance Tested Bull Sale in Springfield. They have produced some of the top selling and top indexing bulls each year.

To show how they have progressed in the seedstock business in the early 1980's, they would sell 8 to 10 bulls annually and 2 or 3 open heifers. In 1989, they sold 30 open heifers and 35 bulls into 8 different states.

Their goal, as purebred breeders, has always been to produce bulls for the commercial breeder, and hopefully a herd bull, once in awhile.

They have always tried to help promote in their local area and have helped with many county, state, and national programs.

Otis was elected a board member to the Illinois Simmental Association in 1989. Otto helped organize the Shelby County Cattlemen's Association and served as treasurer for many years.

Rincker Brothers advertise in the Illinois Beef magazine and Illinois Simmental Directory and their slogan is "we raise cattle for a living, not a hobby" and that says it best.

Nominated by Illinois Beef Association and Illinois Co-operative Extension Service

Charles and Ruby Simpson
Tag-A-Long Red Angus
Brookdale, Manitoba

Located at Brookdale, Manitoba, Charles and Ruby Simpson have been involved in the cattle business for 27 years. Their Tag-A-Long Red Angus herd consists of 90 cows, 5 herd bulls; 12 replacement heifers and 29 bred heifers for sale.

Since 1980, the weaning weight on bull calves has increased from 488 pounds to 595 pounds. A similar increase is evident with the heifers---from 449 pounds to 572 pounds. Yearling weights have shown similar increases too: bulls from 974 pounds to 1074 pounds and females 713 pounds to 830 pounds. This has been done while the percentage of assisted births has decreased and hip height has increased.

Charles and Ruby Simpson demand balanced performance trait data when selecting replacement females and herd bulls. Ease of calving is a definite priority. They must be of good disposition, structurally sound with good feet and legs; be easy calvers with moderate birth weights.

Tag-A-Long Red Angus have developed a Private Bull Test Station and Private Treaty Sale. They are merchandising performance tested bred females. The use of performance testing has resulted in a more uniform calf crop in terms of size and age. Also, it has increased their weaning and yearling weights on both bulls and heifers.

Charlie is Past President of the Red Power Association; serves as the Red Power Rep. on the Manitoba ROP Advisory Board; and is the Manitoba Rep. on the Canadian Red Power Promotional Society. Ruby is Vice-President of the Manitoba Angus Association; was Secretary for 8 years and Treasurer for 10 years of Red Power.

Nominated by the Manitoba Beef Cattle Performance Association

T.D. and Roger Steele
Lynn Brae Associates
Daleville, Virginia

T.D. Steele and his father, Dr. B.W. Steele, started in the cattle business in 1950 on a farm in Catawba, Virginia. A very productive herd of about 150 cows was developed and maintained at that size using bulls primarily form the Central Test Stations and the Wye Plantation Herd. In the mid-1970's, the farm started using A.I. and rapid genetic improvement was made. In 1980, an additional farm was purchased in Botetourt County, and Roger Steele became involved full time in the operation.

In the 1980's, the herd was expanded dramatically with the retention of heifers and the purchase of cattle in several significant dispersion sales. The A.I. program expanded and genetic improvement continued with the addition of natural service sires, Hungry Jack and Blastoff. By the mid-1980's, the cow herd had reached approximately 350 cows. The Steeles began searching for a way to improve the marketing alternatives for commercial bulls as well as to lower production costs for developing young bulls. In October 1986, the Steeles purchased a ranch near Topeka, Kansas. By transporting cattle and by retaining most of the heifers, the Steeles are currently managing about 250 brood cows in Kansas and 350 brood cows in Virginia.

Future plans are to maintain the same herd size in Virginia and to expand the Kansas herd to 500-600 cows. Lynn Brae will continue the use of A.I. heavily and to select bulls which will produce the kind of heifers and bulls demanded by commercial producers. The father and son Steele team have been exceptional leaders in the beef cattle industry and have excelled as seedstock Angus breeders.

Nominated by Virginia Beef Cattle Improvement Association

Bob Thomas Family
Thomas Angus Ranch
Baker, Oregon

Thomas Angus Ranch is a family-owned operation consisting of three families. Bob and Gloria Thomas, their daughter and son-in-law Andy and Kris Barr, and son and daughter-in-law, Rob and Lori Thomas. From Bob and Gloria's start 43 years ago in Iowa, the ranch's sole income has been from breeding and selling of seedstock Angus cattle. In 1962 the ranch located at its present site in Baker, Oregon.

Thomas Angus Ranch was at the forefront of performance testing, starting with the Oregon Beef Improvement Association 22 years ago, and the Angus Herd Improvement Records four years later. With the advent of EPD's the Thomases were quick to adapt. Recognizing the strength and realizing their weaknesses, they sought to again meet their customers' demands with the use of this valuable tool. It became apparent to Thomas Angus Ranch that there was an obvious trend toward more growth and away from calving ease and maternal ability. This is when they purchased their two recent major herd sires, AAR New Trend and Emulation N Bar 5522, both later leased to American Breeders Service. With New Trend, they were able to build upon a strong maternal cow herd, and 5522 gave them the ability to stack pedigrees for calving ease, while maintaining adequate growth and milking ability.

Today they continue to breed one group of cows for moderate birth weight, high maternal and moderate high growth. Another set of cows are bred to emphasize calving ease and growth. Their customers are directed to the group that meet their program needs most closely.

Through their performance testing with "AHIR", they have increased weaning weights by 127 lbs. on bulls and 125 lbs. on heifers while increasing conception rates, shortening calving season, and increasing customer demand.

Seventeen years ago, Thomas Angus Ranch was one of the first ranches to sell bull calves right off the cow. Today they remain uniquely successful averaging over $2,100 on more than 190 lots in this past year's sale.

The Thomases remain committed to breeding top performance cattle in the future. They feel it is up to registered breeders to stay on the cutting edge, one step ahead of the industry, in order to supply what the industry demands. They believe it is not enough to rest on their laurels, but rather must keep contributing to the industry to promote beef improvement.

Nominated by Oregon Cattlemen's Association

NOMINEES FOR COMMERCIAL PRODUCER OF THE YEAR

Phillip, Patty and Greg Bartz
Green Valley Ranch, Rockville, Missouri

Green Valley Ranch, situated in west central St. Clair County, has been growing cattle since the early 1900s. It was purchased by Phillip and Patty Bartz in 1966, and a partnership with son, Greg, was formed in 1985.

Over the years, the 400 cattle grazing the fescue, clover, and lespedeza pastures have changed from all Polled Herefords to a mix of Polled Hereford-Angus or Simmental cross. The Angus and Polled Hereford bulls, plus the new Limousin were all purchased at performance-tested sales held by the University of Missouri in Columbia. The cows are divided into fall and spring calving herds which give fat cattle ready to market in August-September and February-March. The ranch-raised calves are brought to dry lot after weaning where they are sorted with some heifers being kept for replacement cows. The rest are finished for slaughter by being fed a 50% moisture haylage (fescue, small grains, and milo stalks), and a 25% moisture whole rolled milo from the two Harvestor silos. All of the grain and hay fed are grown on the 1,360 acre ranch or the 1,200 acres of rented crop and pasture land. Soybeans, wheat, corn, fescue seed, and lespedeza seed are grown as additional cash crops.

All of these components put together produce their long-range goal of a calf which is not extra large at birth or weaning but which dresses out and grades well at the time of slaughter.

Nominated by Missouri Beef Improvement Association

John J. Chrisman
Flying W. Ranch, Big Piney, Wyoming

Flying W Land and Livestock is a family-owned corporation. John Chrisman manages the Ranch in Sublette County. Sublette county is in the southwest part of Wyoming. The ranch elevation is 7000 feet and up. The growing season is short but the feed is strong. John's grandfather started ranching in southwestern Wyoming in the late 1870s and the family still continues in the ranching business.

Flying W run about 100 registered Salers and Polled Hereford cows, along with 1100 commercial crossbred cows. The registered cows and commercial cows run together except during the breeding season. John says, "I don't want our registered cows to get any special care. They must compete with the commercial cows and there's a lot of registered cattle around that can't compete with our commercial cows under our conditions."

The Flying W try to cull the bottom end of their cows every year and replace them with heifers. The replacement heifers are fed and bred at Fausset and Glanz Feedlot near Worland, Wyoming. They are synchronized and A.I.'ed, then cleanup bulls are used for 25 days. The cows are bred and culled for a 45-day calving period. The cows start calving just when the heifers finish. They wean about a 94% calf crop.

John Chrisman uses the most progressive and innovative methods he can. He believes in EPDs and performance testing.

Nominated by Wyoming Beef Cattle Improvement Association.

Les Herbst, Spring Range Farm
Butler, Kentucky

Les Herbst of Spring Range Farm, Butler Kentucky has been in the beef cattle business for ten years. In 1955, Les and Vera Herbst purchased their present farm in Pendleton county. Ten years ago, a decision was made to plan for quitting the dairy business and switch to a beef cow-calf program. The Holstein cows were bred to Angus bulls. The heifers from this cross are the foundation of the present farm.

The Herbst farm consists of two hundred and eighty-six acres. The crop acreage for 1989 consisted of five acres of tobacco, twenty acres of no-till corn, thirty acres of alfalfa, twenty acres of red clover-grass hay, fifteen acres of grass hay and the balance in pasture. The small grain on the cultivated acreage was cut for silage.

The beef herd now consists of sixty crossbred cows, all with a percentage of Holstein genes. Half of the cows calve in the spring and half calve in the fall. The decision to split the herd was to take advantage of the bull power, to spread out marketing, and to better utilize facilities. Replacement heifers are selected from the calf crop.

The Pendleton County Beef Cattle Association was organized in 1986. Les Herbst was chosen as one of the first directors. He was elected President of the Association and is now serving his third year. Under his leadership, the Association has held three beef heifer replacement sales, two beef bull sales, conducted beef tours, round ups, and hosted the fall management meeting sponsored by the Kentucky Beef Cattle Association.

Nominated by Cooperative Extension Service, University of Kentucky

Jon C. Ferguson
Ferguson Brothers Inc.,
Kensington, Kansas

Jon Ferguson is committed to ranching and farming both as a family business and lifestyle. Ferguson Brothers, Inc. is home to roughly 700 cows and 8000 acres of range and cultivated land.

Beef cattle play an important part in the integrated resource management concept Jon so totally embraces. They play a vital role in the utilization of grassland and provide a way to utilize the various crop residues that many farm crops produce. Thus, he believes the profitability of Ferguson Brothers, Inc. is greatly affected by all aspects of beef cattle management. These aspects include genetic improvement, herd health practices, nutritional management and overall management programs aimed at reducing labor and machinery costs. Utilizing EPDs in sire selection, developing a cost-effective herd health program, instituting an extensive record-keeping system with the aid of a personal computer and a chute scale, rating and culling cows based on their productive efficiency and utilizing A.I. are among the measures Jon has undertaken in order to improve profitability. These measures have resulted in increased cowherd fertility, reduced calving periods and continuing improvement in weaning and yearling weights.

Furthering research and development in all aspects of beef production is one of Jon's reasons for being active in the Kansas Livestock Association. Jon is currently serving as Vice-Chairman of the Cow-Calf/Stocker Council of KLA and also serves on KLA's Grazing Research Advisory Committee. He is also involved in community activities such as serving on the County Fair Board.

Nominated by Kansas Livestock Association

Mike and Diana Hopper
Double M Ranch
Stanfield, Oregon

Mike and Diane Hopper, Stanfield, Oregon, run 1250 commercial cows that have all been born on the ranch, and have been rigorously performance tested during the 15 years of operation. Fifteen years ago (1974) Mike established a commercial production system based on these Hereford cows and the principles of performance testing. Over the last 10 years weaning weights have increased 166 lbs.

All calves are retained on the ranch, run as stockers until they reach 800 to 900 lbs and then marketed directly to feedlots. The major change in performance has been that cattle are marketed at younger ages. The real measure of performance at the Double M Ranch is weight per day of age at sale time. Over the past seven years this measure has increased by .5 lbs per day of age.

In addition, through meticulous record keeping Mike and Diana have been able to increase calf crop percentage to 95% (a 6% increase over 7 years). They use modern technology as tools of this trade, i.e. AI, EPDs and computers. They consistently record performance data and use 205 day and yearling weights, pregnancy success, calving dates, mature weights, calving interval, and medical histories. Heifers are synchronized and bred AI in order to increase calving ease and provide calves with genetics to perform with other calves. Cows selected on performance are bred AI to genetically proven sires.

Mike provides leadership in a quiet yet effective manner and currently serves as Vice-chairman of the Oregon Beef Improvement organization. He served as a leader for the development of a software package for commercial cattlemen to emphasize those performance traits of economic importance. In addition, the Double M Ranch is frequently used as a showcase of genetic principles by the University and local producer groups.

Nominated by Oregon Cattlemen's Association

James McKinlay
Silver Spring Farms
Ravenna, Ontario

James McKinlay was raised on a mixed farm in Grey County. With his wife, Joan, and father, Francis, he operates a 75 cow purebred and commercial Simmental herd and produces cash crops of seed grain, canola, wheat, hay and forage seeds on arable acres.

James' love of farming found him renting land while in high school, college and university. Land rental and developing a cow herd gradually has allowed James to follow his philosophy of "pay as you go'.

At Silver Springs Simmentals, the goal has been set to supply the commercial market with high performing, easy fleshing, useful breeding stock. The early adoption and use of EPDs has greatly aided in the selection of genetically superior animals. A vigorous selection and culling program based on performance records has greatly improved the genetic base and performance of the herd. Calves not used for replacements are finished on farm so selection for carcass quality and ease of fleshing is also important. This has produced very efficient functional cattle for the commercial cattleman.

James has served his agricultural community extensively through a wide variety of groups and associations. He was founding President of the Grey County Beef Improvement Club, a producer run organization responsible for weighing 500 herds and offering educational programs. He is currently vice-chairman of South Western Ontario Cow-Calf Association. He has served as past president of Grey County Soil and Crop Improvement Association and the Grey County 4-H Leaders Association and spokesman for the Ontario 4-H Leaders' Committee.

James is recognized as an interesting and informative speaker and freely gives of his time to participate in many educational programs locally and provincially. Serving the community is also an important part of his life. His commitment and involvement in the 4-H program allowed him to influence a great many young lives. He was chairman of the Advisory Board for Centralia College and a member of the Youth Activities Committee of the Royal Agricultural Winter Fair. He is an active member of the Grace United Church and an instigator of many community events. He serves as vice-chairman of the Grey County Land Stewardship Committee and was recently appointed to "The Rural Leadership in the 90s " committee.

James philosophy "of the more one gives to life, the more you get out of life" is obvious in his day-to-day life.

Nominated by Ontario Beef Cattle Performance Association

Gilbert Meyer
Meyer Stock Farm
Tripp South Dakota

Gilbert Meyer of Tripp, South Dakota has been involved in farming and cattle operations for the past 35 years. The cattle operation consists of 120 Angus and Maine cross cows with approximately 115 stock cattle handled annually.

Artificial insemination was introduced in 1974. Currently, 805 of the cow herd are artificially inseminated to Chianina sires. Sires are selected based on calving ease, disposition and growth performance. Selection criteria for the cows include MPPA records, fertility and disposition.

The use of performance records have increased calf crop weaning by 10%, weaning weights by 125 pounds and yearling weights by 350 pounds. Herd performance records have been processed thorough the South Dakota Beef Cattle Improvement Association for the past 16 years.

In 1989, Gilbert Meyer was declared the Commercial Producer of the Year by the South Dakota Beef Cattle Improvement Association.

Gilbert Meyer has been an active supporter of 4-H and numerous agricultural and community organizations that include: Tripp county Crop and Livestock Improvement Association, Farmers Union and Turner-Hutchison Electric Corp; school Board and the United Church of Christ.

Nominated by South Dakota Beef Improvement Association

DuWayne Olson
Olson Ranch
Macintosh, South Dakota

The Olson Ranch is located in Sioux county North Dakota, and has been in the commercial cattle business for 54 years. The ranch consists of 200 Red Angus X Saler brood cows which are pastured on 5500 acres of primarily native rangeland where 30 acres are needed per animal unit. A six pasture rotation grazing system is used from May to December and is altered from year to year so pastures are idle at different times each grazing season.

Performance records obtained from the North Dakota Beef Cattle Improvement Association are used extensively in managing the cow/calf enterprise. The Olson ranch has been performance testing since 1964 and the NDBCIA has processed their records since 1972. Early reproductive selection based on a short calving season is the key factor for DuWayne's consistent reproductive performance. Through years of performance testing, DuWayne has consistently produced calves with greater than 600 pound adjusted 205 day weights. This is achieved by maximizing weight per day of age (3.09 pounds) within a minimum calf production time (188 days). The performance records are strictly adhered to when selecting replacement heifers, herd sires and during culling. The Olson ranch produces brood cows which are of moderate size, milk very well and are of breed combinations which maximize hybrid vigour and fertility. DuWayne's understanding and application of performance data has produced a herd which has consistently excelled in both reproductive and growth traits.

Nominated by North Dakota Beef Cattle Improvement Association

Raymond R. Peugh
D R Simmentals
Sterling, Illinois

Ray Peugh of Sterling, Illinois currently runs approximately 75 commercial cows and farms 329 acres of row crops and hay, plus additional rented acres for pasture. He started his cow herd in 1970 with 5 cows and has expanded to his current 75 cows in partnership with his brother-in-law David Ricklefs.

The herd has been built using polled Simmental bulls, with about one-third of the herd being bred using artificial insemination. The cows have been selected for growth while moderating frame size and minimizing dystocia. Bulls are selected from area Bull Test Stations.

The performance programs have resulted in increases in weaning weights while expanding cow numbers. From 1981 to 1987 the average 205 day weight increased from 544 pounds to 593 pounds. The last two years the weaning weights have levelled off due to drought conditions. In addition, the calves have proven that they can make post-weaning gains of 4 pounds per day in the feedlot. The calves have demonstrated exceptional gains in the feedlot while maintaining average frame score at approximately 6.0. Peugh's calves are so in demand by local cattle feeders that they are sold on the farm by sealed bids. Reproduction efficiency has also been emphasized with the result being at least a 100% calf crop over the last 4 years.

Ray Peugh is a meticulous manager in both his cow-calf and cropping operation. His strict attention to detail has resulted in an excellent reputation in the agricultural community. He is also a leader in the community and was awarded the 1981 Goodyear Conservation Award and the 1989 Illinois Outstanding Commercial Producer Award.

Nominated by the University of Illinois

Lewis T. Pratt
Pratt Farms
Draper, Virginia

Lewis Pratt has been farming since he graduated from Virginia Tech in 1972. He started farming with his mother, Beth Pratt, and has gradually taken over the ownership and the management of Pratt Farms.

Pratt Farms consists of 3,400 acres, of which 420 acres are owned and the balance is rented. The land is utilized as a cattle grazing operation with hay and corn silage produced for supplemental feed. The cattle program is both a commercial cow/calf and feeder/stocker operation. The labour force consists of Lewis, one full-time employee, and Beth Pratt as record keeper.

The cow herd consists of 325 head of predominantly Angus cows with a few Charolais and Black/White face. All calves produced are retained on the farm and are joined with purchased feeder calves in a stocker operation. The stocker program consists of approximately 700 head fed hay and silage in a growing ration and are marketed as nine hundred weight cattle through tel-o-auction field sales.

Performance tested bulls, both from central test stations and on-farm tested herds are utilized exclusively in the cow herd. Breed sire summary data and individual bull performance records are utilized in the selection process for specific uses. The main yard stick of measure for the Pratt Farm operation is yearling weight.

The past several years, the calf crop percentage has averaged 95%. Weaning and yearling weight have increased each year as a result of the selection information available on performance tested bulls and female productivity selection.

Aside form farming, Lewis enjoys a quality family life with his wife Jackie and son Andy. They are members of the Draper Valley Presbyterian Church. Lewis has served as a Board of Director of the Dublin Feeder Cattle Association, the Farm Bureaus, and Southern States Cooperative.

Nominated by Virginia Beef Cattle Improvement Association

Ken and Wendy Sweetland
Lundar, Manitoba

Ken and Wendy Sweetland of Lundar, Manitoba have been in the cattle business for 11 years. They have been performance testing for 9 of those 11 years.

Presently, they own 110 cows, 4 bulls and 18 heifers. Their crossbred cows include Charolais, Limousin, Simmental, Hereford, Angus and Shorthorn. Charolais, Limousin and Simmental sires have been used. Presently they are introducing the Saler breed to the herd to: 1) improve an approximately 17% birth assistance rate; 2) lower birth weights; and 3) increase the winter hardiness for the herd.

The Sweetlands credit performance testing for their increased calf weaning weights (from 515 pounds on 58 head in 1981 to 585 pounds on 99 head in 1989). Yearling weights have increased similarly. They also credit an approximately 95% live birth rate at least partially to selecting females for calving ease. They have been able to sell breeding females to other herds. Their females have been recognized in the Ahsern-Lundar Ag. Rep. Districts at the 4-h level in the past two years.

The Sweetlands try to select bulls with above average performance when purchasing from test stations, consult the National Sire Monitoring Program (NSMP) when selecting AI and PPP sires and look for ROP records when purchasing breeding stock privately. They are committed to raising their own replacement females. They choose from their higher producing cows, using the ROP cow certificates to differentiate those who consistently raise better than average calves.

Nominated by Manitoba Beef Cattle Performance Assocation

Swen R. Swenson Cattle Company
SMS Ranch
Stamford Texas

Swen R. Swenson Cattle Company's ranch operation is composed of approximately 53,000 acres of land, located in the Texas Rolling Plains, which was originally established as Swenson Brothers in 1882 by E.P. and S.A. Swenson under the direction of their father, S.M. Swenson. The properties have been operated under the ownership of the Swenson family since its establishment.

The ranches were initially stocked with native Longhorn Cattle. Purebred Hereford bulls were introduced to upgrade the native stock, and selective breeding continued throughout the early years to produce an entire herd of purebred Herefords.

As a result of implementing the Angus breed in a controlled cross-breeding program in 1970, the cow-herds now consist of purebred Herefords and Angus X Herefords. A terminal cross, using Charolais bulls, is used on the Angus X Hereford to produce feeder calves and yearlings.

In addition to the ranch operation, Swenson Meats, Inc. was established in 1986 to process company cattle and market a branded beef product "SMS Ranch Beef".

Gary W. Mathis, located at Stamford, Texas serves as President and General Manager of both operations.

Nominated by American International Charolais Association

SOUTH DAKOTA RANCHER NAMED SEEDSTOCK PRODUCER OF THE YEAR

South Dakota Angus rancher Douglas Hoff recently received a national Beef Improvement Federation (BIF) Seedstock Producer of the Year award at the BIF Convention in Hamilton, Ontario, Canada.

Charles McPeake, Oklahoma State University Extension beef cattle specialist and executive director of BIF, explained Hoff received one of two Producer of the Year awards presented to cattlemen who have made outstanding contributions to herd improvement.

Hoff, owner of the Scotch Cap Angus Ranch in Bison, SD, and his wife Molly currently run 250 head of seedstock Angus breeding cows.

Modern science is used extensively on the Scotch Cap Ranch where 100 percent of the seedstock cows are bred by artificial insemination and 10 percent of the cows are used in embryo transplant.

Hoff believes selecting quality seedstock cattle requires examining performance records that contain individual ratings, dam summaries and pelvic and scrotal measurements.

"The Angus breed has an extremely progressive program. We use their Estimated Progeny Differences (EPDs) and all available performance information when selecting sires," says Hoff.

When selecting replacement females, total reproductive efficiency is one of Hoff's main priorities. Calving intervals, pelvic measurements, weaning and yearling EPDs, structural scores and maternal, birth and milk EPDs are all evaluated.

"Our emphasis is changing from 205 and 365 day weights to reproductive efficiency and edible lean per day of age," says Hoff.

Recording carcass data on all herd bulls is important to Hoff, who is striving to produce genetic lines that will be competitive with pork and poultry on an efficiency basis.

Birth weights on the Scotch Cap Ranch have increased by 12 pounds in the last 20 years, with weaning weights up 200 pounds and yearling weights up 400 pounds.

"Our sale average went from $400 in 1965 to $4,139 in 1989 on 100 yearling bulls, which was one of the best sales in breed history," says Hoff.

Semen sales also have increased, according to Hoff. In fact, more semen was sold from Scotch Cap bulls in 1989 than from any other Angus herd. He attributes much of the success to performance testing.

"It's the best and only yardstick of measurement we have to measure the efficiency of beef production" says Hoff.

Hoff provides prospective buyers with all EPDs, dam summaries, actual and adjusted weaning and yearling weights, actual birth weights, weaning and yearling ratios, as well as pelvic and scrotal measurements.

Young bulls on Hoff's program are weighed at birth and at weaning, when they are put directly on all-roughage ration. Calves are then gradually started on grain up to one percent of their body weight. Pelvic and scrotal measurements are taken after 140 days when the feed tests are completed.

The success of Hoff is further reflected in the 15 Hoff-bred bulls currently involved in various National Sire Evaluation programs. In 1988, both the top rated non parent bull at yearling weight and the top rated non parent female were from Hoff-bred bulls.

Hoff is the recipient of numerous other agriculture related awards, including the South Dakota BIF Seedstock Award, South Dakota Outstanding Young Farmer and the Ralston-Purina Youth of the Year.

Pictured left to right: Jack Chase; Doug, Molly and Andrea Hoff

OREGON RANCHERS HONORED AS BIF 1990 COMMERCIAL CATTLE PRODUCER OF THE YEAR

Cattle producers Mike and Diana Hopper of Stanfield, Oregon, stepped forward as the best of the best at the 1990 Beef Improvement Federation (BIF) annual meeting May 23-27 at Hamilton, Ontario, Canada.

The Hoppers were presented the BIF Commercial Producer of the Year Award for their use of performance records and genetic improvement techniques as tools to enhance the profitability of a cow herd, according to Charles McPeake, Oklahoma State University Extension beef cattle specialist and executive director of BIF.

In 1974, the Hoppers established a commercial production system based on his parents' purebred Hereford operation and the principles of performance testing. They currently run 1,250 commercial cows that are all born on the ranch, and have gone to a crossbreeding program using Simmental, Angus, Salers and Red Angus on the Hereford cow base.

"Artificial insemination, expected progeny differences and computer programs all play a large role in the economic success of the Hopper's Double M Ranch," said McPeake. "Over the past 10 years, weaning weights have increased 166 pounds and calf crop percentage has increased to 95 percent."

Pictured left to right: Mike Hopper, Diana Hopper and Jack Chase

All calves are retained on the ranch and run as stockers until they reach 800 to 900 pounds, when they are marketed directly to feedlots. The major change in performance over the years has been that Hopper cattle have been marketed at younger and younger ages.

"The real measure of performance at the Double M Ranch is weight per day of age at sale time." said McPeake. "Over the past seven years, this measure has increased by 0.5 pounds per day of age."

Each year, the Hoppers cull five percent of their cows, relying on performance records to determine which animals to keep and which to cull. All open cows and cows with low weaning weights are culled.

Regardless of breed, AI sires are selected for moderate calving ease and high EPDs for growth and milk. Natural service sires are all performance tested and selected from the top five to 10 percent of sires from available seedstock producers.

The Hoppers have been so successful that producers and university officials from around the region continually request to use the Double M Ranch as a tour example of a successful cattle operation, according to Frank Hendrix, Washington State University Livestock Extension agent.

DR. J.W. WILTON WINS 1990 BIF PIONEER AWARD

Dr. J.W. "Jim" Wilton, professor of animal breeding at the University of Guelph, Guelph, Ontario is winner of the Pioneer Cattle Award from the Beef Improvement Federation (BIF). The award was presented during the BIF Annual meeting in Hamilton, Ontario May 23 to 27.

Wilton, who has been a professor at the University of Guelph for some 20 years is widely regarded as the premier contributor to beef cattle performance records in Canada. His contributions came through his personal involvement with performance records associations, and the training of graduate students who through their work have positively influenced performance record work in Canada.

A long time member of the Ontario Beef Cattle Performance Association, Wilton has served as a member and chairman of the Technical Advisory committee of the National Advisory Board, and was instrumental in developing the Canadian Beef Sire Monitoring program. He has conducted numerous research projects that have contributed to the genetic improvement of beef cattle. His work has been published widely, and he has made numerous presentations before cattle audiences. He has also served as a consultant and speaker to international organizations in France, Japan, West Germany and Spain.

A 1960 graduate of the University of Manitoba, Wilton earned his masters degree from the University of Toronto and his Phd from Cornell University.

Jim Wilton receives the Pioneer Award from Paola de Rose

DONN AND SYLVIA MITCHELL HONOURED WITH BIF PIONEER AWARD

Donn and Sylvia Mitchell, owners of Klondike Farms, Douglas, Manitoba, were presented the Pioneer Award by the Beef Improvement Federation (BIF) at their 1990 Annual Meeting in Hamilton, Ontario May 23-27.

The Mitchells were honoured for their pioneering work in the applied agricultural field of beef cattle breeding. The Polled Hereford herd developed by them is internationally recognized for performance and quality. Their herd was a joint recipient of the Canadian Beef Cattle Performance Award in 1987, and Donn Mitchell was the first president and founder of the Manitoba Beef Cattle Performance Association and the Douglas Bull Test Station in 1963.

The Mitchells own and manage Klondike Farms Ltd., an 8,400 acre diversified farming operation with 3,200 acres of grain and oilseed, 1,000 acres of hay and the balance native pasture. The registered Polled Hereford herd numbers some 260 cows and replacement females. Donn was a partner in Shilo Farms a 4,600 -acre farming operation, until 1987 and was one of five founding partners in Bar 5 Simmental Breeders Ltd., an internationally respected importing and breeding operation.

Klondike cattle are enrolled in performance testing programs at the ranch and at test stations. The herd was one of the original herds to enroll in the ROP program in 1956.

Donn Mitchell received the BIF Award of Excellence in 1988 as a seedstock producer, was made an honourary life member of the Agricultural Institute of Canada in 1981, and was named to the Canadian Hereford Honour Roll in 1982.

Klondike cattle have been exported to the United States, Argentina, Brazil and South Africa.

Pictured during the presentation of the Pioneer Award are: Don and Sylvia Mitchell; Jack Chase and Keith Coates

DR. HOON SONG HONOURED WITH 1990 BIF PIONEER AWARD

Dr. Hoon Song, a beef cattle geneticist with Agriculture Canada in Ottawa, was awarded the Pioneer Award from the Beef Improvement Federation (BIF) at the organization's annual meeting May 23 to 27 in Hamilton, Ontario. Song was honoured by the international organization for his pioneering work in Canada's Beef Sire Evaluation Program (BSEP).

A native of Kai-sung, South Korea, Song joined Agriculture Canada in 1982, and did the majority of the developmental work on the Beef Sire Evaluation Program. This included revising the program from a sire to an animal model program, and performing all production runs of the sire evaluation program.

The program provides semi-annual evaluations for 14 breeds in Canada. It evaluates calving ease, weaning gain and yearling gain, using an individual animal multiple trait model. Song has also programmed micro-computer modules to produce across herd EPDs for beef cows and calves, and within-flock EPDs for sheep.

Song earned his B.S. degree in animal husbandry at Kunkuk University in Seoul, South Korea. He completed a Masters of Science at Northwest Missouri State University, Maryville, and completed his PhD at South Dakota State University in Brookings.

In 1976 Song moved to the University of Guelph, Ontario to work with Dr. Jim Wilton, another 1990 recipient of the BIF Pioneer Award. In 1982, he joined Agriculture Canada and since that time has been closely associated with BSEP.

In his nomination memorandum, Dr. J. Chesnais, chief and senior geneticist of the Genetic Evaluation Section of Agriculture Canada had this to say about the honoree, " Through [his] pioneering work Dr. Song has had a considerable impact on the development and application of genetic evaluation methods in Canada ... he carried out single-handedly the research, development, computer programming and operation of the new programs. This was only possible through his exemplary dedication to his work ...".

Hoon Song receives the Pioneer Award from Jack Chase and Bruce Howard

ROBERT C. DE BACA HONOURED WITH BIF AMBASSADOR AWARD

Robert C. de Baca, Huxley, Iowa, was presented with the Beef Improvement Federation (BIF) Ambassador Award at the organization's Annual Meeting May 23-27 in Hamilton, Ontario. The award was presented in recognition of his years of service to the beef cattle industry, as editor and publisher of Ideal Beef Memo for nine years and for his contribution to the history of performance records as author of the book, Courageous Cattlemen.

A native of New Mexico, de Baca is a graduate of New Mexico State University. He earned his M.S. and PhD degrees at Oregon State University, and was on the faculty of Iowa State University for 14 years as a professor of Animal Science and Extension Livestock Specialist.

At Iowa State he developed on-farm performance testing, the Iowa Beef Improvement Association, central bull tests, interstate feeder cattle performance evaluations, and feedlot business analyses for cattle feeders and swine performance testing programs. One year alone more than 10,000 feeder cattle were weighed individually, bi-monthly in 88 counties. For nine years he was editor and publisher of the semi-technical newspaper, The Ideal Beef Memo, that featured and promoted the beef cattle performance concept. He is also author of Courageous Cattlemen, a book that combines genetics, history, personalities, conflict and philosophies in the beef industry during the 20th Century.

He is co-owner and president of a professional cattle management company, managing retained ownership feedlot operations as well as purebred and commercial cowherds for clients and for 20 years has been a producer of purebred and commercial cattle.

The organizer of some 150 stockmen's educational meetings annually, de Baca has been a conference speaker in 40 states and 13 foreign countries. With counterparts he initiated the first cattle and swine performance programs in Latin America.

Pictured left to right: Jack Chase, Bob de Baca; and Mary de Baca

ROBERT DICKINSON PRESENTED CONTINUING SERVICE AWARD BY BEEF IMPROVEMENT FEDERATION

Robert Dickinson, a Paradise, Kansas, registered Simmental breeder, was presented with the Beef Improvement Federation (BIF) Continuing Service Award at the organization's annual meeting May 23-27 in Hamilton, Ontario. The award is presented annually to a cattle producer who has given outstanding service to the beef cattle industry and performance evaluation.

A past president of the Beef Improvement Federation, and a long time supporter of the organization and performance testing, Dickinson is also past president of the American Simmental Association and the Kansas Simmental Association. He also served these three organizations in numerous other capacities, and has been a long time supporter of the Kansas Bull Test Stations at Beolit and Colby, and served on both test stations' boards of directors.

Born in Ellis County he attended Paradise, Kansas, schools and received a B.S. degree from Kansas State University in Manhattan. He began his farming and ranching career while still in college and went into the business full time upon graduation in 1956.

He joined the American Simmental Association in 1969 and received the World Federation Award from the ASA in 1988.

His cattle breeding skills are widely respected. He has served on his count conservation board, received the Good Year Certificate of Merit Award for good conservation practices in 1968, 1969, and 1983 and won the Soil Conservationist of the Year Award.

Pictured left to right: Jan Dickinson, Bob Dickinson and Jack Chase

1990 BEEF IMPROVEMENT FEDERATION BOARD OF DIRECTORS

Front row: Glynn Debter, Charles McPeake, Jim Leachman, Paola de Rose, Jack Chase, Frank Baker

Middle row: Leonard Wulf, Paul Bennett, Keith Vander Velde, Doug Hixon, Don Boggs, Steve McGill, Loren Jackson

Back row: Jim Gibb, Glenn Brinkman, Wayne Vanderwert, Larry Cundiff, Bob Dickinson, Ron Bolze, Bruce Cunningham, Marvin Nichols

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