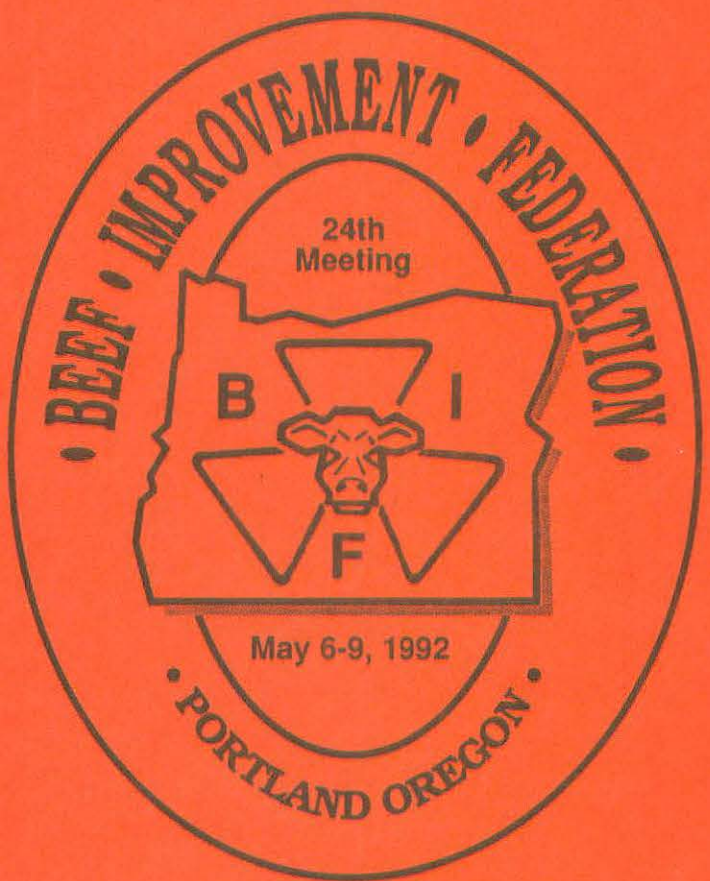
PROCEEDINGS

BEEF IMPROVEMENT FEDERATION

RESEARCH SYMPOSIUM & ANNUAL MEETING



1992 BEEF IMPROVEMENT FEDERATION BOARD OF DIRECTORS

NAME	1992 YEAR TERM	REPRESENTING
Paul Bennett	1994	Eastern BCIA
Glenn Brinkman	1992	Central BCIA
Jack Chase	1992	Western BCIA
John Crouch	1994	Breed Association
Bruce Cunningham	1994	Breed Association
Glynn Debter	1992	Eastern BCIA
Jim Gibb	1993	Breed Association
Loren Jackson	1994	Breed Association
Gary Johnson	1994	Central BCIA
James Leachman	1993	Western BCIA
Craig Ludwig	1994	Breed Association
Steve McGill	1992	Breed Association
Marvin Nichols	1993	At-Large
Leonard Wulf	1992	At-Large
Frank Baker	Original	
Don Boggs	Central Region BIF Secretary	
Ron Bolze	Eastern Region BIF Secretary	
Larry Cundiff	USDA ARS	
Paola de Rose	Agriculture Canada	
Doug Hixon	Western Region BIF Secretary	
Charles McPeake	Executive Director	
Ronnie Silcox	Eastern Region BIF Secretary	
Norman Vincel	NAAB	
Gary Weber	USDA - Extension	
Darrell Wilkes	NCA	

1992 BEEF IMPROVEMENT FEDERATION CONFERENCE
Red Lion/Jantzen Beach, Portland, Oregon
May 6-9, 1992

WEDNESDAY, MAY 6

1:00-6:30 PM	Registration
1:00 PM	Board of Director's Meeting
6:00-10:00 PM	"Oregon Sternwheeler" (Ticket Required)

THURSDAY, MAY 7

7:00 AM-6:00 PM	Registration
	SYMPOSIUM: GAINING THE COMPETITIVE EDGE Coordinator: Don Boggs - SDSU
8:00 AM	**Welcome** - Lynn Lundquist President Oregon Cattlemen's Association
8:15 AM	**The Beef Quality Audit - Laying the Foundation** ♦ Gary Smith Colorado State University Fort Collins, CO
8:45 AM	**C.A.R.D.S - A First Step Toward Value-Based Marketing** ♦ Jeff Savell Texas A&M University College Station, TX
9:15 AM	**Lowering the Bottom Line with Integrated Resource Management** ♦ Larry Corah Kansas State Univ. Manhattan, KS
10:00 AM	**BREAK**
10:15 AM	**What Value-Based Marketing and Integrated Resource Management Means to My Ranch Program** -Panel Discussion- ♦ Jim McAdams, Chairman, National IRM Coordinating Committee McAdams Cattle Company Huntsville, TX ♦ Ron Baker, C&B Livestock Hermiston, OR ♦ Pat "Doc" and Connie Hatfield High Desert Ranch, Brothers, OR ♦ Bob Lundgren, DVM, Lundgren Inc. Pasco, WA
11:45 AM	Caucus and Election of Officers
NOON	Luncheon - (Ticket Required)

Thursday May 7, 1992

1:30-5:00 PM **COMMITTEE MEETINGS**

CENTRAL TEST & GROWTH COMMITTEE
Ron Bolze, Chairman

ROLE OF BIF CENTRAL TEST COMMITTEE
- ♦ Ron Bolze, Kansas State Univ.

CHALLENGES WITH CURRENT CENTRAL TEST STRUCTURE
- ♦ Ronnie Silcox, Univ. Of Georgia

CHANGING TIMES - DO THEY REQUIRE CHANGES IN CENTRAL BULL TEST?
- ♦ Wayne Wagner, West Virginia Univ.

ZEROING IN ON BREED AVERAGE EPD'S
- ♦ Don Boggs, South Dakota State Univ.

SYSTEMS COMMITTEE
Jim Gibb, Chairman

SUB-COMMITTEE RECOMMENDATIONS FOR COW HERD REPRODUCTIVE TRAITS
- ♦ Kris Ringwall, North Dakota State Univ.
- ♦ Daryl Strohbehn, Iowa State Univ.
- ♦ Danny Simms, Kansas State Univ.

SPA FOR SEEDSTOCK PRODUCERS
- ♦ Don Boggs, South Dakota State Univ.

ECONOMIC VALUE OF TRAITS... A COMPUTER SIMULATION UPDATE
- ♦ Charles Gaskins, Washington State Univ.
- ♦ Tom Jenkins, RLHUSMARC, Clay Center, NE
- ♦ Rick Bourdon, Colorado State University

ECONOMIC TRADEOFFS OF MARBLING VS CUTABILITY
- ♦ Tom Brink, Cattle-Fax

GENETIC PREDICTION COMMITTEE
L. V. Cundiff, Chairman

EDITS AND PARAMETERS IN EPD ANALYSIS
- ♦ Keith Bertrand, University of Georgia
- ♦ Paola deRose, Agriculture Canada
- ♦ Bruce Golden, Colorado State University
- ♦ Richard Quaas, Cornell University

INTERBREED COMPARISONS - BREED MEANS TABLES
- ♦ L. V. Cundiff, MARC, Clay Center, NE

CHAPS DATA STORAGE SYSTEM
- ♦ Kris Ringwall, North Dakota State Univ.

- CONVENE EXECUTIVE SUB-COMMITTEE -

6:00 PM **Social Hour (Cash Bar)**

7:00 PM **Awards Banquet (Ticket Required)**
Featuring: Jon Bowerman, Cowboy Poet, Fossil, OR

FRIDAY, MAY 8

7:30 AM - 9:00 AM	**Breakfast (Ticket Required)**
8:00 AM - 5:00 PM	**Registration**
	SYMPOSIUM: GENETIC DIRECTION - PERFORMANCE IN PRODUCTION Coordinator: Bill Zollinger, Oregon State Univ.
9:00 AM	**Correlated Selection Responses** ♦ John Hough, American Polled Hereford Assn.
9:30 AM	**Tradeoffs in Prioritizing Trait Selection** ♦ Rick Bourdon, Colorado State Univ.
10:00 AM	**EPD'S and other Genetic Predictors... How We Decide What Is Right for Us** ♦ Panel: Jim Gibb, Moderator Gary Johnson, Dwight, KS Paul Bennett, Red House, VA John Bruner, Winifred, SD Bill Brockett, Haymarket, VA
11:30 AM	**BIF'S Modernized Mission** ♦ Jim Leachman, BIF President Billings, MT
12:00 Noon	**LUNCH (On your own)**
1:30-4:30 PM	**COMMITTEE MEETINGS**

LIVE ANIMAL AND CARCASS EVALUATION COMMITTEE
John Crouch, Chairman

REVISED RECOMMENDATIONS FOR ULTRASOUND CERTIFICATION
♦ Ronnie D. Green, Texas Tech University

NCA CATTLEMEN'S CARCASS DATA SERVICE
♦ John Stowell, National Cattlemen's Assoc.

REPRODUCTION COMMITTEE
Bruce Cunningham, Chairman

GROWTH OF SCROTAL CIRCUMFERENCE IN BEEF BULLS

GENETICS OF CALVING DIFFICULTY

5:00 PM	Depart - Columbia River Basin Tour* Ticket guaranteed for pre-registered participants

SATURDAY, MAY 9

8:00 AM	Continue Columbia River Basin Tour

TABLE OF CONTENTS

GENETIC PREDICTION COMMITTEE

SYMPOSIUM: GENETIC DIRECTION - PERFORMANCE IN PRODUCTION

LIVE ANIMAL AND CARCASS EVALUATION COMMITTEE

REPRODUCTION COMMITTEE

THE BEEF QUALITY AUDIT -- LAYING THE FOUNDATION

GARY C. SMITH
Colorado State University

EXECUTIVE SUMMARY

The Goal of the National Beef Quality Audit--1991 was "to conduct a quality audit of slaughter steers/heifers (their carcasses, cuts and dress-off/offal items) for the U.S. beef industry in 1991, establishing baselines for present quality shortfalls and identifying targets for desired quality levels by the year 2001."

The National Beef Quality Audit--1991 consisted of three Phases. Phase I consisted of the Face-to-Face Interviews, Phase II was comprised of Slaughter-Floor and Cooler Audits in 28 beef packing plants, and Phase III was a Strategy Workshop.

Phase I: More than 100 persons were questioned by the Interview Team to identify quality problems, defects, shortcomings or shortfalls with slaughter steers/heifers, their edible/inedible offal, their carcasses, their wholesale/retail cuts and the processed beef made from their trimmings. Beef was found, by both FDA and USDA, to be very safe in terms of residues of pesticides, hormones and antibiotics. There are food-borne pathogens on some beef, but efforts to reduce numbers/incidence of those microbes, by packers and USDA-FSIS personnel, are succeeding; public-education programs directed toward end-use preparers of beef will minimize impact of those microbes on ultimate consumers of beef. In general, those interviewed found greatest fault with beef's inconsistency, fatness, palatability and price.

In Face-to-Face Interviews with supermarket meat-management *personnel* ("retailers"), the top ten Concerns About The "Quality" Of Beef were: (1) **Excessive External Fat**, (2) **Excessive Weights/Box**, (3) **Too High Incidence of Injection-Site Blemishes**, (4) **Excessive Seam Fat**, (5) **Low Overall Cutability**, (6) **Low Overall Uniformity**, (7) **Inadequate Tenderness**, (8) **Too Frequent Bruise Damage**, (9) **Too Many Dark Cutters**, and (10) **Too Large Ribeyes/Loineyes**.

In Face-to-Face Interviews with those who wholesale beef to the food-service industry ("purveyors"), the top ten Concerns About The "Quality" Of Beef were: (1) **Excessive External Fat**, (2) **Too High Incidence of Injection-Site Blemishes**, (3) **Too Large Ribeyes/Loineyes**, (4) **Too Frequent Bruise Damage**, (5) **Excessive Seam Fat**, (6) **Low Overall Uniformity**, (7) **Too Many Dark Cutters**, (8) **Low Overall Cutability**, (9) **Low Overall Palatability**, and (10) **Low Overall Appearance**.

In Face-to-Face Interviews with those who purchase, prepare and present beef to customers in hotels, restaurants, institutions, fast-food franchises, etc. ("restaurateurs"), the top ten Concerns About The "Quality" Of Beef were: (1) **Excessive External Fat**, (2) **Too High Incidence of Injection-Site Blemishes**, (3) **Excessive Seam Fat**, (4) **Too Large Ribeyes/Loineyes**, (5) **Insufficient Marbling**,

(6) **Low Overall Cutability**, (7) **Too Many Dark Cutters**, (8) **Inadequate Tenderness**, (9) **Inadequate Flavor**, and (10) **Low Overall Uniformity**.

In Face-to-Face Interviews with those who purchase live cattle and convert them into carcasses, edible offal and inedible offal ("packers"), the top ten Concerns About The "Quality" Of Beef were: (1) **Too Frequent Hide Problems, Caused By Brands, Insects, Parasites, and Mud/Feces/Urine**, (2) **Too High Incidence of Injection-Site Blemishes**, (3) **Excessive Carcass Weights**, (4) **Too Many Bruises**, (5) **Reduced Quality--Lower Marbling Scores, More Ossification of the Skeletal System, Elevated Incidence of Dark Cutters, Decreased Tenderness -- Due to Use of Implants**, (6) **Too Many Liver Condemnations**, (7) **Too Few U.S. Choice Carcasses**, (8) **Too Many Yield Grade 4 and 5 Carcasses**, (9) **Lack of Uniformity of Live Cattle and Carcasses**, and (10) **Too Many Dark Cutters**.

Based upon results of the Face-to-Face Interviews, estimates were made of Quality Losses Per Slaughter Steer/Heifer due to problems, defects, shortcomings and shortfalls. It was determined that the industry was losing $256.27 for every steer/heifer slaughtered in the U.S. during 1991.

It was not intended that the Face-to-Face Interviews Phase of the National Beef Quality Audit--1991 result in ultimate conclusions regarding Concerns About The "Quality" Of Beef or Quality Losses Per Slaughter Steer/Heifer. Phase III -- the Strategy Workshop -- was designed to use results of Phases I and II, to attain consensus on those two matters.

Phase II: The Federally Inspected Slaughter (FIS) of steers and heifers was surveyed during October, November and December 1991 in 28 packing plants chosen to approximate at least 70% of the FIS and to represent the geographic distribution of slaughter/dressing facilities in the U.S. From each lot of cattle in a given packing plant, 50% of the animals were evaluated for hide defects (N=32,365), viscera condemnation (N=37,925), head/tongue condemnation (N=30, 646) and bruises (N=31, 619). In addition, from each lot of cattle in a given packing plant, 10% of the carcasses were evaluated/measured for gender as well as USDA Quality and Yield Grade factors (N=7, 375) by the Packing-Plant Audit Team.

Slaughter-floor audits revealed the following: (a) Brand Incidence -- 55.0%, no brand; 29.9%, butt brand; 13.8%, side brand; 0.8% shoulder brand; 2.1%, multiple brands; (b) Brand Size -- 5.13 sq. in., 6.50 sq. in., and 0.19 sq. in., for butt, side and shoulder brands, respectively; (c) Presence of Horns -- 68.9%, polled or dehorned; 31.1%, horned; (d) Excessive Mud -- 6.8%, excessive mud; (e) Viscera Condemnations -- 19.24%, 5.07%, 3.49% and 0.07%, of livers, lungs, tripe and total viscera, respectively, were condemned by FSIS-USDA Meat Inspectors (abscesses accounted for 72.66%, 53.59% and 87.58%, respectively, of liver, lung and tripe condemnations); (f) Head/Tongue Condemnations -- 1.06% of the heads and 2.70% of the tongues were condemned by FSIS-USDA Meat Inspectors; (g) Pregnancies -- 0.93% of heifers contained a fetus; and (h) Bruises -- 16.8%, 15.7%, 25.5%, 2.3%, 0.0% and 0.3% of the chuck, rib, loin, round, brisket and other-cut areas, respectively, had at least "superficial" bruises.

Cooler audits revealed the following: (a) Gender -- 61.1%, steer; 37.8%, heifer; 1.1%, bullock; (b) Carcass Maturity -- 93.0%, A; 6.7%, B; 0.3%, C; (c) Marbling Score -- 0.3%, Practically Devoid; 5.9%, Traces; 36.5%, Slight; 37.2%, Small; 12.4%, Modest; 5.4%, Moderate; 1.8%, Slightly Abundant; 0.5%, Moderately Abundant; 0.2%, Abundant; (d) Dark Cutter Discounts -- 94.9%, none; 3.4%, one-third grade; 1.2%, two-thirds grade; 0.5%, one full grade; (e) Occurrence of Blood Splash in Ribeye -- 99.3%, no; 0.7%, yes; (f) USDA Quality Grade -- 2.3%, Prime; 52.7%, Choice; 36.9%, Select; 7.6%, Standard; 0.5%, Commercial/Utility/Cutter/Canner; (g) Carcass Weight -- 3.9%, less than 600 lb; 22.7%, 600 to 700 lb; 40.2%,700 to 800 lb; 26.3%, 800 to 900 lb; 6.9%, more than 900 lb; (h) Fat Thickness, Three-Quarter Measure, 12th/13th Rib -- 2.2% less than .20 in.; 18.0%, .20 to .39 in.; 32.6%, .40 to .59 in.; 27.5%, .60 to .79 in; 12.9%, .80 to .99 in.; 6.7%, more than 1.00 in.; (e) Ribeye Area, 12th/13th Rib -- 2.4%, less than 10.0 sq. in.; 7.5%, 10.0 to 10.9 sq. in.; 17.6%, 11.0 to 11.9 sq. in.; 25.8%, 12.0 to 12.9 sq. in.; 22.3%, 13.0 to 13.9 sq. in.; 14.1%, 14.0 to 14.9%; 6.5%, 15.0 to 15.9 sq. in.; 3.8% more than 16.0 sq. in.; (j) USDA Yield Grade -- 10.0%, Yield Grade 1; 33.9%, Yield Grade 2; 39.6%, Yield Grade 3; 13.6%, Yield Grade 4; 2.9%, Yield Grade 5.

Particularly striking was the contrast between results of an audit (The USDA Market Consist Report, 1974) conducted 17 years ago and those from the present audit (in 1991). During that period of time, there were: (a) decreases of .30 of a grade, in USDA Yield Grade; .03 in., in Fat Thickness, Three-Quarter Measure, 12th/13th Rib; .80 percentage points, in Kidney/Pelvic/Heart Fat; and, two-thirds of a score, in Marbling Score; (b) increases of 1.10 sq. in., in Ribeye Area, 12th/13th Rib; and, 81.20 lb., in Hot Carcass Weight; and (c) no change in Carcass Maturity Score and USDA Quality Grade. Recall that the battle cry in the War On Fat has been "Get Rid Of The Waste Fat -- Keep The Taste Fat," results of the contrast of the 1974 vs. 1991 audits and of USDA Quality Grade Consist Data (FY-87 through FY-91) suggest that the beef industry may be doing neither and, in fact, may have "Kept The Waste Fat -- But Lost The Taste Fat."

Phase III: At the start of the Strategy Workshop which was Phase III of the National Beef Quality Audit--1991, the 43 participants/guests were asked to complete a questionnaire. The questionnaire consisted of two parts: (a) There were 43 specific quality problems, defects, shortcomings or shortfalls that had been identified by purveyors, restaurateurs, retailers and/or packers -- to which each person was asked to assign a score from 10 ("severe problem") to 1 ("not a problem") based on his/her perception of severity of that defect as a problem in cattle, dress-off/offal items, carcasses and/or cuts; and (b) There was a question asking each person to list, in descending order, the five most serious quality problems, defects, shortcomings or shortfalls for present-day beef as compared to beef in the past and to other meat, poultry and fish items that are competitors to beef. Aggregated responses in terms of "Quality" Concerns from that exercise were as follows: (1) **Excessive External Fat**, (2) **Low Overall Uniformity of Beef**, (3) **Low Overall Uniformity of Live Cattle**, (4) **Excessive Seam Fat**, (5) **Price Too High**, (6) **Inadequate Understanding of the Value of Closer-Trimmed Beef**, (7) **Low Overall Cutability**, (8) **Low Overall Palatability**, (9) **Too Frequent Hide Problems**, (10) **Too High Incidence of Injection-Site Blemishes**, (11) **Insufficient Marbling**, (12) **Inadequate Tenderness**,

(13) **Inadequate Juiciness**, (14) **Perceived Unhealthfulness of Beef**, and (15) **Excessive Weights/Box.**

"Quality" Concerns were then discussed in a series of 32 presentations made by individuals selected to have unique expertise in the subject-matter assigned to them. Following completion of the 32 presentations, the same questionnaire as was used at the beginning of the Strategy Workshop was distributed, it was completed by all participants/guests and the results were compiled. Aggregated responses in terms of "Quality"Concerns from that exercise were as follows: (1) **Low Overall Uniformity of Beef**, (2) **Excessive External Fat**, (3) **Low Overall Uniformity of Live Cattle**, (4) **Price Too High**, (5) **Excessive Seam Fat**, (6) **Low Overall Palatability**, (7) **Inadequate Tenderness**, (8) **Low Overall Cutability**, (9) **Insufficient Marbling**, (10) **Too Frequent Hide Problems**, (11) **Too High Incidence of Injection-Site Blemishes**, (12) **Excessive Weights/Box**, (13) **Excessive Live/Carcass Weights**, (14) **Inadequate Understanding of the Value of Closer-Trimmed Beef**, and (15) **Too Large Ribeyes/Loineyes**.

The over-riding consensus that beef could be made more competitive in price with alternative protein-sources if it could be made more uniform and consistent, caused the participants/guests at the Strategy Workshop to reconfigure the form in which the aggregated "Quality" Concerns from the National Beef Quality Audit--1991 were summarized. As a result, "Low Overall Uniformity of Beef," "Low-Uniformity of Live Cattle," and "Price Too High" were extracted from the list of "Quality" Concerns and the inverse of those Concerns was made the desired outcome of attempts to improve the "Quality" of beef. It was agreed that the ultimate goal in capitalizing upon the knowledge gained from this endeavor would best be characterized as "Improving The Consistency and Competitiveness Of Beef" (A Blueprint for Total Quality Management In The Beef Industry). By increasing the uniformity, consistency and conformity of beef (i.e., reducing the cost of nonconformance -- now and forever), its price/quality/value relationships could be improved.

With improving the latter relationships as the overall objective of attempts to improve the "Quality " of beef, the specific objectives are: (1) Attack Waste -- by reducing excessive external fat, decreasing excessive seam fat, improving overall cutability and increasing understanding of the value of closer-trimmed product; (2) Enhance Taste -- by improving overall palatability, increasing tenderness and assuring sufficient marbling; (3) Improve Management -- by lessening occurrence of injection-site blemishes, decreasing hide problems (caused by brands, insects, parasites, and mud/feces/urine), improving implantation practices and protocols, decreasing bruises, reducing liver abscesses and lowering incidence of dark cutters; and (4) Control Weight -- by reducing excessive weights of live cattle and carcasses, lessening occurrence of excessive weights of beef in boxes and lowering incidence of ribeyes/ loineyes that are too large.

Two weeks prior to the Strategy Workshop, at least one participant was asked to conduct an independent economic assessment of the cost of each of the Quality Losses Per Steer/Heifer (for which a total loss of $256.27 had been assigned following the Face-to-Face Interview Phase of the NBQA--1991). Following discussion of each

of the values, consensus was achieved for individual components, and the total, of the economics of the Quality Losses Per Slaughter Steer/Heifer due to problems, defects, shortcomings and shortfalls. It was agreed-upon that the beef industry was losing $279.82 for every steer/heifer slaughtered in the U.S. during 1991.

Amounts lost associated with: (a) Waste (total = $219.25) were $111.99 for Excessive External Fat; $62.94 for Excessive Seam Fat, $14.85 for Fat In Excess of 20% In Beef Trimmings and $29.47 for Incorrect Muscling and Muscle:Bone (either too much or too little); (b) Taste (total = $28.81) were $2.89 for Inadequate Overall Palatability (especially Inadequate Tenderness), $21.68 for Insufficient Marbling (the extent to which the present consist of USDA Quality Grades fails to conform to the desired consist -- identified by participants/guests at the Strategy Workshop -- of 7% Prime, 24% Upper Two-Thirds of Choice, 40% Lower One-Third of Choice, 29% Select, 0% Standard and lower Grades), $3.80 for Maturity Problems (too young or too old at the time of slaughter) and $0.44 for Gender Problems (failure to castrate; pregnancies); (c) Management (total = $27.26) were $16.88 for Hide Defects, $1.35 for Carcass Pathology, $0.56 for Liver Pathology, $0.35 for Tongue Infection, $1.74 for Injection-Site Blemishes, $1.00 for Bruises, $5.00 for Dark Cutters and $0.38 for Grubs, Blood-Splash, Calluses, Yellow Fat; and (d) Weight (total = $4.50) were $4.50 for Carcasses Weighing Less Than 625 Or More Than 825 lb.

Participants/guests at the Strategy Workshop determined that the ten best Strategies for "Improving The Consistency and Competitiveness of Beef" were these: (1) Encourage Quarter-Inch As The New "Commodity" Fat-Trim Specification For Beef Primals/ Subprimals; (2) Change Live:Carcass Price Logic -- From Dressing Percentage (Untrimmed Carcass Weight ÷ Live Weight x 100) To Red Meat Yield (Weight Of Carcass Trimmed To Quarter-Inch Fat-Trim ÷ Live Weight x 100); (3) Keep The "Heat" On Communicating Cutability To Retailers And Packers By *Improving* Understanding Of The Value Of Closer-Trimmed Beef; (4) Go After, And Correct, Management Practices That Create Non-Conformity; (5) Eliminate Biological Types Of Cattle (Not Breeds per se) That Fail To Conform; (6) Institute Quality-Based Marketing; (7) Identify Outlier-Values (Ribeye, Too Large Or Too Small; Marbling Level, Too Low; Weight, Too Heavy Or Too Light; Etc.) For Carcass Traits To Facilitate Meeting Of Targeted Outcomes; (8) Design And Conduct The "Strategic Alliance Field-Studies" (Partnering Between Cow/Calf Producers, Feeders, Packers, Retailers And Purveyors As Demonstrations Of Functional Integration Based On Total Quality Management Principles -- A Proposal Approved In Principle By The NCA Industry Information Committee), (9) Use The National Beef Carcass Data Collection Program (Plus DNA Fingerprinting And Determination Of Shear Force Requirements) To Identify Superior Seedstock, and (10) Repeat The National Beef Quality Audit At Periodic Intervals To Assess Progress And Identify New Opportunities For Improvements In Consistency And Competitiveness Of Beef.

CARDS — A First Step Toward Value-Based Marketing[1]

J.W. Savell[2]
Department of Animal Science
Texas A&M University
College Station, TX 77843-2471

Introduction

Value-based marketing will be the beef industry's greatest focal point for the remainder of this century. Producers have been frustrated at the apparent lack of monetary differentiation among cattle with great variation in quality and carcass cutability. No specie seems to be immune from this problem: marketing cattle, sheep and hogs "on the average" is commonplace throughout the United States. What beef producers want is a true "value-based" marketing system where cattle are bought and sold on individual carcass merit. Carcass merit deals with evaluations of two different areas: (a) quality — marbling, maturity, etc. — and (b) cutability — total lean, fat and bone, or lean with some acceptable level of external fatness, along with trimmable fat and bone. Without market differentiation, no real incentives are given for producers to purchase "better" breeding stock, for feeders to sort animals to better meet slaughter endpoints or not to overfeed, for packers to trim boxed beef more closely rather than selling excess fat down the chain, and for retailers and purveyors to purchase products differently than in the past.

Value-based marketing became a buzz word in the late Eighties due to the efforts of the Value Based Marketing Task Force (1990). The beef industry found that something had to be done to ensure that value-based marketing was implemented in the near future. The Task Force was assembled under the combined auspices of the Beef Industry Council of the National Live Stock and Meat Board and the National Cattlemen's Association. Membership on the Task Force came from seed-stock and cow-calf producers, feeders, packers, purveyors and retailers. The Task Force met several times beginning in late 1989 and ending in mid 1990 to discuss problems with the current marketing system for beef and to arrive at an action plan for solving the problems associated with "average-based" marketing.

In its report (Value Based Marketing Task Force, 1990), the Task Force identified this clearly stated objective as its goal: "To improve production efficiency by reducing excess trimmable fat by 20% and increasing lean production by 6%, both by 1995, while maintaining the eating qualities of beef." The Task Force listed eight

---

[1] Presented at the Symposium, "Gaining the Competitive Edge," at the Beef Improvement Federation Annual Conference, Portland, Oregon, May 7, 1992. Appreciation is extended to the Cattlemen's Beef Promotion and Research Board for support of these research and industry information projects through the Beef Industry Council and the National Cattlemen's Foundation, respectively.

[2] Professor and Section Leader, Meat Science Section.

consensus points that serve as specific research areas or priorities to accomplish the stated objective of reducing excess trimmable fat and increasing lean production.

The Task Force recognized that the major problem facing the beef industry was that proper economic signals were not being sent along the beef distribution chain from consumer to producer. It is with this in mind that the first two consensus points were focussed clearly on the interface between the retailer and packer. These consensus points are addressed partly by the software package I was invited to discuss at this meeting — CARDS.

Consensus Points 1 and 2

Consensus Point 1: Communicating value to the retail industry is critical to reducing waste fat production. In 1986, retailers across the United States began the "War on Fat" with the adoption of "1/4-inch Trim Specifications" programs. This was the result of the major finding of the National Consumer Retail Beef Study (Cross et al., 1986; Savell et al., 1989) that closer trimming of retail cuts could result in an improved image for and sales of beef. The National Beef Market Basket Survey (Savell et al., 1991) found that: (a) the average fat thickness of retail cuts of beef was .11 inch, and (b) over 42% of beef cuts had no external fat. Retailers had responded to the clear message that for beef to be competitive in the marketplace, it had to have less trimmable fat than at any point in the past. The Task Force felt that the retail segment of the beef industry has done its part for beef; however, the rest of the industry is lagging far behind in reducing the amount of excess fat production.

The main factor identified by the Task Force for the lack of response by the rest of the industry was the lack of clear economic signals being sent from retailers back through the beef chain. It was felt that the retail segment did not have the information available that would show what the value of closely trimmed, higher cutability primals and subprimals should be worth. Therefore, conducting research to gather new cutability information or taking existing cutability information and disseminating it was considered a high priority to help everyone in the beef industry make more informed purchase decisions.

Five recommendations for information needs were listed in the Task Force report:

1. Carcass to primal cut. Called for developing cutability information from the carcass to the primal cut that reflects differences in cutting style, sex-class, breed-type and fat trim effects. This information is reported in Griffin (1989).

2. Primal to retail cut. Called for developing cutability or yield data from the primal to the subprimal to interface with the information obtained in Griffin (1988). The information will reflect differences in trim level, cutting style, bone-in versus boneless, and other factors related to the yield of retail cuts from various subprimals. This information is now complete and is reported in Garrett et al. (1991).

3. Retail simulation. Called for a retail simulation study to determine all of the factors needed for a "value equation" of closer trimmed beef. A simulated backroom of a retail store was constructed in the Rosenthal Meat Science and Technology Center at Texas A&M. This backroom had cutting tables, bandsaws, wrapping machines and the other usual features found in a supermarket. In addition to using this facility to obtain cutting test information, trained meat cutters from the meat cutting school at the Texas State Technical College at Waco were used to obtain time and motion information on the possible labor savings that could accrue to retailers to cut closer trimmed subprimals compared to the regularly trimmed commodity products. The time and motion information is contained in the report by Garrett et al. (1991).

4. Develop user-friendly software. Called for developing user-friendly software to aid packers and retailers with making decisions regarding selling/purchasing closer trimmed beef. As a feature of the information gathered for Recommendations 2 and 3 above, a software program, called CARDS — computer assisted retail decision support — was developed by animal scientists and computer specialists at Texas A&M University (Walter et al., 1991). This software was released to the public at the National American Wholesale Grocers Association and National Grocers Association Meat Operations Meeting in Kansas City on September 30, 1991. The CARDS system allows comparisons among different purchasing options for commodity (up to 1-inch), 1/2-inch or 1/4-inch maximum external fat boxed beef cuts when cut into retail cuts with three different fat trim specifications — 1/4-inch, 1/8-inch or no external fat. Information generated by CARDS includes gross profit, net profit per hundred pounds cut, cutting yields, and labor costs. The CARDS program is being distributed to interested parties at no-cost, courtesy of the Cattlemen's Beef Promotion and Research Board, to get the maximum use of the information by the different segments of the industry.

5. Develop communication workshops for the industry. Called for conducting workshops that would help in the dissemination of cutability information to the various segments of the beef industry. With the unveiling of the CARDS system at Kansas City in September, 1991, the dissemination phase of the packer-to-retailer cutability information has begun. It consists of hands-on workshops, meetings, one-on-one visits, and other methods of information transfer. When the packer-to-retailer information transfer process has reached a saturation point, the feeder-to-packer interface will be concentrated on. It is important that the educational process occur at the interfaces between the various segments at the point nearest the consumer and work back from there. Attempts to work from the producer forward likely would be counterproductive without the other segments demanding new and improved products.

Consensus Point 2: Closely-trimmed boxed beef should be an option in the marketplace. This point is related to Consensus Point 1. With retail cuts having less than 1/8-inch fat, and with boxed beef, for the most part, coming into the backrooms of retail stores with up to one-inch of external fat, a tremendous amount of fat is being trimmed at retail that should be coming off before or should never be put on in the first place.

Excel Corporation introduced a line of closely trimmed boxed beef soon after the "1/4-inch trim specification" revolution hit in 1986 (Cross et al., 1986). This product was called "Perfect Trim," and it had a fat trim specification of 1/2-inch. Excel pulled the product from the market in 1990 because of slow sales. Retailers were willing to pay less for the commodity product and trim it themselves rather than paying the upcharge for Perfect Trim.

Excel also faced a problem in the marketplace because it had the only closely trimmed product available from the major packers. Retailers faced the dilemma of comparing commodity prices to Perfect Trim prices, which could differ substantially based on the cut. Without competition to price compare against, most retailers stayed with commodity products. Unfortunately, the CARDS system was not developed in time to be used to compare yields and cutting times from commodity cuts and closer trimmed cuts such as Perfect Trim.

By the summer of 1991, IBP and Monfort were offering their own versions of subprimal cuts trimmed to 1/4-inch or less. With at least two companies competing for the closer trimmed subprimal market, retailers can price one packer against the other. Having a substantial market for closer trimmed subprimals is important to cattle producers; without this market, there is no incentive for packers to purchase higher cutability cattle if up to one-inch of fat on each cut can be sold for the same price as the lean.

Progress to Date

As of May, 1992, over 480 CARDS software units have been shipped to over 450 different companies and organizations. This represents retailers who have individual stores numbering in the tens of thousands. This penetration is having an impact. First, some chains are now at least considering the evaluation of closer trimmed boxed beef. Secondly, some chains have used CARDS to determine the range they can afford to pay for closer trimmed cuts and have purchased some on a test program. In every case we have heard from, the profitability of using closer trimmed boxed beef was similar to that revealed by CARDS. The major consideration that most retailers who have experimented with "new and improved" boxed beef is that they must purchase additional lean trimmings for ground beef to compensate for lost poundage that would be sold if they were purchasing the regular commodity beef.

Both the demand for CARDS and the feedback we have received from users of this software have been so great that a new version of it will be released in early

summer of 1992. This version is much faster and flexible than the original version. The original CARDS required both Microsoft Excel® and Microsoft Windows® to run, while the new version of CARDS will only require Microsoft Windows®. This major upgrade is the result of both talking and listening to retailers. With major input into the new version of CARDS, retailers will feel even more strongly about this tool to help them become more competitive in the marketplace. CARDS is helping pave the way for value-based marketing to become a reality in the future.

References

Cross, H.R., J.W. Savell, and J.J. Francis. 1986. National Consumer Retail Beef Study. Proc. Recip. Meat Conf. 39:112.

Garrett, R.P., R.W. Theis, J.P. Walter, D.B. Griffin, J.W. Savell, H.K. Johnson, T.R. Dockerty, J.W. Allen, and T.R. Pierson. 1991. Communicating cutability to the retailer. Final report to the Beef Industry Council of the National Live Stock and Meat Board, Chicago, Illinois, on behalf of the Cattlemen's Beef Promotion and Research Board.

Griffin, D.B. 1989. Beef cutability as affected by different subcutaneous fat trim levels, carcass types and grades. Ph.D. Dissertation, Texas A&M University, College Station.

Savell, J.W., H.R. Cross, J.J. Francis, J.W. Wise, ,D.S. Hale, D.L. Wilkes, and G.C. Smith. 1989. National Consumer Retail Beef Study: Interaction of trim level, price and grade on consumer acceptance of beef steaks and roasts. J. Food Qual. 12:251.

Savell, J.W., J.J. Harris, H.R. Cross, D.S. Hale, and L.C. Beasley. 1991. National Beef Market Basket Survey. J. Anim. Sci. 69:2883.

Value Based Marketing Task Force. 1990. The War on Fat! A report from the Value Based Marketing Task Force, Beef Industry Council of the National Live Stock and Meat Board, Chicago, Illinois, and National Cattlemen's Association, Englewood, Colorado.

Walter, J.P., R.P. Garrett, R.W. Theis, D.B. Griffin, J.W. Savell, H.K. Johnson, and T.R. Dockerty. 1991. CARDS System — Computer Assisted Retail Decision Support: User's Manual. Department of Animal Science, Texas A&M University, College Station, Texas.

LOWERING THE BOTTOM LINE WITH INTEGRATED RESOURCE MANAGEMENT

Larry Corah
Kansas State University
Animal Science Department

Paul Gutierrez
Colorado State University
Agricultural Economic Department

As the beef industry moves into the 90's, there is no question that there are two pivotal points of focus--product quality and the cost of producing that product. Both are extremely important topics and critical to the long-term future of the beef cattle industry.

In the following proceedings we'll address three items that relate to the profitability of the cow-calf/stocker/feedlot/purebred sector:

What is the history and purpose of Integrated Resource Management (IRM)?

What are the opportunities to lower the "bottom line" in the cow/calf industry?

How can BIF be involved in the IRM effort and in the effort to lower the "bottom line"?

IRM--Its history and purpose. In trying to identify the purpose of IRM, it's important to understand how the concept evolved.

History. The IRM concept started in Idaho with a program that has been referred to as the Pea-gram project. In the late 1970's, calf health problems were causing major economic losses in the Idaho cattle industry. Through an integrated educational effort involving veterinarians, university personnel, allied industry and the lending institutions ways were found to dramatically reduce this calf health problem. This successful endeavor caught the attention of cattlemen, industry representatives, and Extension workers nationwide. In 1980 following a meeting of industry leaders, producers and scientists, it was recognized that improving reproductive efficiency needed to be one of the major goals of the cattle industry. Using the Pea-gram model, the group felt an integrated approach would be far more successful than simply focusing on one aspect. Thus, IRM was introduced in approximately 1980, but at that time it meant integrated reproductive management. Later in the early 80's, people working with the IRM program recognized that the concept was bigger than just reproductive management and that to ensure success and profitability in cattle operations, all resources needed to be considered. Thus, the acronym was changed in about 1983 to integrated resource management and became the program as it's known today. About that time, IRM programs started to spring up in a number of states. The United States was broken down into four IRM regions, with the greatest success and most immediate adoption of the IRM concept being in the western half of

the United States. The concept has now grown in popularity to the point that nearly 35 states have some form of an IRM program, and many states are continuing to make progress in the development of programs. As more programs started to develop, it was quickly recognized that there was a need for a national coordinated effort. This led to the development of the National IRM Coordinating Committee. The responsibilities of the National IRM Coordinating Committee are predominantly to share IRM information between states and through a coordinated effort, give greater visibility to the IRM concept, hopefully, making it available to more cattlemen throughout the United States. This sharing has been done by placing emphasis on many different activities. In 1988 a National IRM Workshop was held in Colorado that was coordinated in conjunction with the National Cattlemen's Association.

Many people have been extremely involved in the development of the National IRM effort. However, it would be remiss to not mention individuals such as Martin Jorgensen, South Dakota Angus breeder, who has served as chairman of the National IRM Coordinating Committee and NCA IRM committee from its onset until recently resigning the position and turning the responsibilities over to Jim McAdams.

In the structure of the National IRM Coordinating Committee, the executive committee is made up of sub-committees. These sub-chairman have taken on many responsibilities. One of the sub-committee chairman from its onset has been John Beverly at Texas A&M University. John has been instrumental in creating a focus for the IRM effort.

From an industry standpoint, John Bonner was one of the early leaders in the National IRM effort, helping provide industry financial support for its initial efforts and helping in the development of some of the information used and shared by the National IRM Coordinating Committee. This included working with Idaho in the development of the "red book" which helped document production information and is now widely used with over 25,000 copies printed annually.

The National Cattlemen's Association has been extremely instrumental in supporting the IRM concept and has served as an "umbrella" for the National IRM Coordinating Committee. Without NCA's support IRM would not have reached its current national prominence.

One of the more significant developments which developed under the leadership of Danny Simms, was his recognizing the need to develop standardized performance analysis systems for both production and financial information with the capability of interfacing these into one system. This would give producers an opportunity to accurately document both financial and production data in a standardized manner and be able to make economic and production decisions based on sound information. A committee was formed to look at the needs and develop a program to facilitate this process.

The development of the standardized performance analysis guidelines has been under the leadership of Dr. Jim McCrann at Texas A&M. Through Jim's linkage with the lending industry, he has incorporated the guidelines of the Farm Financial Standards Task Force into these new financial standards. To support this endeavor, a federal grant was submitted and funded with individuals such as Paul Gutierrez, Colorado State; Danny Simms, Kansas State; Harlan Hughes, North Dakota State; Danny Fox, Cornell University; and Daryl Strohbehn, Iowa State University helping in the development and evaluation of the standardized production records and financial records which became known as SPA (Standardized Performance Analysis).

Thus, the focus of the National IRM Coordinating Committee has been to develop tools that ultimately can be used to enhance the profitability of cattle producers.

It's easy to get excited about some of the state IRM programs, or by tools developed by the National IRM Coordinating Committee such as the SPA guidelines. But, it's also extremely important to keep in perspective that these are only useful to the industry if ultimately they are utilized by producers and become an integral part of the decision making process.

Purpose of IRM. Much has been written about IRM and in these writings it becomes fairly apparent that there is not necessarily a set program, but rather it is a concept that is designed to hopefully enhance the profitability of individual producers and, thus, the cattle industry. An integral component of the implementation of that concept is that documentation of production information and financial information. Documentation of problems within an operation, and ultimately, the focal point is that in many cases it will take integrated information to ultimately create a solution for the problem, or to enhance the profitability of an operation.

Only when IRM is truly implemented at the producer level and only when IRM affects the profitability of operations will it be able to be classified as a successful endeavor.

Opportunities to lower the *bottom line* with Integrated Resource Management. Just as with product quality, there are immense opportunities in the cow-calf industry to improve economic efficiency. Relative to other segments of the beef industry and, particularly when comparing the cow-calf industry to highly integrated industries such as the poultry and pork industry, there is ample evidence that the magnitude of improvement in economic efficiency is very feasible. Evidence in the states that have documented production costs and evaluated the variability between profitable and un-profitable operations such as North Dakota, Iowa, Colorado and Kansas has offered evidence for the magnitude of progress that can be made.

In evaluating the profit factors in the cow-calf industry -- those being the % of cows weaning calves, average weaning weight, annual cost of maintaining the cow

and selling price of calves -- the following table illustrates summaries of level of productivity being achieved and the cost. These results are based on the initial analysis of the standard performance analysis (SPA) data, as well as the recent 1992 survey report of Cattle Fax.

	SPA Data*	Cattle Fax Data (1992)
% Calf crop born, % of cows exposed		91
Calf death loss		4.5
Pregnancy rate	87%	
Calving rate	81.8%	
Weaning weight	507 lbs	519 lbs
Lbs of calf weaned per cow exposed	406	
Annual cost per cow	$316.29	$309.00

*To date the SPA data base is based on very limited number of observations,but this is the first step to a national database.

Just as the quality audit showed that there are tremendous opportunities for improvement in product quality. A summarization of the IRM data collected in various states, as well as a collective interpretation of a recent NCA report prepared by Lambert, 1991, clearly suggests that there may be excellent opportunities to enhance the profitability per cow. Opportunities that can further be evaluated and researched through IRM programs.

Potential for Increased Gross Value (Per Cow Basis)

Improved calving rate
Reduce calf death loss
Improved weaning weight
Reduced feed cost

Improved calving rate. Summarizing the economic opportunities for the beef industry, Lambert (1991) reported that of the 36.614 million beef cows in 1989, approximately 29.584 million calves were born for a calving rate of 80.1%. The initial SPA analysis summary reported at the NCA meeting, January 15, 1992, reporting that the calving rate on 55 beef herds in 12 states was 81.8. Herein lies one of the major economic inefficiencies that exists in the cattle industry. This loss is accumulation of reduced pregnancy rates, abortions, embryonic death, etc. A realistic goal for the industry would be to increase the calving rate to 90%.

Calf death loss. It is estimated, based on USDA figures, that there's an approximate death loss of 3.7 million beef cattle annually, with approximately 65% of these occurring at birth or within 2-4 weeks of birth. This implies that 2.4 million beef calves die at birth or shortly within birth, which reflects a 6.5% calf death loss for the industry. Again, its interesting to compare this to the annual cow-calf survey results of Cattle Fax (January 1992) which showed an annual calf death loss of 4.5%. If, in fact, this death loss could be reduced by half, this would greatly increase the revenues per beef cow.

Increased weaning weight. One of the areas of considerable genetic progress in the cattle industry has been the improvement in weaning weight. The following Cattle Fax figures report what has happened from 1970 to the current 1991 figures.

1970 -- 427
1980 -- 465
1991 -- 519

As reported, however, by Lambert (1992), 48% of the total calf crop still weighed less than 500 lbs. A further reflection of the difference in weaning weights between profitable operations and those not profitable is the North Dakota records which indicate that the 20% most profitable enterprise weaning calves were 76 lbs heavier and, subsequently, produced 189 lbs more calf per cow than the 20% least profitable. This would clearly imply that some further improvement in weaning weights and realistic and plausible in most cow-calf operations.

Feed costs. In the estimations of the authors, one of the greatest economic efficiency improvements that can be made in most cow-calf operations is in the reduction of annual feed costs. In most operations the focus must be on the enhancing the utilization of the forage and range resource base which is a primary source of feed in any cow-calf operation. Utilizing data from an 11 state summary compiled by Ritchie (1992), he indicated that the average feed cost reported by various states was $171 per cow. Evaluating the difference between high profit herds and low profit herds, North Dakota reported a $72 difference in feed costs between the 20% most profitable and 20% least profitable while Iowa reported a $57.67 difference. Realistic in most cow-calf operations, reduction in feed cost per cow is one goal achievable by nearly all cow/calf producers.

Questions: Improvements can be made in each of these four areas -- but at what cost?

To enchance profitability we need to identify the costs associated with improving production efficiency.

Opportunities for BIF to interface with IRM activities. There are a number of ways that the Beef Improvement Federation can and should interact in the IRM effort. Let's list a few of these opportunities.

1. **Continue to evaluate the production guidelines now being used in the SPA analysis for cow/calf producers.**

2. **Interact in the development of SPA guidelines for seedstock producers.** Obviously, as SPA production and financial guidelines are developed for purebred producers, the Beef Improvement Federation needs representation on this committee in developing these guidelines. This already appears to be in place.

3. **Implementation of production/economic information in purebred operations.** More important than the development of guidelines is the incorporation and utilization of economic information by purebred producers. Purebred producers need to place their emphasis on traits of economic importance to the industry. Many purebred producers do have an excellent appreciation of the economics of commercial cow-calf production. In the state of Kansas, two of the larger purebred operations maintain two of the most productive commercial cow herds in the state.

4. **Just as BIF has utilized the expertise of geneticists in making considerable progress in genetic trait selection, it's important that we create an atmosphere where economists can interact with producers, purebred operators, animal scientists and industry representatives, to evaluate the economic significance of various genetic traits.** For example, we tend to become extremely infatuated with EPD's for weaning weight and milk production when, in actual fact, enhanced reproductive efficiency may be one of the greatest economic opportunities available to the cow-calf industry.

5. **Just as the incorporation of production data and financial data was a major challenge for the IRM effort and certainly is a long ways from being completed, the need to incorporate genetic information into this whole economic and production model would greatly enhance the ability of the cattle industry to make managerial decisions based on sound financial, production and genetic information.**

6. **BIF should have input into what may be IRM's highest priorities for the future -- managing the impact of animal agriculture on the environment.** This focus was identified at the 1991 National IRM Planning Workshop.

Summary

To date, the bulk of the focus of IRM has been on creating an awareness for the concept and process and, likewise, on the development of tools that can be utilized by the cattle industry. The extremely exciting time for IRM is yet to come. When we utilize these tools and this information process at the producer level to enhance the economic efficiency and improve the decision making process, then IRM will have reached its threshold of success. It's not too late to profit from IRM.

WHAT VALUE BASED MARKETING AND INTEGRATED RESOURCE MANAGEMENT MEANS TO MY RANCH PROGRAM

Jim McAdams, Chairman
National IRM Coordinating Committee
Huntsville, Texas

We started using the Integrated Resource Management concept in our ranching operation in 1985, although we weren't cognizant at that time of the IRM movement. We just realized that we were going to have to start doing a better job of utilizing all of our ranch's resources if we were going to be able to hold onto the land.

For years we had utilized the help of different experts to make management decisions. For example, we bought our first exotic bulls in 1974 with the help of an Extension Beef Cattle Specialist and we designed a nutrition program in the same year with the help of a feed company nutritionist. We had always worked very closely with our local veterinarian and our local county agent, and a timber company forestor helped us manage our timber. Although we were getting good input from these people, the problem was we would usually initiate a new production program without thinking through its impact on other aspects of our operation.

In 1984 we purchased a computer and by the end of that year my wife and I had attended four computer shortcourses. With the assistance of an Extension Agricultural Economist, we had both our production and our financial records computerized by 1985. With good records, we were able to analyze the impact of production management practices on our ranch's profitability.

We started doing enterprise analysis on the computer and it soon became apparent that we needed a comprehensive, long term ranch plan. We wanted to be sure that we properly utilized all of the resources on our ranch in an effort to maximize our profits. We continued to use the same resource people we had always used, but before initiating any new practices, we would analyze both its economic impact and its impact on the other ranch enterprises. By 1988 we were formally into the IRM program. Since 1985, we have drastically reduced our ranch's debt and increased its productivity. We feel that the IRM concept has helped us to improve our business acumen, enhanced our ranch's resources and increased our profitability.

Value Based Marketing is another new concept that needs to be thoroughly analyzed before it is implemented on any ranching operation. I definitely think it is something that needs to be rapidly adopted by the beef industry. We must never forget, however, that it first must be profitable for its participants. Before we can concentrate on value based marketing, we must make sure that our cattle are the most adaptable and the most efficient available for our environment. These cattle

must be the kind that will enable us to lower our production costs while maintaining our productivity. We can then breed the cows that meet these criteria with bulls that produce calves that have the desired carcass qualities. It will be important that these calves receive enough of a premium to offset any loss in production efficiency.

Cattle producers need to adopt good business management practices, learn to utilize resource people in a team concept, and always analyze thoroughly the impact management and production decisions have on the entire operation. I believe that if these three things are done, the cattle industry will improve its efficiency and enhance its competitive position with other protein sources.

CENTRAL TEST AND GROWTH COMMITTEE

Minutes

The Central Test and Growth Committee was called to order at 1:30 p.m. on May 7, 1992 by Ron Bolze. Ron Bolze started the meeting with a discussion of the role of BIF committees and a review of programs developed by the Central Test Committee in the past. There has been a realignment of committee functions. The Central Test Committee has been changed to the Central Test and Growth Committee. The former Reproduction and Growth Committee is now the Reproduction Committee.

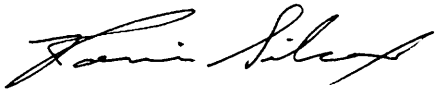
Ronnie Silcox addressed "Challenges with Central Test Structure" and Wayne Wager gave a presentation entitled "Changing Times - Do They Require Changes in Central Bull Tests?" Don Boggs gave a report on Breed Averages for EPD's. These will be printed in the proceedings.

These problems were discussed at length. There was a discussion of predictions of yearling scrotal circumference based on weaning or on-test measurements. There was also discussion on the use of EPD's at test stations. One major problem is that breeds use different methods of presenting averages and percentile breakdowns.

A motion was made for the committee to develop an annual list of breed EPD averages and distribute this list to Extension specialists and test station managers in the late fall. The motion passed. It was also pointed out that such a list would not be as necessary if we could get all of the breed associations to list summary data in a similar fashion.

The meeting adjourned at 5:00 p.m.

Respectfully Submitted,



Ronnie Silcox
Secretary

CHALLENGES WITH CURRENT CENTRAL BULL TEST STRUCTURE

Ronnie Silcox
University of Georgia

Central bull testing began at least as early as 1941 in Balmorhea, Texas. During the 1950s several states developed BCIA and central test programs. Some of these central tests have run continuously for well over 30 years. It is not the purpose of this paper to either condemn or glorify test stations, but merely to express some of the concerns and challenges identified by managers of central bull test stations.

Continued justification of central test stations is a concern in some areas. The management of test stations varies across the country. Some stations are run by colleges and universities and others are owned and operated by producer groups. While it is difficult to justify some of these programs strictly as bull evaluation tools, it must be realized that there are many other reasons for maintaining central test stations. On college campuses, test stations can be a good source of livestock to use in teaching programs. On experiment stations, bull tests are highly visible programs that draw producers to the experiment station. For Extension programs, bull tests provide contacts with purebred producers and opportunities to develop educational programs for both purebred and commercial cattlemen. Purebred producers send bulls to test stations for a number of reasons that have little to do with evaluation. In a recent survey of bull test consigners in Georgia, all agreed with the statement, "Test stations are a good form of advertisement." Ninety-seven percent agreed with the statement, "Test stations provide a good market for bulls." For commercial producers, test stations are a good source for performance tested bulls.

The original justification for many of the test stations that started in the 1950s was to demonstrate the new technology of performance testing. A challenge today is to continue to incorporate new technology into bull test programs. Over the past few years at various test stations, breeders have been exposed to items like ultrasound, libido testing, individual feed efficiency and low birth EPD groups.

Advances in National Cattle Evaluation (NCE) and the use of EPDs presents another challenge to central test stations. Sending bulls to central test stations can affect calculation of yearling EPDs. Agriculture Canada has begun to use test station data in the Canadian Beef Sire Evaluation Program (BSEP). In some breeds in the United States, test station data on intact contemporary groups are included in NCE, while other breed associations edit any data that carry a test station management code. Concern has been expressed about losing performance records in NCE, but the effect on a commercial bull buyer's ability to evaluate yearling bulls is not as great as some believe. If a bull is evaluated in an on-farm test, a commercial bull buyer may have available a pedigree estimate for yearling EPD and the bull's individual performance within his contemporary group. When bulls are sold at a year of age, a

yearling EPD from NCE will generally not yet be available. In some breeds interim EPDs are available. These are just the pedigree estimate adjusted for the bull's within contemporary group performance. At the test station the buyer has a pedigree estimate of yearling EPD and the bull's test station performance. In theory, maintaining an intact contemporary group in an on-farm test should be a somewhat better evaluation method than sending bulls to a central test. In practice, commercial buyers often get more complete performance records at the test station. The purebred breeder who consigns the bull probably loses more than the commercial buyers. For the purebred breeder, loss of performance records can affect the accuracy of a herd sire's yearling EPD.

Splitting contemporary groups to send bulls to a central test should not affect birth, weaning or milk EPDs as long as contemporary groups are properly managed before the test. This presents an educational challenge for test station managers. Unfortunately it is not uncommon to see bulls listed in station catalogs with a weaning contemporary group of one. Bulls get weaned early or otherwise separated from their weaning contemporary groups before being sent to the test station. This results in the loss of both a weaning and milk record on one of the purebred producer's cows. Some of this problem is simply due to a breeder's failure to consider the consequences of his actions, but part of the problem is also due to entry deadlines and birth date requirements set by the test station.

A challenge that always faces test station managers is obtaining accurate and consistent performance records. One part of the problem is simply getting information from all of the consigners. Another problem is using consistent data. For example, are birth weights actual or adjusted? A problem that has developed over the past few years is obtaining the same type of EPDs for all bulls. When breeders send in EPDs, some send pedigree estimates, some send interim EPDs and some wait to send EPDs from the current evaluation. One solution to this problem is for test stations to get registration numbers and request EPDs for all bulls directly from the association. In test stations where more than one breed is evaluated it is also important for test stations to provide commercial buyers with breed averages for EPDs.

Most bull tests use some type of index, usually a combination of test gain and weight per day of age, to rank bulls. Some tests use within breed indexes and others use across breed indexes. These indexes are necessary to set sale orders and list bulls. An educational challenge for test stations is to convince buyers that the test station index does not necessarily indicate the best bulls for a particular herd. Along with the index comes the challenge of deciding which bulls should sell. Since indexes in the past have been based heavily on rate of gain, some stations have offered special test groups such as low birth EPD groups in an attempt to sell bulls with more balanced data. Within breeds or groups some fraction (usually 1/4 to 1/3) of the bulls are culled. This approach works well with large groups but, can cause problems with small groups. In a group of 4 or 5 bulls, culling the bottom third can result in culling a bull that is superior to most of the other bulls on test. Various test stations have developed rules for culling small groups that allow bulls in the lower third to remain in

the sale if they meet certain minimum standards. Developing fair culling procedures that cover all size groups is certainly a challenge.

Culling bulls based on weight gain is fairly straightforward. Culling bulls for structural soundness is subjective. A challenge facing test station managers is to develop culling standards and methods for traits like structural soundness that will please both buyers and consigners. This requires a judgement to be made by the station manager or a committee. This is not a very popular job.

A challenge that has always faced central test stations is maintaining the health of bulls. The central test station is designed to draw farm-fresh cattle from a large number of herds all over a state or region into one location. Needless to say this is not an ideal situation for maintaining animal health. At some stations this is further complicated by the close proximity of research cattle or the use of facilities for research during the off season. A periodic evaluation of vaccination and receiving programs is very important.

Conducting breeding soundness exams on yearling bulls also presents a challenge. This has been complicated at some stations in the past few years. With the move from 140-day to 112-day tests, some managers have found themselves evaluating bulls that are 28 days younger than those in the past.

Central test stations have always faced challenges and as new technology develops new challenges will develop. In this presentation I have tired to describe a few of the common problems or concerns expressed by bull test managers.

CHANGING TIMES - DO THEY REQUIRE CHANGES IN CENTRAL BULL TESTS?

Wayne Wagner
West Virginia University

When the first bull test stations were established in the late 50's and early 60's, most of the beef cattle in this country did not have enough growth. At the time, there were few performance test programs and sire evaluation did not exist. BIF did not exist when the first bull tests were established. The need for more growth and improved feed efficiency was evident. Central tests were established to essentially evaluate one trait, postweaning growth rate.

Although a selection program based upon one trait (single trait selection) provides the greatest opportunity for genetic change in that trait, animal breeders would rarely recommend it as a logical system for genetic improvement. Yet, many would suggest that bull test stations today generally focus on one trait - growth rate.

In recent years, the concept of optimum and integrated resource management has emerged. Optimum will surely vary between farms and ranches. At some time, a beef producer must evaluate the whole bull, not just his growth rate, because when he selects a bull he selects all his genes. It should be clear that although one producer may need to emphasize more growth in his cattle, the next producer may be at or near the optimum level of growth. Therefore, his emphasis may be on other traits such as fertility, calving ease, fleshing ability, muscle, soundness, milk, udder quality, etc. Breeding programs that emphasize total productivity are necessary and bull test programs that tend to emphasize growth rate only, distract producers from developing a balanced trait breeding program.

The value of Central Bull Tests today may vary between regions or between states. In West Virginia, bull test stations serve a function beyond evaluation of growth rate which I believe they must do to justify their existence. Should we continue to operate the West Virginia tests? Yes. Let me explain. West Virginia has many small producers and the bull test serves as a kind of supermarket for our commercial producers. It provides those interested in a bull with a relatively large assortment of bulls from which to evaluate. If these bulls were raised in small groups of 3 to 10, on the farms where they originate, it becomes a difficult to impossible task to evaluate and compare these bulls across consignors and across a relatively large geographic area. In addition to the logistical problem, consider the number of different feeding and management programs that would be utilized. Should we be concerned about this? In West Virginia, there are only 2 or 3 producers who would produce and market more than 30 bulls annually. Source of bulls is a problem for our commercial producers and our tests fill a need in this area. However, let me emphasize that there are many good farm sources of bulls that producers can and should consider in addition to test stations. Test stations are not the only and may not be the best source.

I believe the West Virginia stations are set up to emphasize more than just growth rate. Therefore, I would prefer to call them bull evaluation centers. Typically, test stations have used average daily gain (ADG) or a combination of ADG and 365-day adjusted weight to determine qualification for sale and sale order. Other traits need to be considered in breeding programs such as:

Birth Weight/Calving ease
Scrotal Circumference/Fertility
Milk
Mature Size
Structural Correctness/Soundness
Muscle

Test station consignors have tended to focus on high growth cattle in order to be competitive in a test station. The consequence is that few of those individuals have concentrated on moderate or low birth weights because of the high genetic correlation between birth weight and other measures of growth rate. Research has shown that birth weight is the most important trait which affects calving difficulty. In order to counter this effect, we utilize the following index to determine sale order and qualification:

I = [1/2 (ADG Ratio + 365d weight ratio) - BW EPD]

In my opinion, this limits the emphasis on just growth. However, there is a serious problem with this index because some breeds provide only pedigree EPD values for young animals. I believe this index has encouraged some breeders to produce and consign bulls with more moderate to low birth weight EPD's. Bulls with low to moderate birth weight EPD's and acceptable EPD's for yearling weight are in demand by commercial producers to use on heifers. They are ready and willing to sacrifice some growth in order to find bulls that have less risk of causing calving difficulty when bred to virgin heifers.

In my opinion, the importance of the breeder has been diminished or lost in test stations. Bulls in a test are only as good as the breeders who consign them and should reflect their breeding programs. If consignors manipulate data such that birth weight and milk EPD's do not adequately reflect true genetic merit, the data becomes useless. I believe we must focus more on the breeder/consignor in these evaluation centers. True contemporaries are those that were contemporaries from birth. A buyer should choose a consignor who has a breeding program and philosophy that is compatible with his and then select a bull from within that consignment. This suggests that not only single bull consignments, but small consignment groups should be discouraged from bull evaluation centers. In West Virginia, I would like to focus on larger consignments per breeder so that there are more true contemporaries to yearling age. This would help change the focus from test stations to breeders. Currently we have several consignors who will consign ten or more bulls in our program, but I think we need to increase this number.

Many test stations measure scrotal circumference and conduct breeding soundness exams. It has generally been considered that bulls should have a minimum scrotal circumference of 30cm as recommended by the Society of Theriogenology. Because of the relationship between scrotal circumference and fertility and age at puberty in daughters and the economic importance of fertility in commercial production, I believe more emphasis needs to be placed on scrotal circumference. There may be a maximum desirable scrotal circumference, but I believe few breeders have approached the maximum, at least in West Virginia. Instead of using our index to cull the bottom third from the sale, perhaps we should use it to cull only the bottom 20% and then cull the smallest 20% of those remaining on scrotal circumference with scrotal circumference adjusted to 365 days.

While discussing scrotal circumference, consider this: measuring scrotal circumference is not as accurate as measuring weight. People differ in how snug they pull the tape. Consequently, I believe that for comparative purposes, a ratio within breed may be appropriate. A yearling scrotal circumference measurement of 36 cm may reflect a different relative size depending upon who measured the bull and when and where. It is not an absolute value.

Many bull test stations have forced producers to focus on frame size by establishing a minimum requirement. Since feeders want uniformity and packers want cattle that fit the box, perhaps the time has come to change our philosophy about frame size. Too much may be just as bad for the industry as too little. If we have set minimum requirements, should we set maximum limits?

Many test stations are now providing some evaluation or measure of muscle. I believe this is appropriate as long as we do not over-emphasize muscle. My preference is for something in the middle-of-the-road. I believe that in West Virginia we have too many cattle that have insufficient muscle and some evaluation is necessary to get people to focus on it. Although we do not measure loin eye area, we do provide a muscle score as determined by a committee of three. Muscle, however, is not included in the index.

In the past we have considered average daily gain (ADG) on test to be the most important piece of information on bulls in test stations when evaluating growth rate. Data from a preliminary analysis at West Virginia University (unpublished) on progeny weights at weaning and yearling sired by bulls selected on two different criteria are shown in Table 1. Bulls in the WDA group have a high weight per day of age (WDA) at the beginning of the test and a near average average daily gain (ADG) on test. Bulls in the ADG group were selected because of high ADG on test and near average or below WDA at the beginning of the test. There were no significant differences between the two groups in progeny weaning or yearling weights. These data question the importance of ADG in a bull test. Furthermore, these results support the recommendation that single bull and/or small consignment groups should be discouraged from consigning to central bull tests.

It has been suggested that the availability of non-parent EPD's has diminished the need for bull tests. In my opinion, EPD's have provided much needed additional information, which could not be generated in a test, about the genetic merits of bulls in test stations. Why not simply use EPD's to evaluate growth rate? Most of these bulls are just yearlings when the come off test and have only pedigree values for yearling weight. I believe a bull's performance on test, especially within a consignors's group of bulls, enhances our evaluation of a bull's genetic merit for yearling weight. I believe one compliments the other. In the case of birth weight and milk EPD's, we certainly do need to use these values because they provide critically important information which can not be collected in a test station.

In conclusion, I think test programs need to look at changes which will allow and encourage consignors to focus on a "balanced" breeding program instead of one or two traits. Times have changed and so has the commercial beef cattle population. If bull test or evaluation programs are to be useful, they must be useful to the commercial producer.

TABLE 1: A Comparison of 205 Day and 365 Day Progeny Weights of Bulls Selected for High ADG Versus High WDA in The West Virginia Bull Test.

Group	Progeny Weights 205 Day[c]	365 Day[c]
WDA[a]	533	776
ADG[b]	541	776

[a]9 Bulls selected for high Weight Per Day of Age (WDA) at the beginning of the test and near average ADG on test.

[b]7 Bulls selected for high average daily gain (ADG) on test and near average WDA at the beginning of the test.

[c]Least Squares Means. No Significant Differences.

BREED AVERAGE EPDs

Don Boggs
South Dakota State University
Report to BIF Central Test Committee

Many breed associations publish the average EPDs of the sires of their breed at the front of their sire summary (Table 1). Knowledge of the breed average EPDs is helpful in quickly establishing a sire's relative rank within the breed. It is important to realize that 0.0 EPD does not mean breed average. Differences in genetic trend and differences in the base point for calculating the EPDs have moved the average EPD for some traits in some breeds well away from zero. Therefore, a positive EPD for a trait does not always mean an above average ranking within that breed. For example, it would be a mistake to assume that a Polled Hereford sire with a weaning weight EPD of +5.0 lb would sire above average preweaning growth for his breed since the breed average EPD for weaning weight is +6.3 lb.

Knowledge of the breed average EPDs is also valuable when evaluating cattle in more than one breed. In this situation, it is imperative to realize that the EPDs are not comparable across breeds. A high breed average EPD for a trait does not indicate breed superiority for that trait. It is more a reflection of the genetic trend and the base point of calculation for that breed. Thus once again the value of a breed average EPD table is to simply and quickly establish a bull's relative rank within its own breed. Breed average tables will let you quickly assess that a Beefmaster sire with +10 lb yearling weight EPD is above breed average (+1.8 lb) for growth and a Hereford sire with a +10 lb yearling weight EPD is below breed average (+17.4 lb) for growth; but they say nothing about comparing the bulls or their breeds.

Producers and other animal breeders must be cautious not to extrapolate breed average EPDs into across breed comparisons. Not only are there computational differences among the breeds in the calculation of their EPDs; there are also differences in what the various breeds report as breed averages. Some breeds report the average of "all sires", some report the average of "all current or active sires", and others report the average of the "sires listed in their sire summaries". These differences can have a major impact. For example, the average birth, weaning, yearling and milk EPDs for "all Red Angus sires" are -.4, 4.2, 4.9 and 3.4 lb, respectively. In contrast the average EPDs for these same traits for sires listed in the Red Angus Sire Summary are 1.3, 20.4, 32.5 and 6.0 lb.

In addition to the sire averages, several breed associations also publish the breed average EPDs for the last calf crop year or the nonparent cattle (Table 2). This allows a producer that is looking only at young, nonparent cattle to more readily determine how they compare to cattle in the same breed of similar age. For instance, if a young Angus bull with a weaning weight EPD of +8 lb is compared to all Angus sires (average EPD = 7.4 lb), he would appear to be about breed average for

preweaning growth. However, when the same bull is compared to the other young, nonparent Angus cattle (average EPD = 20.0 lb), he is considerably below the average EPD of the other bulls of his age that might be available. The table of breed average EPDs for young animals is likely the most practical for publication and use in Central Test Station and other multuple breed sales.

TABLE 1. BREED AVERAGE EPDs FOR SIRES (1991 - 1992 EVALUATIONS)

	Direct EPD's				Maternal EPD's		
Breed	CE	BW	WW	YW	CE	MILK	MWW
Angus (all)		1.2	7.4	10.9		2.0	
Beefmaster (all)		0.0	.8	1.8		1.8	
Brahman (all)		.4	2.6	4.5		2.5	
Brangus (all)		.4	2.8	4.7		.2	1.6
Charolais (listed)		.9	4.5	7.0		-1.9	
Gelbvieh (current)	100.1	.4	4.7	8.9	101.0	1.5	4.1
Hereford (listed)		2.2	29.0	47.0		7.0	22.0
Limousin (current)		.6	3.2	6.4		0.0	1.6
Polled Hereford (all)		1.0	6.3	10.0		-.3	
Red Angus (listed)		1.3	20.4	32.5		6.0	16.2
Salers (all)		.5	4.9	7.5		3.6	6.1
Santa Gertrudis (all)		.4	3.8	4.6		2.4	
Shorthorn (all)		.5	2.3	4.0		1.2	
Simmental (active)	-1.1	.1	3.2	9.2	.9	.8	2.4
South Devon (all)		.1	0.0	.1		.1	
Tarentaise (all)	100.0	2.0	3.1	4.7	100.0	.3	1.8

TABLE 2. BREED AVERAGE EPDs FOR YOUNG ANIMALS (1991-92 EVALUATIONS)

	Direct EPD's				Maternal EPD's		
Breed	CE	BW	WW	YW	CE	MILK	MWW
Angus (non parents)		3.1	20.0	32.2		6.9	
Beefmaster (1990 calves)		0.0	5.3	9.6		4.5	
Brahman (1991 calves)		.8	6.9	10.8		5.0	
Brangus (1991 calves)		.9	9.8	15.9		.9	
Charolais (1991 calves)		1.0	6.9	10.6		-1.4	2.0
Gelbvieh (1991 calves)	100.3	.3	4.7	9.0	101.1	2.0	4.7
Hereford (1991 calves)		2.1	27.4	44.4		8.0	21.8
Limousin (1990 calves)		.6	3.5	6.7		.5	2.2
Polled Hereford (1991 calves)		3.4	21.5	34.9		.8	
Red Angus (1991 calves)		.9	18.3	28.2		6.0	
Salers (1991 calves)		.7	6.6	10.3		3.1	
Shorthorn (1991 calves)		1.5	9.0	14.5		2.8	
Simmental (1991 calves)	-3.7	.4	10.8	22.6	6.1	.2	4.1
Tarentaise (1990 calves, est.)	99.2	2.6	7.1	10.1	100.0	.4	

Systems Committee Minutes
From Meeting Held May 7, 1992 At
Portland, Oregon

Chairman Jim Gibb called the meeting to order at 2:00 p.m. In initiating the meeting, Chairman Gibb thanked the 70 plus attendees for their being at the meeting and then briefed them on the agenda, the history of the Systems Committee and the emphasis given to the committee by the BIF Board of Directors. He indicated the main charges were to emphasize measuring inputs and evaluation of whole herd efficiency. In addition, two new missions were added; evaluation of the economic impact of various selection traits and opportunities of networking BIF with Integrated Resource Management (IRM) and the National Cattlemen's Association SPA (Standardized Performance Analysis) efforts.

First on the meeting agenda was the subcommittee report on the Evaluation of Methods to Calculate a Calving Distribution Table, Cow Herd Inventory, and Calf Crop Percentages. Subcommittee members appointed by Chariman Gibb in 1991 were Kris Ringwall (North Dakota State University), Daryl Strohbehn (Iowa State University), Danny Simms (Kansas State University) and Roger McGraw (North Carolina State University).

Chariman Gibb called on Kris Ringwall to present the subcommittee's recommendations on methods to calculate calving distribution. Recommendations included in the attached report were presented and discussed. Garth Boyd moved that the Systems Committee accept and recommend to the BIF Board of Directors the subcommittee's recommendations on calculation and reporting of calving distribution tables. Don Boggs seconded the motion and the motion passed by unanimous vote.

Kris Ringwall then presented the subcommittee's recommendation on Calculation of Cow Herd Inventories. Recommendations are included in the attached report. It was moved and seconded that the Systems Committee accept and recommend to the BIF Board of Directors the subcommittee recommendation. The motion passed.

Chairman Gibb then called on Danny Simms to present the subcommittee's recommendations on methods of calculation of herd reproduction traits. It was duly noted that current BIF Guidelines has standards for this area and that the standards remain relevant, but there is a need for definition refinement. Discussion was entertained and one addition in the subcommittee's recommendation was suggested and the subcommittee injected the addition. The modification was in the last sentence of the definition for pregnancy percentage. It should now read: "The inverse of pregnancy percentage is percent open, 100% pregnant." Garth Boyd moved that the subcommittee's recommendations for Composite Herd Reproductive Traits be accepted with the one modification and recommended to the BIF Board of Directors. Randall Grooms seconded and the motion passed.

Chairman Gibb then called on Daryl Strohbehn to present the subcommittee's discussion piece on component herd reproduction traits. Three alternative methods were presented for the calculation of pregnancy loss percentage and calf death loss percentage. After discussion, it was moved by Don Boggs to direct the BIF Board of Directors to work with NCA SPA Guideline committee in the elimination of the first equation listed to calculate calf death loss percentage (Number of Calves That Died/Number of Cows Exposed x 100). Seconded by Steve Radakovich. Motion passed.

Additional discussion on the component herd reproduction traits brought up the complications of twins in most calculations. It was noted and discussed that the NCA SPA Guideline is in error in the formula used to calculate calving percentage. Rather than number of calves born in the numerator, the equation should contain the number of cows that calve divided by the number of cows exposed. This error was duly pointed out and instructions were voiced that this error should be pointed out to the SPA Guidelines committee.

Following further discussion of the component trait piece, Mark Boggess moved that the discussion piece be turned from a discussion piece to a recommendation to the BIF Board of Directors. Bill Borror seconded and the motion passed.

Chairman Gibb next introduced Don Boggs for a report on the development of the IRM/SPA Seedstock Guidelines. Boggs told the audience a committee had been established by the NCA/IRM Subcommittee for this development and that the committee had met the day previous to the BIF Convention. The test version of SPA Seedstock Guidelines are to be ready by the NCA midyear meeting. Goals for the committee are to make the guidelines conform as close as possible to the guidelines already established for the commercial cow-calf sector, develop a seedstock overhead category to handle entities involved with the business of producing and selling seedstock, and to obtain herd participants to test the guidelines in Fall 1992.

Chairman Gibb then introduced the remaining program for the Systems Committee meeting. Presentations on determining economic value of traits were made by Charlie Gaskins, Rick Bourdon, Tom Jenkins, Mike MacNeil and Tom Brinks.

Following these presentation and discussion there was no further business. The meeting was adjourned by Secretary Strohbehn in Chairman Gibb's absence at 4:50.p.m.

Respectfully submitted,

Daryl Strohbehn

Evaluation of Methods to Calculate a Calving Distribution Table, Cow Herd Inventory and Calf Crop Percentage

Subcommittee Report to the BIF System Committee

Jim Gibb appointed Kris Ringwall (North Dakota State University), Daryl Strohbehn (Iowa State University), Roger McGraw (North Carolina State University) and Danny Simms (Kansas State University) to a subcommittee to study the development of standards for the calculation of calving distribution tables, cow herd inventories and calf crop percentages and make a report to the BIF Systems Committee.

Calculation of the Calving Distribution Table

Subcommittee Recommendation: A recommended calving distribution table is presented in figure 1. The calving distribution table reports the number (expressed as actual calf numbers and/or percentage of total calves born) or calves born within the herd in 21 day intervals. Generally, three 21 day periods are presented with those cows calving after 63 days listed as late, and an early period for those cows that calve before the date selected as the initiation of the calving season. Twenty-one day intervals are used since the natural estrous cycle of a cow is 21 days.

The initiation date for the first 21 day period should be calculated by adding the estimated gestation length to the date the bull was intentionally exposed to the mature cows (three years old or older cows). A producer should use the breed average gestation length or 285 days if several breeds are involved. If a bull exposure date is reported but the third mature cow calves more than four days prior to the first expected calving, then the first 21 day period should start with the date the third mature cow calved, thereby disregarding the calculated start date based on bull exposure. If the bull exposure date can't be determined, then the projected start date for the first 21 day period within the calving distribution table should be the date that the third mature cow calved.

Ideally, the analysis for heifers should be calculated separately from the mature cows and then summarized for overall herd evaluation. However, an alternative approach is to base 21-day periods on mature cows for the entire herd, placing those heifers that calve prior to the calculated initiation date for mature cows in the early group.

Calculation of Cow Herd Inventories

Subcommittee Recommendation: Herd size for the purpose of performing an economic evaluation on a per cow basis should be based on a perpetual inventory. Preferably, herd size should be the average of monthly inventories. However, a simplified alternative is to average inventory at the beginning of the year, calving, breeding, weaning, and the end of the year.

Calculation of Cow Herd Reproductive Traits

Subcommittee Recommendation: The evaluation of cow herd reproductive performance needs to account for the performance of each cow exposed to the bull. The following is a brief review of the reproductive successes and failures that ultimately determine the number of calves weaned per cow exposed. The current Beef Improvement Federation standards are still relevant, but they need more refined definitions.

Herd reproductive rates can only be calculated on herds that have an inventory based appraisal record system. Total cows exposed can then be retrieved for subsequent evaluation of reproduction. The following are composite and component traits needed to adequately appraise cow herd production. The subcommittee recommends adoption of the composite traits and further study of the component traits.

Composite Traits : Reproductive and production performance analysis should be based on cows exposed (to the bull or artificially inseminated). Consequently, the definition of an exposed cow is crucial to any standardized performance analysis.

Definition of an Exposed Female -- The number of females exposed during the breeding season must be adjusted for inventory changes as follows:

Add:	1.	Purchased females that were exposed
	2.	Purchased pairs
Subtract:	1.	Sales of pregnant females
	2.	Females exposed but intended to be culled following weaning of their calf.
Note:	1.	Do not include purchased females or pairs that are open and added to the herd between the end of breeding and pregnancy diagnosis
	2.	All death losses of exposed females should remain in the exposed female numbers

Pregnancy percentage: Is a composite reproductive trait reflecting estrus rate and conception rate within the cow herd. Since most producers do not obtain mating or estrus data, pregnancy percentage is calculated by dividing the number of exposed cows diagnosed as pregnant by the number of cows exposed to the bull. Exposed cows must be adjusted for exposed females purchased prior to pregnancy evaluation. The inverse of pregnancy percentage is the percent open, *100% pregnant.*

Calving percentage: Is a composite reproductive trait which accounts for both pregnant percentage and pregnancy loss percentage. Pregnancy loss percentage accounts for pregnant females that terminate pregnancy before term (abort). Calving percentage is the number of cows that calve divided by the number of cows exposed.

Calf crop percentage: Is a composite reproductive trait calculated by dividing the number of calves weaned by the number of females exposed.

Component Traits: *(Not a part of the Subcommittee Recommendations)*

Estrus rate (mating percentage): Is the number of cows expressing estrus during a synchronized breeding period or the breeding season divided by the number of females exposed.

Conception rate: Is the number cows diagnosed pregnant divided by the number of cows expressing estrus during a specified period.

Pregnancy loss percentage (abortion rate): Pregnancy loss percentage or abortion rate is the number of pregnant cows that terminate pregnancy before term (abort) divided by the number of females diagnosed pregnant.

Calf death loss percentage: Calf death loss percentage is the number of term calves which died divided by the number of calves born.

Discussion Piece for BIF System Committee Meeting Portland, OR - 1992

Example Herd No. 1: 100 females in the herd at start of breeding season, 3 of the 100 females are intended to be sold after calf weaning due to unsoundness, 10 cow-calf pairs are purchased already exposed, 85 females are diagnosed pregnant, 3 females abort prior to calving and 82 females calve, 5 calves are lost at or after birth, but before weaning, thus 77 calves are weaned.

Exposed females = 100 - 3 intended sales + 10 purchases = 107

Comparison of 3 Methodologies

	SPA/BIF Recom.	Alter. 1 Recom.	Alter. 2 Recom.
Pregnancy %	85/107 = 79.44%	85/107 = 79.44%	85/107 = 79.44%
Pregnancy Loss % (or Prenatal Survival)	3/85 = 3.53%	3/107 = 2.80%	82/85 = 96.47%
Calving %	82/107 = 76.64% [79.44 x (100 - 3.53%)]	82/107 = 76.64% [79.44% - 2.80%]	82/107 = 76.64% [79.44% x 96.47%]
Calf Death Loss % (or Postnatal Survival)	5/82 = 6.10%	5/107 = 4.67%	77/82 = 93.90%
Calf Crop or Weaning %	77/107 = 71.96% [76.64 x (100 - 6.1%)]	77/107 = 71.96% [76.64% - 4.67%]	77/107 = 71.96% [76.64% x 93.90%]

DAM AGE	# CALVES EACH AGE	NUMBER OF CALVES BORN DURING EACH PERIOD						OPEN/ ABORT	late
		EARLY	1st 21	2nd 21	3rd 21	4th 21	LATE		
2	9	2	3	1	1	2			2
3	5		2	2	1				
4	9	1	5	1			2		2
5-11	15		4	5	4	2		1	2
12+									
TOTAL	38	3	14	9	6	4	2	1	6
AVERAGE ACTUAL WEAN WEIGHT		528	540	478	453	345	313		334

Figure 1. Calving distribution report.

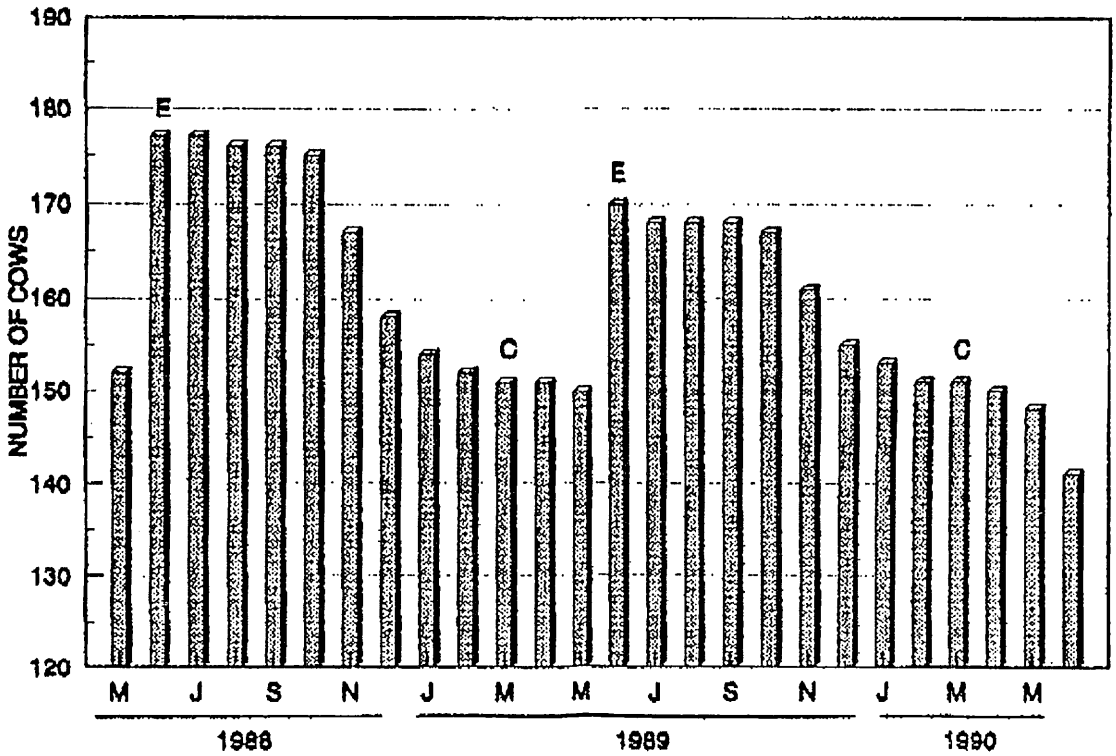


Figure 2. Overall monthly inventory (May 1988 - May 1990).

ECONOMIC VALUE OF TRAITS: A COMPUTER SIMULATION UPDATE

Rick Bourdon
Colorado State University

Over the past five years or so, a team of researchers has been working on a comprehensive model of beef production that will allow us to simulate the biology of rangeland forage growth and consumption; the biology of animal growth and reproduction, and herd dynamics; and the economics of the entire system. The goals for the model are as diverse as the interests of the researchers involved, but probably the most important goal for the animal breeders in the group is to determine in an objective way the relative value of traits in different production situations.

Model Components

The simulation model is really three models in one, and we call it SPUR/CBCPM/FLIPSIM. SPUR (Simulation of Production and Utilization of Rangelands) is the USDA-ARS range model. It simulates forage production and grazing effects using climate, plant and soil data. Our collaborators with SPUR and the FORAGE grazing submodel are Jon Hanson and Barry Baker of the Great Plains Systems Research Group in Fort Collins.

CBCPM (Colorado Beef Cattle Production Model) is the animal component of the three models. It evolved from the Texas A&M beef production model and, like its predecessor, simulates nutrient requirements, feed intake, energy partitioning, growth, lactation, fertility, and death loss. Graduate student Wade Shafer and I are responsible for CBCPM.

FLIPSIM (General Firm Level Policy Simulation) is an economic analysis model developed at Texas A&M. FLIPSIM allows us to examine a wide variety of economic variables including the long-term viablity of a ranching operation. We will use it heavily to determine economic weightings for traits. Larry Van Tassel of the University of Wyoming is our FLIPSIM expert.

The Animal Model

CBCPM simulates the performance of individual animals within an entire herd. It differs from other cattle models that I am aware of in that it combines deterministic effects produced by the biological equations in the model with randomly generated genetic and environmental effects. This allows us to simulate the biology as we understand it, and yet have (hopefully realistic) variation among animals.

In equation form, the model can be expressed as follows:

Animal performance = an overall mean
+ breed effects
+ hybrid vigor effects
+ other deterministic effects
+ random effects of:
breeding value
non-additive genetic value
permanent environment
temporary environment

The "genetic" traits in the model, traits for which random variation exists, include birth, yearling and mature weights, milk production, age at puberty, probabilities of cycling and conception, direct and maternal dystocia, gestation length, fat accretion, appetite, soundness, survival, maintenance, marbling, fat-free composition, and yield grade. The carcass traits are as yet only partially integrated into the model, and we still struggle with basic elements like maintenance requirements and feed intake.

The presence of so many traits makes CBCPM something of a nightmare to parameterize. On the other hand, the model is flexible enough that a (trained and talented) user can, by altering both input files and specific parts of the code, simulate almost any crossbreeding system and a variety of environments and management situations.

Applications

To date, we have completed just one study using the simulation model, and it has nothing to with the economic value of traits. The study was concerned with the effect of global climate change on range production. In a nutshell, results suggested that production would increase in the northern plains and decrease in the southern plains. The chief factor was a lengthening of the growing season in the north.

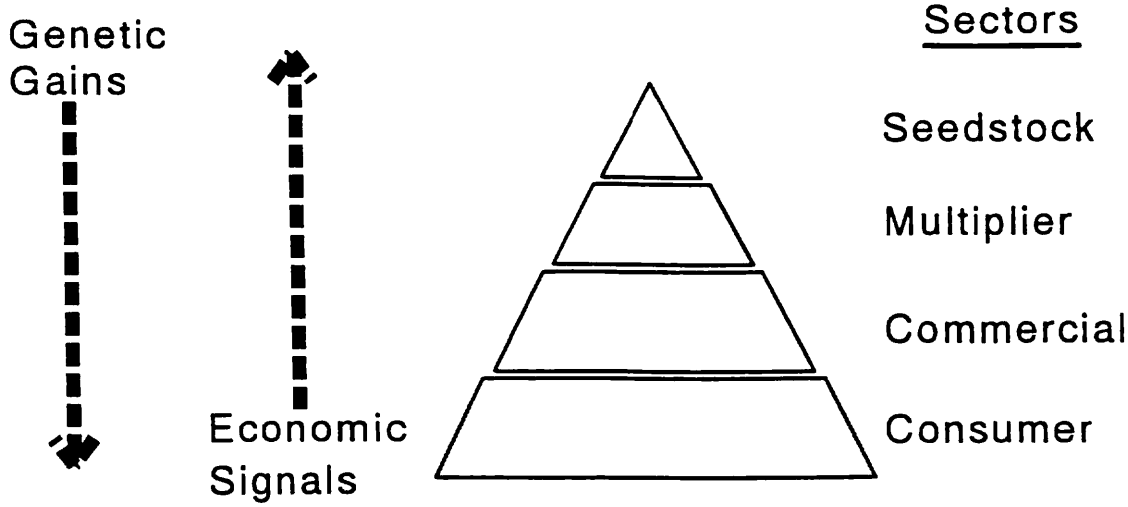
This summer we hope to complete a study on the economic efficiency of terminal sire systems. This project should produce economic weights useful to breeders of terminal sires. Other studies in the works include an investigation of potential problems in utilizing across-breed EPDs and a project designed to identify useful fertility traits.

RELATIVE ECONOMIC VALUES FOR TRAITS AFFECTING PROFITABILITY OF BEEF PRODUCTION IN CANADA

M. D. MacNeil and S. Newman

USDA, Agricultural Research Service, Miles City, Montana 59301[1,2]

INTRODUCTION: The structure of the beef industry in the U.S. has a profound effect on relative economic values for various traits affecting profitability. A pyramid having four tiers (below)



provides a visual framework. Genetic improvement mainly arises from relatively intense selection within the seedstock sector. Multiplier herds replicate that genetic improvement with sufficient numbers of bulls to service the commercial industry. Within the commercial industry the greatest proportion of end-products eaten by consumers are produced. The commercial industry employs crossbreeding to capture heterosis and exploit genetic differences among breeds or strains in producing beef products that are consistent with consumer demands. Thus, intuitively, genetic improvement made within the seedstock sector should be directed toward its use in the commercial sector to satisfy consumer demands. Likewise, economic signals reflecting consumer demand should migrate upward from consumers to seedstock producers.

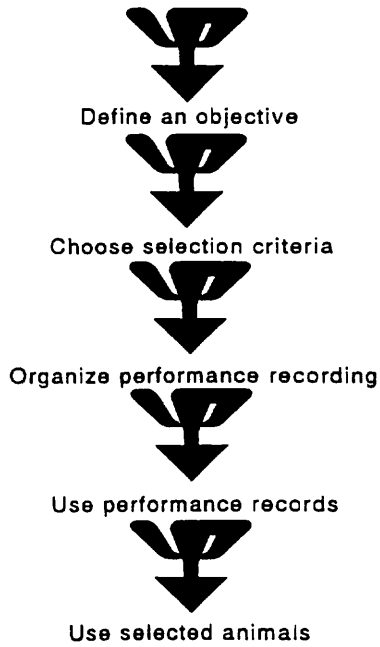
Development of a breeding program can be portrayed as a process consisting of five steps. We view the process of defining an objective or goal as the foundation upon which sustainable success

---

[1] Contribution No. J-2791 from the director, Montana Agric. Exp. Sta. Mention of a trade name, proprietary product or vendor does not constitute a guarantee or warranty of the product by USDA or imply its approval to the exclusion of other products or vendors that may also be suitable.

[2] This research was supported, in part, by a grant from Beefbooster Montana Cattle, Inc. The authors appreciate that support.

in beef cattle breeding is based. Previous research efforts have demonstrated the usefulness of performance records. Today most breed associations have organized recording systems for their members. Individual breeders have defined conceptual objectives and selected toward them based on performance records and their visual appraisal of candidates for selection. However, carefully researched objectives for beef production are rare in the industry. Information from a variety of sources is needed to derive objective and measurable goals upon which to base selection decisions. Presented in this report to the systems committee of the Beef Improvement Federation are relative economic values for maternal strains and for specialized sire strains. These relative economic values could serve as weighting factors for EPD's, if EPD's were available for the traits identified as economically important. Alternatively, they can be used in deriving multiple trait selection indexes in which indicator traits that are correlated with the economically important traits serve as selection criteria.



MODELING: A 100-cow beef herd was modelled using calculations similar to those used in SIMUMATE (Minyard and Dinkel, 1974). Yearling heifers were bred to a specialized sire line (EZ calving) that maximized calf survival. Two-, three- and four-year-old cows were bred in a rotation among three "maternal" lines and replacements were saved from these matings. Older cows were bred to another specialized sire line (terminal) that was expected to excell in growth and carcass composition. All offspring from both specialized sire lines were sold. Calves nursed their dams until weaning, were backgrounded to 700 pounds (heifers) or 750 pounds (steers) and then finished on a high energy ration until slaughter. Carcasses were ultimately broken into meat cuts. Feed consumed by cows was computed based on their weight and milk production (Anderson et al., 1983) and feed consumed by calves after weaning was based on observed feed conversion ratios.

Inputs to the model (Table 1) characterize the cattle biologically and the operating environment economically. For this research these inputs were obtained from a survey of Beefbooster members and other sources. Biological variables were manipulated mathematically to predict pounds of retail product produced and all feed inputs needed to produce them. Economic statistics were applied to the quantities of resources used (expense) and products produced (income). Profit was the difference between income and expense.

Table 1. Inputs for simulating profitability of beef production.

Biological variables	Economic variables
Male fertility, %	Fixed costs
Female fertility, %	cow-calf
Calf survival, %	backgrounding
Gain: birth to weaning, lbs	finishing
direct	Variable costs
maternal = milk	cow-calf
Average daily gain lbs/day	feed (74%)
Backgrounding	non-feed (26%)
Finishing	postweaning
Feed-to-gain ratio	Product value
Dressing %	carcass quality
Percent A grade	cutability
Cutability, %	
Cow weight, lbs	

A relative economic value is defined as the change in profit resulting from a unit change in a biological variable. Thus, for each of the five lines, differences were computed between profits from runs where a single biological variable was increased one unit and profit from the baseline characterization of the system.

RESULTS: Relative economic values for the three types of strains employed in the simulated breeding system are shown in Table 2.

Table 2. Relative economic values of traits affecting profits from beef production in Canada.

	Strain		
Trait and unit of increase	Maternal	EZ calving	Terminal
Male fertility, / 1%	0.87	0.38	1.90
Female fertility, / 1%	1.31	0.00	0.00
Calf Survival, / 1%	0.90	0.28	0.89
Gain: birth to weaning, / lb.	0.06	0.03	0.06
Average daily gain / lb.			
Backgrounding	0.86	0.43	0.60
Finishing	7.38	2.15	7.29
Feed-to-gain ratio / lb. feed	-0.61	-0.21	-0.64
Dressing percent / 1%	2.78	0.92	2.85
Percent A / 1%	0.18	0.06	0.19
Cutability / 1%	4.81	1.67	5.10
Cow weight / lb.	-0.05	0.00	0.00
Maternal ability / lb (weaning wt)	0.06	0.00	0.00

Differences in frequency and units of expression complicate comparisons within and across types of strains. Differences between values for postweaning growth and reproduction result from differences in scale. When considering differences in variability and units of measure, such as in selection index calculations, fertility and survival are far more important than is immediately apparent from these results. Differences among values for growth rate arise from backgrounding to a constant weight endpoint and then finishing for a fixed number of days.

REFERENCES:

Anderson, V. A. L. Jost, C. A. Dinkel and M. A. Brown. 1983. Prediction of daily total digestible nutrient requirement of beef cows in northern climates. J. Anim. Sci. 56:271.

Minyard. J. A. and C. A. Dinkel. 1974. Crossbreeding Beef Cattle: A Guide for Using Simumate. Coop. Extension Serv. South Dakota State Univ. Extension Circ. 701.

The Economic Tradeoffs Between Quality Grade, Yield Grade and Muscling... A Preliminary Summary

Tom Brink, Cattle-Fax

Key Findings

If the beef industry's market structure was such that fed cattle prices accurately reflected the true value of the beef and by-products they produce:

1. Cutability (red meat yield) would be a major value determinant in the fed cattle market. It would likely be the single biggest factor affecting differences in price from one group of cattle to another.

2. Fed cattle with numerically lower (more desirable) yield grades would be worth significantly more than cattle with less desirable yield grades (assuming other factors equal). A group of YG 2.0 cattle would have been worth $1.97/cwt more, on a live price basis, than a set of equal grading, equally muscled, YG 3.0 cattle during the past five years.

3. Muscle thickness has a significant impact on cutability; therefore, it has a large impact on the value of fed cattle. Assuming other factors equal, heavy muscled (No. 1) were worth $3.06/cwt more than average muscled (No. 2) cattle during the past five years.

4. Quality grade is an important price factor in today's fed cattle market. However, 80% of the time during 1987-1991, the value increase that resulted from a 20% increase in the number of Choice grade cattle (within a given group of cattle) was less than $1/cwt. On average during the past five years, a pen that graded 60% Choice was worth $.73/cwt more than a pen that graded 40% Choice (assumes other factors equal).

5. There would be significant value tradeoffs between quality grade, yield grade and muscling. For example, the table below compares two hypothetical sets of cattle. One group is fairly high grading, but low in cutability, while the second group is relatively low grading, but is high in cutability.

Equivalent Live Value Comparison

Quality Grade (% PR/CH/SE/ST)*	Yield Grade	Muscle Score	Estimated Live Value**
			($/cwt)
Set 1 3/75/20/2	3.0	2	73.46
Set 2 0/31/60/9	2.0	1	74.34

*Prime, Choice, Select, Standard
**Average 1987-1991

The beef produced from Set 2 would have a lower average per pound value because of the increased number of Select and Standard grade carcass in the mix. However, their higher cutability would net back enough additional pounds of trimmed product to offset the price difference. On average in the past five years, they were worth slightly more than Set 1.

6. A more optimal balance between quality grade and cutability would be achieved compared to the current situation. Dressing percent would no longer be a key fed cattle price determinant--so there would be less incentive to "keep feeding" cattle to increase both dressing percent and the percentage of cattle reaching the Choice grade. It would still be desirable to have a fairly high number of cattle fall into the Choice grade, but this objective would be balanced by the need to maintain high cutability.

Conclusions

In an ideal marketing system, fed cattle would be priced according to their true beef and by-product values. Quality grade and cutability would be the main value determinants in the fed cattle equation. These two factors influence value more than any other criteria currently used in marketing beef. If, in the future better, value-measurement tools can be found, they should be used instead of quality and/or yield grades.

Quality grade is already used extensively throughout the cattle and beef marketing chain. Arguably, the use of the current quality grading system is accomplishing its purpose by communicating value at the consumer level back down the marketing chain. There's much room for improvement in this system. However, until better measures of eating quality are found, quality grade will continue to be utilized by much of the beef industry.

Dressing Percent: A Key Problem

The current use of dressing percent as a price determinant for fed cattle is a serious problem because it indiscriminantly rewards the deposition of fat or lean. Thus, it is not an accurate measure of true carcass value. Both quality grade and dressing percent increase as time-on-feed increases. Combine that fact with a system which uses quality grade and dressing percent as its main valuing factors, and the result is a system that encourages over-feeding. Overfeeding and excess fat production are a major waste and expense in cattle production and throughout the beef marketing chain. The use of dressing percent as a pricing mechanism has perpetuated this problem.

The use of some measure of cutability would be significant improvement over the use of dressing percent, because cutability measures lean yield and discriminates against fat. Cutability decreases as time-on-feed increases (graph). Thus, under a "value-based" pricing system, a more optimal mix of quality grade and red meat yield would be targeted.

Change is Anticipated

Fortunately, there has been increased recognition of this problem within the beef industry during the past few years. Cutability is beginning to be recognized by retailers and food service operators as a factor that significantly influences their bottom line, and one which greatly affects the true value of beef at wholesale.

One change that could (and is beginning to) affect the industry's dressing percent mentality is a change in the industry's boxed beef standard from "YG 3 or better" to a trimmed boxed product with no more than a 1/4 inch external fat. Once trimmed boxed beef becomes the standard, packers will no longer be able to market excess fat to retailers and others at the same price as lean. Cutability will then affect a packer's bottom line in a much more direct way than it does today. Consequently, packers should bid and buy cattle based on their expected quality grade and cutability.

How Will Cattle Be Priced?

Many cattle will continue to sell on a live price basis. However, packers in formulating their bids, will consider both quality grade and red meat yield per pound of live weight. Dressing percent will diminish in importance as a key price determinant.

As these changes take place, high cutability cattle should improve in value relative to other cattle. It is also possible that high grading, but low yielding cattle will decline in value in relative terms. Overall, a wider price spread in the fed cattle market will be noted as prices begin to more accurately reflect differences in true beef value.

Analysis has shown that incremental increases in the percentage of cattle reaching the Choice grade has a fairly modest positive impact on cattle values, and may not offset value lost as cutability declines. This will vary by cattle type, and costs are another consideration (which was not a part of this analysis) because most cattle feeders will keep cattle on feed until the marginal cost of gaining a pound of live weight equals the marginal cost of that gain.

Nevertheless, it is expected that a somewhat leaner endpoint will become the target for most fed cattle. The industry will not go strictly to YG 1s and YG 2s, because current cattle genetics will not allow this without the production of too many Standard-grade and Select-grade and too few Choice-grade cattle.

The optimal endpoint (based on a balance between quality grade, cutability and costs) for various groups of cattle will change depending on market conditions--such as the Choice/Select spread, feed grain prices and other factors. But because this system is responsive to these changes, it should be a first step toward making cattle values reflect the actual value of the beef they produce. Doing this will help the beef industry better respond to consumer demands.

GENETIC PREDICTION COMMITTEE

May 7, 1992

The meeting was opened by Larry Cundiff, Chairman, at 2:00 PM in the Clark Room of the Red Lion Hotel/Jantzen Beach, Portland, Oregon. The printed agenda includes presentations on edits and parameters in EPD analyses, interbreed comparisons - breed means tables, and CHAPS data storage system. After these presentations, an executive sub-committee is to convene for the purpose of making decisions concerning the development of across breed EPD's. Each presenter provided a paper to appear in the proceedings of the meeting. The following presented papers: Keith Bertrand, Paolsa de Rose, Bruce Golden, Richard Quaas, Larry Cundiff, and Kris Ringwall.

Cundiff noted that we may need to establish guidelines for edits and parameters in EPD analyses. After Kris Ringwall's presentation, the need for a commercial data base was stressed. Some CHAPS data has multiple breeds of sires used within the same herds. This could be the across breed data base in the future. Ontario has such data as well. Larry Cundiff broke the meeting for a break.

EXECUTIVE SUB-COMMITTEE

Larry Cundiff opened the executive session with a report on the follow-up of fixing the NCE bases. The majority of the committee (10 for and 6 against) voted to fix the base. Six voted for the base as 1982, seven voted for the base as 1985, and four abstained, so no majority resulted. He opened the floor for discussion, Brett Middleton moved that BIF recommend a fixed base but that the breeds use the year of their choice. John Crouch seconded. Much discussion followed and alternatives were suggested. After the discussion the question was called and 11 voted for and 4 were opposed, so the motion passed.

Larry Cundiff then presented the 1990 all animal, non-parent mean EPD's from the 1991 genetic evaluations in a table. John Crouch moved that such a table be made and reported yearly. Keith Bertrand seconded. It was noted that the Central Bull Test Committee was doing a comparable project and that *coordination* be made. After discussion the motion passed 15 for and 0 against.

John Crouch moved that the following recommendations for inclusion in the sire evaluation reports be included in the guidelines: 1. Genetic trends by birth year for all animals be reported. 2. Average EPD's for all active sires (those with at least one calf included in the analysis in the last 2 years) be reported with the option to report the average EPD's of all sires in the analysis. 3. The average EPD's for all active dams (those having a calf in the analysis in the last two years) be reported. And 4. A percentile breakdown (1,2,3,4,5% and every five% points thereafter) be reported for active sires, active dams, and non-parents from the most current birth year. Brett Middleton seconded. The motion passed with 14 in favor and 1 opposed.

Jim Leachman proposed a motion that would have moved the development of across breed EPD's along, but the motion was out of order. Larry Cundiff said he was comfortable with the new analysis of the breed table he had presented. A motion was made to support continuing research on across breed EPD's and breed tables to facilitate breed comparisons. The motion passed with 15 in favor. Jim Brinks moved that two breed tables (1. a breed table for breeds in which adjustments for genetic trends could be made and 2. a breed table for all 26 breeds in the US MARC-GPE project that would include all traits available) be published by BIF yearly starting in 1993. John Crouch seconded. The motion passed 15 to zip.

Larry Cundiff raised the need for guidelines for edits and parameters used in NCE and after discussion appointed a sub-committee of the program participants on this topic to write such guidelines. A motion by Jim Gibb to do so was made and seconded by Craig Ludwig. Motion passed 15 to zip.

Dave Notter suggested that support be given to help develop a commercial data base of records that eventually could be quite useful in developing across breed EPD's. Jim Leachman noted that BIF might be able to help support with money such development.

At 6:10 PM, Larry Cundiff closed the executive sub-committee meeting.

DATA EDITING AND ITS IMPORTANCE IN NATIONAL CATTLE EVALUATION PROGRAMS

Keith Bertrand and Del Little
University of Georgia

The calculation of valid expected progeny differences (EPDs) depends on several key elements. Factors, such as the model, contemporary group formation and the correct genetic and environmental parameters, are essential to providing accurate EPDs. But the application of the appropriate model that uses the "best" parameters is no better than the data to which the model is applied. The examination of data to insure that valid information is used to predict EPDs is a very important component of the National Cattle Evaluation (NCE) program at the University of Georgia.

Many types of edits are performed across all the breed data sets analyzed at UGA, while other edits are breed specific. Most edits fall into one of three categories: identification edits, contemporary group edits and performance records edits.

Correctly identifying animals is very important in an NCE program. The relationship matrix does not work properly if animals do not have accurate pedigrees. Such information as unique registration numbers for sires and animals, precise birth dates of calves and dams, and the sex of the animal must be known and correct. A registration number is required on the dams in some breeds, but may be unknown in those breeds that are in a up-grading mode and have percentage females in their data. Gross errors, such as having individuals that were both sires and dams, an individual that was its own sire, calves that were older than their dams and dams that were in access of 40 years old are common occurrences in field data.

Contemporary groups are inspected to insure that animals that are truly treated alike are grouped together in common environmental groups. Information for sex, management codes and weigh dates must be present in order to form contemporary groups properly. In those breeds that allow percentage calves, the percent of the calf must be known and correct or possible to derive from parental information. Records from embryo transfer calves are eliminated in most breeds. Single record contemporary groups, records from twins and yearling weight records from centrally tested bulls are eliminated in all breeds.

Performance records are screened for typing errors and improper records. The weights and calf ages are checked to eliminate records that are out of range. These ranges are breed specific. An additional check involving within contemporary group ratios is also conducted at the University of Georgia. For this edit, the mean of each contemporary group is computed and the calves within that contemporary group receive a ratio relative to the mean. Ratios that fall outside a specified range are then eliminated. In the past the performance record edits have found negative birth weights, weaning weights of 2000 lbs. and yearling wts of 5000 lbs.

A final edit that is performed at the University of Georgia for most of the breeds concerns the elimination of disconnected data. In order to fairly compare the sires in a breed, a certain data structure must be present. This structure involves having many sires that are used in more than one herd, which insures that all sires are compared directly or indirectly through common bulls. For example, suppose sires A, B, C and D have progeny in contemporary group one, sires A, E and F have progeny in contemporary group two and sires G and H have progeny in contemporary group three. Bulls A through F are said to be connected and the EPDs predicted for them can be compared fairly, while sires G and H are considered disconnected. Sire A has linked or connected contemporary groups one and two, and therefore, comparisons between BCD and EF can be made because all these bulls have progeny in a contemporary group with sire A. It is apparent that sires G and H do not have any progeny in common contemporary groups with bulls A through F. Expected progeny differences generated for bulls G and H can be directly compared to each other only.

In summary, editing is conducted to eliminate or correct errors in animal identification, contemporary group designation, and performance recording, and to insure data that will produce accurate EPDs.

Note: Tables 1 and 2 contain genetic parameter estimates for breeds that have NCE programs at the University of Georgia.

National Cattle Evaluation
Genetic Parameters

BWT

	h^2_D	h^2_M	r_{DM}
Angus	.41	.15	-.34
Hereford	.49	.18	-.27
P. Hereford	.45	.22	-.28
Limousin	.22	.05	-.16
Brangus	.24	.12	-.12
Canadian Charolais	.42	.13	-.18
Shorthorn	.22	.13	0
Beefmaster	.14	.26	-.30
Brahman	.25	.14	-.29
Santa Gertrudis	.34	.30	-.30
Gelbvieh	.41	.12	-.21

National Cattle Evaluation
Genetic Parameters

WWT - GAIN

	h^2_{WD}	h^2_{WM}	r_{WDM}	h^2_G	r_{WDG}
Angus	.28	.22	-.33	.22	.38
Hereford	.24	.24	-.28	.24	.41
P. Hereford	.23	.30	-.27	.22	.42
Limousin	.16	.15	-.30	.15	.34
Brangus	.28	.20	-.29	.20	.30
Canadian Charolais	.23	.30	-.23	.19	.45
Shorthorn	.19	.21	-.09	.20	.35
Beefmaster	.21	.19	-.29	.28	.35
Brahman	.18	.12	0	.26	.35
Santa Gertrudis	.25	.23	-.38	.17	.35
Gelbvieh	.23	.10	-.21	.19	.40

Canadian EPDs

E. Paola de Rose
Chief, Beef and Sheep Improvement
Agriculture Canada

The History

Canada has been involved with beef sire evaluation since the 1960's. In the early years, organized progeny testing was undertaken and adjusted weights and indexes were presented. In the mid-70s, the Beef Sire Monitoring Program (BSMP) began providing Predicted Differences (PD) and Standard Errors of Prediction (SEP) for gain and weight traits, using field data collected through the Federal-Provincial Record of Performance Program. By the 1980s, breed associations and provincial governments had begun to establish performance programs to serve their clientele. This data was also incorporated in each annual run of the BSMP.

In 1989, the evaluation was upgraded to use an Individual Animal Model (IAM) multiple trait procedure. The new program, called the Beef Sire Evaluation Program (BSEP) provides EPDs and accuracies on direct and maternal traits. In 1990, the program moved to a semi-annual evaluation schedule. The model was expended to handle seven traits in 1991. The recently-released Spring 1992 BSEP Sire Summary contains EPDs on 2,598 proven sires and 3267 young sires of 13 breeds.

Genetic evaluations are performed by the federal government. A team of geneticists employed by the Department of Agriculture undertake genetic evaluation for beef and dairy cattle, swine, sheep and goats.

The programs, however, are run as industry-government partnerships. A committee comprised of representatives from breed associations, the AI industry, provincial governments, the commercial cattle industry, and other stakeholders meet twice annually to provide direction to the beef evaluation.

The Data and the Edits

Nine herd test programs currently submit data to BSEP. About 250,000 records are submitted annually. The historical database currently contains 2.5 million records. Breed associations routinely submit pedigree data for use in the evaluation.

Records missing calf tattoo or sex, or sire or dam breed are deleted. In addition, age-of-dam must be reported and must be between 19 and 240 months. Records must contain either calving ease (CE), birth weight (BW), weaning weight (WW) or yearling weight (YW). Duplicate records found within a source (eg. a herd test program) are deleted.

Performance data is validated using the allowable ranges shown in Table 1. Next, animal identifications and breed codes are validated. Tattoos must adhere to acceptable formats. Registration number prefixes are compared to acceptable prefixes defined by breed associations. Breed codes must conform to the industry standard.

MAS categories (subclasses for calf sex, dam age and dam breed) are then assigned. Dam age subclasses for Hereford and for other breeds are shown in Table 2. For the Spring 1992 evaluation, 15 age-of-dam classes were used for the Hereford breed, while other breeds used the traditional 4 classes. The implementation of finer classes (eg. smaller age range per class) was easiest for the Hereford breed, since the evaluation uses only purebred records (eg. only one breed of dam is involved). Evaluations for other breeds involve 20 breed of dam classes. Acceptable dam breeds are shown in Table 3.

The next step in the data handling process is a pedigree cross-check. Performance files are checked against pedigree files submitted by various breed associations to identify errors in identification, or incomplete identification. Then, data from all sources is merged. Duplicates existing in the pooled database are removed.

Once the data is pooled, all MAS subclasses are checked for number of records. All subclasses containing less than 20 records are eliminated. Contemporary groups (defined within sex) are also checked, and all single calf groups are removed. Calves which change contemporary group at weaning are evaluated using their post-weaning grouping.

Connectedness Checks

Connectedness (genetic linkage) is then assessed within and across herds. The within herd assessment is based on females. For each herd, consecutive herd-years in the performance data are compared. If the herd-years share 10 cows (or 30% of cows) they are considered connected. The next herd-year is then compared to the combined previous years. No data is eliminated at this stage. Rather, data from a given herd is deemed connected, or is divided into two or more unconnected subsets.

The across herd connectedness check is based on sires. The herd (or unconnected herd subset) having the most sires is used as a base group. This herd is checked against all other herds in the data, sequentially. When a herd contains one or more progeny of any of the sires in the base group, that herd is considered connected. All sires used in that herd are added into the base group of sires. Once all herds have been checked, the base group of sires is expanded to include all identifiable sons of base group sires which appear with progeny in the performance data base. The sequential checking of herds is then repeated three more times.

Data Loss

Loss of data can be heavy at some steps for some breeds. In the Spring 1992 run, losses at the pedigree crosscheck stage ranged from 5 to 30% for different breeds. Contemporary group edits deleted another 3 to 17% of records. Connectedness checks resulted in the loss of another 2 to 28% of the data.

The Evaluation

Evaluations are run by breed of sire. At the current time, 16 breed databases contain enough performance data (2,000 records) for an evaluation. These breeds are Angus (including black and red), Blonde d'Aquitaine, Brown Swiss, Chianina, Charolais, Galloway, Gelbvieh, Hays Convertor, Hereford, Limousin, Maine-Anjou, Pinzgauer, Salers, Shorthorn, Simmental and Tarentaise.

Evaluations for all breeds except Hereford use commercial data. Having breed-of-dam in the model (as part of the MAS fixed effect) accounts for the contribution of the other breed and the heterotic effect.

The same seven traits are evaluated for all breeds. These are calving ease (direct and maternal), birth weight (direct and maternal), weaning gain (direct and maternal) and post-weaning gain.

All evaluations are undertaken using a multiple-trait Individual Animal Model (IAM). Direct and maternal effects are treated as seperate but correlated traits. The model is as follows:

Individual's Record	=	Fixed contemporary group effect	+	Fixed effect of dam breed, dam age, and calf sex	+	Breeding value of the individual	+	Maternal breeding value of the dam	+	Permanent environment affecting the the dam	+ Residual

The contemporary group effect accounts for the environmental influences affecting a group of calves which were maintained together and treated in a like manner during the assessment period. The MAS effect accounts for the influences which dam age, dam breed and calf sex will have on calf performance.

The breeding value of the individual is a random effect which represents the animal's genetic worth. The Estimated Breeding Value (EBV) produced when the mixed model equations are solved provides the EPD as follows: EPD = EBV/2.

The maternal breeding value of the dam is a random effect which estimates the dam's genetic ability to provide an advantageous maternal environment during gestation, calving or pre-weaning growth.

The random permanent environmental effect accounts for those environmental factors which affect a dam consistently throughout her lifetime, and which therefore affect the records of all of her calves. For example, a cow which milks from three quarters is under the influence of a detrimental permanent environmental effect.

Permanent environmental, genetic and residual variance-covariance matrices are used in the analysis. Seperate matrices are used for the Angus, Charolais, Hereford, Limousin and Simmental evaluations. All other breeds are analyzed using the Simmental matrices. Key heritabilities and correlations are shown in Table 4.

Coefficients for each animal are generated directly from the data and from pedigree records, as described by Kennedy and Schaeffer (1985) and stored on disks. Adjusted right hand sides (RHS), solutions and diagonal matrices are also stored. Block iterations are used whereby all traits for a given animal are computed simultaneously. All animals, sires and dams are represented, therefore back-solving is not required. Each evaluation consists of 150 rounds of iteration, except in unusual circumstances.

An accuracy value is computed for each EPD as an approximation of the square of the correlation between the true genetic value of the animal and the estimate. All accuracies are based on single trait approximations. There is an adjustment for contemporary group size during the accuracy calculation. The procedure uses the accuracy of the sire and dam's own genetic merit to account for pedigree and sib information. The oldest animals are processed first, so that the accuracy of the parents is computed before that of their progeny. The procedure is run iteratively.

The Evaluation Base

The evaluation base is defined as all calves of the breed born in the last three calendar years. The base is changed once a year, for the spring evaluation. Since the base is a current one, the EPD of the average animal in the current population will average zero (0) for each trait. Since the base rolls every year, successive EPDs calculated for individual animals generally decrease as populations undergo genetic progress.

The Sire Summary

Each time the evaluation is run, the multi-breed publication entitled the Canadian Beef Sire Evaluation Program Sire Summary is printed. The sire summary contains proofs on all sires meeting the publication criteria. No proofs on males without progeny or on females are included. Publication criteria have been imposed to ensure that the EPDs published in the official national summary are accurate and reliable, and to ensure that the size of the publication remains manageable.

The publication criteria for Proven Sires are as follows:

1) accuracy of weaning gain EPD $\geq$ 60% (no EPDs are published with an accuracy of < 60%)
2) at least one progeny with a valid performance record born in the last five years
3) progeny with valid performance records in at least 3 herds

Criteria for the publication of Young Sires are:

1) accuracy of weaning gain EPD $\geq$ 40% (no EPDs with accuracies of < 40% are published)
2) at least one progeny with a valid performance record
3) four years of age of younger

The traits reported in the Sire Summary are calving ease (direct), calving ease (maternal), birth weight (direct), weaning gain (direct), maternal milk (= weaning gain maternal), and yearling gain. During the evaluation, post-weaning gain is evaluated, not yearling gain. This is done for technical reasons, in light of the fact that part-whole correlations exist between gain to weaning and gain to yearling. In other words, weaning gain is an inherent part of yearling gain. Following the evaluation, yearling gain EPDs are computed as the sum of the weaning gain and post-weaning gain EPDs. Yearling gain accuracies are computed as the average of the weaning and post-weaning gain accuracies.

For each proven sire, the sire summary indicates the number of progeny contributing information (at weaning), and the number of herds in which they are found. In addition to the number of progeny from daughters of that bull (with weaning records) is noted. For young sires, information on the numbers of progeny and herds is provided.

Sires are ranked for weaning gain and maternal milk. Trait leaders are published. In addition, genetic trend for each trait and breed is published.

Micro-Computer EPDs

Micro-computer modules exist which are linked to the national evaluation. These within- herd modules use an IAM, multiple trait approach. One module uses national run EPDs for all sires, and all historical data for the herd. A second module uses national EPDs for sires and dams, and performance data on the current calf crop. The modules use only data on purebred calves. While the current modules do not include birth weight, work is underway to expand the modules to handle seven traits.

The modules are used in regional and breed association offices to produce EPDs on all sires, cows and calves with minimal turnaround time. In some offices, the time

from data submission until the return of adjusted weights, indexes and EPDs to the farm is less than two weeks.

Planned Developments

In the fall of 1992, a pilot run will be conducted parallel to the regular BSEP run. This pilot run will include data from Canada's national bull test database. Data from all stations which conform to National Standards for the operation of test stations (including requirements for the length of adjustment and test periods, the entry ages and age ranges of bulls, the group sizes, and various aspects of station management) will be eligible for inclusion in this run. Different contemporary group fixed effects will be defined for the pre- and post-weaning periods. Following care review of the results of this pilot run by researchers and the industry, bull test data will likely be incorporated into routine BSEP runs.

Work is underway on the development of a micro-computer EPD module which would operate in test stations. This module would use EPDs from the national run on the parents of tested bulls, and perhaps on the bull himself based on pre-weaning data submitted to the national run.

Research is continuing into the development of international conversion factors for the fair comparison of Canadian beef EPDs to those from the USA, and ultimately from other countries. Preliminary work has been completed for the Angus, Hereford and Limousin breeds. Work is underway with Simmental. In addition, the method for the development of conversion factors is being studies o determine if improvements are possible.

Table 1 - Data Validity Checks

Trait	Valid Range	Action if Invalid
calving ease	U,E,H,S	reject CE record
birth weight (lbs)	$30 < BW < 200$	set BW to missing
age at weaning (days)	$119 < age < 281$	reject weaning & yearling record
weaning weight (lbs)	$100 \leq WW \leq 1200$	reject weaning & yearling record
post-weaning phase (days)	$60 < days < 300$	reject yearling record
yearling weight (lbs)	$400 \leq YW \leq 3000$	reject yearling record
adjusted weaning weight (lbs)	$150 \leq AWW \leq 950$	reject weaning & yearling record
adjusted yearling weight (lbs)	$400 \leq AYW \leq 2500$	reject yearling record

Note 1: Raw weaning and yearling weights are adjusted for calf age to 200 and 365 days, respectively. No adjustment for dam age is made.
Note 2: There is no check for allowable post-weaning gain.
Note 3: If birth weight is missing, a table value is used (Table 5.4), and raw birth weights are not adjusted.

Table 2 - Age of Dam Categories

For all breeds except Hereford, age of dam is coded from 1 to 4, as follows:

-if age is 20-35 months = 1
-if age is 36-47 months = 2
-if age is 48-59 months = 3
-if age is 60-239 months= 4

For the Hereford breed, age of dam is coded as follows:

-if age is 20-29 months = 1
-if age is 30-41 months = 2
-if age is 42-53 months = 3
-if age is 54-65 months = 4
-if age is 66-77 months = 5
-if age is 78-89 months = 6
-if age is 90-101 months = 7
-if age is 102-113 months = 8
-if age is 114-125 months = 9
-if age is 126-137 months = 10
-if age is 138-149 months = 11
-if age is 150-161 months = 12
-if age is 162-173 months = 13
-if age is 174-184 months = 14
-if age is 185-239 months = 15

Table 3 - Breed of Dam Groups

Code	Genetic Makeup of Dam
01	3/4 or more Angus
02	1/2 Charolais, 1/2 British breed
03	3/4 or more Charolais
04	3/4 or more Hereford
05	1/2 Limousin, 1/2 British breed
06	3/4 or more Limousin
07	1/2 Maine-Anjou, 1/2 British
08	3/4 or more Maine-Anjou
09	3/4 or more Shorthorn
10	1/2 Simmental, 1/2 British breed
11	3/4 or more Simmental
12	3/4 British crosses, excluding Angus, Hereford and Shorthorn(see note 1)
13	non-specified combinations (see note 2)
14	3/4 or more Blonde d'Aquitaine
15	3/4 or more Chianina
16	3/4 or more Galloway
17	3/4 or more Gelbvieh
18	3/4 or more Hay's Converter
19	3/4 or more Salers
20	3/4 or more Tarantaise

Note 1: Breeds such as Red Poll, etc..

Note 2: These combinations could be anything, such as:
Charolais X Simmental
Texas Longhorn X Salers
Limousin X Maine-Anjou

Table 4 - Hertiabilities and Correlations (%)

Canadian Beef Sire Evaluation Program (BSEP)

Trait	Breed				
	Angus	Charolais	Hereford	Limousin	Simmental
Birth Weight	40	45	45	40	45
Calving Ease	15	15	15	10	15
Weaning Gain	30	25	30	25	30
Post Weaning Gain	30	30	35	25	35
Maternal BW	20	20	20	20	20
Maternal CE	10	10	10	10	15
Maternal WG	25	25	25	20	25
Trait Combinations					
BW (direct - maternal)	-10	-20	-10	-10	-10
CE (direct - maternal)	-10	-10	-10	-10	-10
WG (direct - maternal)	-20	-20	-20	-25	-25
direct: CE - BW	-30	-30	-10	-30	-30
direct: BW - WG	10	10	10	10	10
direct: WG - PWG	25	45	35	35	45
direct: BW - PWG	10	10	10	10	10

EDITS AND PARAMETERS IN EPD ANALYSES PERFORMED BY COLORADO STATE UNIVERSITY

B. L. Golden, C. H. Mallinckrodt, W. M. Snelling and R. M. Bourdon

Colorado State University Department of Animal Sciences is involved in the national cattle evaluation (NCE) analyses for the American-International Charolais Association (AICA), the Red Angus Association of America (RAAA), the American Tarrentaise Association (ATA) and the Mid America RX_3 Association (RX3). Additionally, CSU is participating in the parameter estimation phase of the NCE performed by the American Salers Association (ASA). CSU is also conducting a study of the feasibility of developing expected progeny differences (EPD) for gestation length for the North American Limousine Foundation. CSU is currently performing a study funded by the Leachman Cattle Company to develop predictions for cattle from multiple breed origins. CSU has performed several within herd analyses for purebred cattle producers including Beckton Stock Farms, One Bar Eleven and others.

CSU utilizes a multiple trait - reduced animal model (MTRAM) for all traits analyzed (birth, weaning and yearling). All MTRAM are currently performed as combinations of two trait models. This means that weaning weight is analyzed in combination with birth weight in one analysis and weaning weight is analyzed again in combination with post weaning gain in the yearling weight analysis.

Edits

CSU forms contemporary groups and adjusts raw data prior to analysis for all data sets analyzed accept the data from the RAAA. The RAAA forms contemporary group designations and performs all prior adjustments before creating the magnetic copy of the data that is received by CSU. Table 1 shows the amounts of data received in the performance files obtained from the associations and the amounts used in the NCE analyses. Data that are used in the analysis must come from contemporary groups of at least two individuals and fall within ranges of reasonable values. These ranges are designated to remove data entry errors. CSU does not currently eliminate data that may indicate a sires offspring is not correctly quantified within a contemporary group. This type of data filter has been applied in the past by CSU to eliminate small amounts of data that were obviously erroneous.

Even though the breed associations are requested to identify calves who are the product of embryo transfer technology or the result of twin births, CSU identifies any calves that were missed by the breed associations. This is accomplished by ordering the calves by dam within age of dam class and identifying those who do not occur uniquely. An additional check is made by ordering calves by dam within birth year.

TABLE 1. AMOUNT OF DATA RECEIVED FROM FOUR BREED ASSOCIATIONS AND AMOUNT USED FOR NATIONAL CATTLE EVALUATION.

	Birth wt. Received	Birth wt. Used	Weaning wt. Recvd	Weaning wt. used	Yearling wt. recvd	Yearling wt. used
AICA	229163	172741	224131	203330	76830	65007
ATA	58191	46964	51258	43587	8921	6799
RAAA	224178	213172	294873	254184	94590	88958
RX3	15999	15999	15394	14789	5549	5206

CSU does not eliminate any calf's pedigree data when that calf's performance data does not qualify for the NCE analyses or is, otherwise, unavailable. All available pedigree data are used. The breed associations provide additional pedigree information along with the performance data. All pedigree data supplied is *used to* construct as complete a relationship matrix as is possible. Mallinckrodt et. al (1992[a]) demonstrated the importance of using all available pedigree information.

Contemporary groups and adjustment factors

Adjustment factors are applied to the data for all fixed effects, except contemporary groups, prior to obtaining EPD (Tables 2 and 3) except for the ATA analyses. Contemporary groups are constructed to reflect effects described in table 4. The methods of contemporary group formation were mutually agreed upon by CSU and the client organization. Adjustment factors were computed in analyses of each data set and are unique to each organization.

TABLE 2. ADJUSTMENT FACTORS FOR FIXED EFFECTS FOR THREE OF THE FOUR BREED ASSOCIATIONS FOR BIRTH WEIGHT[a].

	AICA	RAAA	RX3
Sex[b]	1.06	1.07	1.06
Age of Dam			
2	6	4	7.1
3	4	2	4.1
4	1	.5	1.9
5 - 10	0	0	0
11 and older	1	1	.7

[a] These factors were fit as fixed effects in the ATA analyses.

[b] Adjustments for sex are multiplicative. Heifer birth weight is multiplied by the factor.

TABLE 3. AGE OF DAM ADJUSTMENT FACTORS FOR THREE OF THE FOUR BREED ASSOCIATIONS FOR WEANING WEIGHT.

	AICA	RAAA	RX2
Bulls & Steers			
2	61	60	62.1
3	39	40	25.8
4	12	20	8.8
5 - 10	0	0	0
11 and older	34	20	17.4
Heifers			
2	52	54	44.0
3	32	36	20.6
4	8	18	7.7
5 - 10	0	0	0
11 and older	26	18	26.4

TABLE 4. FACTORS CONSIDERED IN CONTEMPORARY GROUP FORMATION FOR FOUR BREED ASSOCIATIONS.

	AICA	ATA	RAAA	RX3
Birth Wt.	Year of Birth Breeder Percent Class Season of Birth	Year of Birth Breeder Percent Class	Year of Birth Herd Percent Class Treatment Code	Year of Birth Herd Percent Class
Weaning Wt.	Birth Contemporary Group Sex Weight Date Age Range	Birth Contemporary Group Sex Weight Date Age Range	Birth Contemporary Group Sex Weight Group Age Range Treatment Code	Birth Contemporary Group Sex Weight Group Age Range Treatment Creep Code
160 d Gain	Weaning Contemporary Group Weight Date Age Range	Weaning Contemporary Group Weight Date Age Range	Weaning Contemporary Group Weight Group Age Range	Weaning Contemporary Group Weight Group Age Range

In the analyses performed for the ATA, fixed effects of sex and age of dam (according to the BIF recommend age of dam classes) on birth weight, sex, age of dam and sex by age of dam interaction on weaning weight are fit simultaneously in the

analyses used to obtain the EPD. The regression of weaning weight on age is adjusted according to the BIF recommend equation prior to performing the analyses that produce the EPD.

Heritabilities and correlations

Heritabilities and correlations currently used in NCE are presented in tables 5 through 8. Table 9 contains heritabilities and correlations obtained for the ASA. Estimates in tables 5 through 8 were obtained using Hendersons method III. Estimates in table 9 were obtained using an approximate REML procedure (sire - maternal grand sire).

Tables 5 through 8 do not contain estimates for a permanent environment/non-additive genetics due to the dam. A study recently completed at CSU (Mallinckrodt, et. al, 1992[a]) showed this component does not have an important influence on the predictions of genetic merit for data sets typical of those used for NCE. Leaving it out of the NCE reduces the cost of computing solutions both by reducing the size of the linear system of equations and the number of rounds of iteration required to obtain convergence.

Tables 5 through 8 do not include components for the genetic correlations between the maternal effects on weaning weight and the direct effects in the analyses. A current study at CSU (Mallinckrodt, 1992[b]) indicates that the amount of reporting bias that occurs in data sets used for NCE can produce artificially high negative estimates of these parameters. This erroneous estimate will significantly reduce the correlation between true genetic merit and the prediction (Mallinckrodt, et. al, 1992[a]). Fitting a zero correlation yields EPD with higher correlation to true value then fitting an estimate obtained from data with reporting bias.

TABLE 5. HERITABILITIES AND CORRELATIONS USED IN THE NATIONAL CATTLE EVALUATION ANALYSIS FOR THE AMERICAN-INTERNATIONAL CHAROLAIS ASSOCIATION[a].

	Birth Weight	Weaning Wt.	160 Day Gain	Milk
Birth Weight	**.52**	.42		0
Weaning Wt.	.32	**.43**	.08	0
160 Day Gain		.12	**.26**	0
Milk				**.22**

[a] Heritabilities are on the diagonal (bold), genetic correlations are above the diagonal and environmental correlations are below the diagonal.

TABLE 6. HERITABILITIES AND CORRELATIONS USED IN THE NATIONAL CATTLE EVALUATION ANALYSIS FOR THE AMERICAN TARRENTAISE ASSOCIATION[a].

	Birth Weight	Weaning Wt.	160 d Gain	Calving Ease	Milk	Calving Maternal
Birth Wt.	**.69**	.18		.22	0	0
Weaning	.17	**.49**	.07		0	
160d Gain		.10	**.30**		0	
Calving Ease	.05			**.48**		0
Milk					**.05**	
Calving Maternal						**.12**

[a] Heritabilities are on the diagonal (bold), genetic correlations are above the diagonal and environmental correlations are below the diagonal.

TABLE 7. HERITABILITIES AND CORRELATIONS USED IN THE NATIONAL CATTLE EVALUATION ANALYSIS FOR THE RED ANGUS ASSOCIATION OF AMERICA[a].

	Birth Weight	Weaning Wt.	160 Day Gain	Milk
Birth Weight	**.46**	.56		0
Weaning Wt.	.67	**.36**	.18	0
160 Day Gain		.16	**.36**	0
Milk				**.09**

[a] Heritabilities are on the diagonal (bold), genetic correlations are above the diagonal and environmental correlations are below the diagonal.

TABLE 8. HERITABILITIES AND CORRELATIONS USED IN THE NATIONAL CATTLE EVALUATION ANALYSIS FOR THE RX[3] ASSOCIATION[a].

	Birth Weight	Weaning Wt.	160 Day Gain	Milk
Birth Weight	**.44**	.49		0
Weaning Wt.	.53	**.50**	.11	0
160 Day Gain		.03	**.196**	0
Milk				**.33**

[a] Heritabilities are on the diagonal (bold), genetic correlations are above the diagonal and environmental correlations are below the diagonal.

TABLE 9. HERITABILITIES AND CORRELATIONS DETERMINED FOR THE AMERICAN SALERS ASSOCIATION[a].

	Birth Weight	Weaning Wt.	160 Day Gain	Birth Mat.	Milk
Birth Weight	**.275**	.115	.093	-.002	.043
Weaning Wt.	.32	**.17**	.142		.028
160 Day Gain	.15	-.07	**.082**	.066	-.002
Birth Maternal				**.108**	
Milk					**.130**

[a] Heritabilities are on the diagonal (bold), genetic correlations are above the diagonal and environmental correlations are below the diagonal. Estimates were determined using an approximate REML procedure.

Other considerations for NCE

The goal of national cattle evaluation must be to maximize the correlation of the prediction to the true genetic value being predicted. In a statistical sense, the mixed model methodology employed is appropriate for this task. Many variations in the implementation of the mixed models procedures may yield higher correlations to true values then implementations that strictly follow the statistical requirements of best linear unbiased prediction. This is because of considerations such as the unique characteristics of data collected by beef breed associations, and because it may be impossible to adequately account for all main and interaction effects involved in the traits analyzed. For example, the large amounts of incomplete reporting that can exist in a breed association data set may dictate that preadjusting data for effects such as sex or age of dam is better then trying to account for these effects at the time the EPD are obtained. Another example previously discussed in this paper is the use of a zero correlation between the weaning weight maternal and the direct effects.

Also, the size of the data sets involved, and thus, the size of the analytical problem being solved imposes constraints on the ability to achieve the highest possible correlation between true genetic merit and the prediction. The greater the number of factors that a given model tries to account for, the greater the computational requirements. Available computer capacity grow dramatically from year to year, but within each year the amount of computer resources available can be constraining. There are several examples in current NCE methodology where approximations are implemented to keep the size of the linear system reasonable. One example discussed in this paper is the elimination of the equations that account for permanent environment/non-additive genetics due to the dam.

CSU has undertaken two studies to attempt to quantify the effects of these approximations on the relationship between the prediction of genetic merit and its true

value. In the first study the amount of computer time required to achieve fully converged EPD was explored along with a method of reducing the amount of computer time required to obtain fully converged solutions. EPD are computed using an iterative procedure that involves repeatedly computing the EPD until the best prediction possible is obtained. Each recomputation of the EPD is called an iteration. Computer time saved by improving the rate of convergence in solutions, and thus reducing the amount of iterations required, can be devoted to eliminating approximations in the assembly of the linear systems. The technique used to improve convergence rate (Snelling et. al, 1992) involved stopping iteration after a predetermined number of iterations and computing the average of the current solutions for the EPD. This average is then subtracted from the current values of all EPD and added to the current values of the solutions for the contemporary group effects. The iteration is then continued with the adjusted EPD and contemporary group effects. The mean adjustment technique saved large amounts of computation to obtain fully converged solutions.

The second study (Mallinckrodt, et. al, 1992) quantified the relative losses in reliability of EPD due to approximation methods. The approximations studied were, 1) not considering the permanent environment/non-additive genetic effect on weaning weight due to the dam; 2) not considering the genetic relationship between post weaning gain and milk; 3) not considering environmental correlations between traits; 4) Using an approximate relationship matrix rather then the exact relationship matrix; 5) using only a portion of the available pedigree information. Using these approximations reduces the size of the problem to be solved. Simulated data sets were created according to a method described by Van Vleck, et. al (1991). Traits simulated were weaning weight and 160 d post weaning gain. The effect of each approximation was dependent on data structure. Approximations 4 and 5 had the greatest impact on reliability of EPD. The largest decrease in reliability was seen in milk EPD where the correlation of true value to prediction dropped from .499 (no approximation) to .403 (approximation 5).

Literature Cited

Mallinckrodt, C. H., B. L. Golden and R. M. Bourdon. 1992[a]. The impact of approximations of BLUP methodology on the reliability of expected progeny differences. Proc. Western Section, Amer. Soc. Anim. Sci. 43(in press).

Mallinckrodt, C. H. 1992[b]. Practical and technical considerations of implementing national cattle evaluations. (in review) Ph.D. Dissertation. Colorado State Univ., Fort Collins.

Mallinckrodt, C. H., B. L. Golden and R. M. Bourdon. 1992[c]. The impact of data problems on the reliability of expected progeny differences. Proc. Western Section, Amer. Soc. Anim. Sci. 43 (in press).

Snelling, W. M., and B. L. Golden. 1992. Mean adjustment of the solution vector to improve convergence of mixed model equations. Proc. Western Section, Amer. Soc. Anim. Sci. 43 (in press).

EDITS, CONTEMPORARY GROUPS and PARAMETERS

EPD Analysis: American Simmental Association

R.L Quaas & E.J. Pollak
Cornell University, Ithaca, NY

EDITS

1.	Missing Information
2.	Sire not PB Simmental
	(Calf or Sire not PB Simbrah)
3.	Calving Interval < 280 d
4.	Multiple Birth (natural or ET)
5.	Age of Dam < 450 d
6.	Age at WWt (must be 260-250 d)
	Age at YWt (must be 330-440 d)
7.	YW without WWt deleted
8.	Single Calf Contemporary Group
9.	Unconnected (by sires) Birth CG (all records deleted)

BIRTH WEIGHT & CALVING EASE CONTEMPORARY GROUPS

1.	Breeder-Herd Code	
2.	Year	
3.	Season	*Jan.-June, July-Dec.*
4.	Sex	*Bull, Heifer*
5.	% Simmental	*50, 75, >75*

WEANING WEIGHT CONTEMPORARY GROUPS

1.	Breeder-Herd Code	
2.	Management/Pasture Code	
3.	Date Weighed	
4.	Weaning Sex	*Bull, Heifer, Steer*
5.	% Simmental	*50, 75, >75*

YEARLING WEIGHT CONTEMPORARY GROUPS

1.	Weaning CG	
2.	Feeding Unit Code	
3.	Date Weighed	
4.	Yearling Sex	*Bull, Heifer, Steer*

WEIGHT TRAIT EPD ANALYSIS

Animal Model w/ Heterogeneous Sex-%Simmental Subclass Variances

GENETIC CORRELATIONS

	BW-d	WW-d	Gain-d	YW-d	WW-m	WW-mgs
BW-d	1.00	0.49	0.32	0.47	-0.15	0.18
WW-d	0.49	1.00	0.51	0.89	-0.32	0.36
Gain-d	0.32	0.51	1.00	0.84	-0.02	0.32
YW-d	0.47	0.89	0.84	1.00	-0.21	0.40
WW-m	-0.15	-0.32	-0.02	-0.21	1.00	0.77
WW-mgs	0.18	0.36	0.32	0.40	0.77	1.00

HERITABILITIES, (Phenotypic SD, lbs.)

	50% females	50% males	>50% females	>50% males
BW-d	0.41 (5.5)	0.35 (5.9)	0.45 (5.9)	0.39 (6.2)
WW-d	0.21 (23)	0.20 (27)	0.33 (32)	0.28 (33)
Gain-d	0.18 (19)	0.21 (26)	0.32 (25)	0.26 (29)
YW-d	0.31 (36)	0.29 (46)	0.47 (49)	0.38 (54)
WW-m	0.10	0.12	0.15	0.16

CALVING EASE EPD ANALYSIS

Sire-MGS Threshold Model w/ Birth Wt. as Indicator Trait

HERITABILITIES & GENETIC CORRELATIONS

	BW	CE-d	CE-mgs
BW	.18	-.41	.14
CE-d	-.41	.18	-.13
CE-mgs	.14	-.13	.19

REFERENCES

Dong, M.C., R.L. Quaas and E.J. Pollak. 1991. (Abstr.) Estimation of genetic parameters of calving ease and birth weight by a threshold model. J. Animal Sci. 69(Suppl. 1):204.

Garrick, D.J., E.J. Pollak, R.L. Quaas and L.D. Van Vleck. 1989. Variance heterogeneity in direct and maternal weight traits by sex and percent purebred for Simmental-sired calves. J. Animal Sci. 67:2515-2528.

Quaas, R.L., D.J. Garrick and W.H. McElhenney. 1989. Multiple trait prediction for a type of model with heterogeneous genetic and residual covariance structures. J. Animal Sci. 67:2529-2535.

1990 AVERAGE EPD'S FOR EACH BREED

For selection of breeding stock, it is important to know how EPD's for an individual animal compare to the current breed average. Mean non-parent expected progeny differences (EPD's) are tabulated for each breed. These are useful for making comparisons within breeds. They cannot be used to compare different breeds because EPD's are estimated from separate analyses for each breed. The means are for all calves born in 1990 from the 1991 genetic evaluations. The 1990 calves were chosen because limited data were available on 1991 calves in the 1991 genetic evaluations.

1990 ALL ANIMAL NON-PARENT MEAN EPD'S FROM 1991 GENETIC EVALUATIONS

Breed	Birth wt	Wean. wt	Yrlg. wt	Maternal Milk	Maternal Total	Yrlg. ht	Scrot. circ.	Calving ease Direct	Calving ease Maternal
	lb	lb	lb	lb	lb	in	in	%	%
Angus	+3.2	+20	+36	+7	+17				
Beefmaster	0	+5.3	+9.6		+4.5				
Brahman	+.7	+5.4	+8.7	+4.1					
Brangus	+1.0	+8.9	+14.4	+.8	+5.2				
Charolais	+.6	+2	+3	-1.8	-.9				
Chianina		-.9		-.6					
Gelbvieh	+.4	+4	+8	+2	+4			100.0[a]	100.8[a]
Hereford	+1.9	+25	+40	+8.0	+20	+.5	+.16		
Limousin	+.6	+3.5	+6.7	+.5					
P. Hereford	+3.2	+20	+30	+.3	+10				
Red Angus	+.2	+15.4	+21.9	+5.3	+13.0				
Salers	-.1	+3.8	+3	+.2	+2.1				
Shorthorn	+1.4	+7.5	+12	+2.8					
Simmental	+.4	+9	+19	+.7	+3.6			-4.3[a]	+5.5[a]

[a]For Simmental, calving ease is percentage unassisted births in first calf heifers. For Gelbvieh, calving ease is a ratio (%) of calving ease scores in first calf heifers.

MEAN EPD'S FOR 1990-BORN CALVES
SPRING 1992 CANADIAN BEEF SIRE EVALUATION PROGRAM (BSEP)
(ADJUSTED TO TWO DIFFERENT BASES)

		Direct Traits				Maternal Traits		
Breed	Base	CE	BW	WG	YG	CE	BW	WG
Angus	Current	0.0	0.0	0.0	0.2	0.0	0.0	-0.1
	1982	0.0	0.5	4.8	8.9	0.1	-0.3	-2.5
Blonde	Current	0.0	0.1	0.4	0.8	0.0	0.0	0.3
	1982	0.4	-0.1	0.2	0.2	-0.5	0.2	3.1
Charolais	Current	0.0	0.0	0.2	0.2	0.0	0.0	-0.1
	1982	-0.3	0.9	3.4	4.9	0.6	-1.4	-3.4
Gelbvieh	Current	0.1	0.0	-0.2	-0.4	0.1	0.2	0.0
	1982	0.0	0.1	1.7	2.1	0.2	-0.2	-2.6
Hereford	Current	0.0	0.1	0.1	0.1	0.0	0.0	0.0
	1982	-0.4	1.7	12.2	23.4	0.3	-0.2	4.4
Limousin	Current	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
	1982	-0.2	0.2	2.4	4.9	0.0	-0.2	-1.3
Salers	Current	0.0	-0.1	-0.5	-1.0	0.0	0.0	0.4
	1982	-0.1	-0.5	-3.1	-7.3	0.3	0.0	3.6
Shorthorn	Current	-0.1	0.0	-0.2	-0.7	0.1	0.0	-0.3
	1982	-0.5	0.3	0.6	0.1	0.2	0.0	-0.8
Simmental	Current	0.0	-0.1	0.2	0.2	0.0	0.0	-0.1
	1982	-0.2	0.3	5.8	11.4	0.2	-0.8	-4.0

Current base = mean EPD for all calves born in 1989, 1990 and 1991 is zero
1982 base = mean EPD for all calves born in 1982 is zero

BREED COMPARISONS ADJUSTED FOR WITHIN BREED GENETIC TRENDS USING EPD'S[1]

Nunez-Dominguez, R., L. V. Cundiff and L. D. Van Vleck

U.S. Department of Agriculture, Clay Center, NE 68933
and University of Nebraska, Lincoln, 68583-0908

Accurate estimates of breed means are needed by cattlemen to select breeds that optimize performance and exploit heterosis in crosses. Breed characterization experiments conducted since the 1970's have provided valuable information to cattlemen about breed differences. However, most breeds have changed significantly during this time span. Estimates of genetic trend in expected progeny differences (EPD's) indicate that some breeds have placed major emphasis on growth to weaning and yearling ages, while others have placed primary emphasis on calving ease and maintaining or reducing birth weight. Still other breeds have emphasized maternal performance (milk). Recent research using data from the Germplasm Evaluation (GPE) program at the U. S. Meat Animal Research Center (MARC) has demonstrated that within breed EPD's can be used to accurately predict actual performance of F1 calves produced and to adjust breed comparisons for genetic trends and sire sampling (Notter and Cundiff, 1991). This report summarizes results of a recent analysis that includes data on calves by new samples of Angus, Hereford, Polled Hereford, Charolais, Shorthorn and Salers bulls used in Cycle IV (1986-1990 calf crops) and of Maine Anjou and Chianina used in Cycle II (1973-1974 calf crops), that were not included in the previous analysis of Notter and Cundiff (1991).

PROCEDURE

Birth weight (n = 2,883), weaning weight (n = 2,910), and yearling weight (n = 2,357) obtained on F1 calves by 10 to 12 sire breeds mated to Hereford and Angus dams produced in the Germplasm Evaluation Program at the U.S. Meat Animal Research Center, Clay Center, Nebraska were analyzed. Although, twenty six breeds have been evaluated to date in the GPE Program, only breeds with current national genetic evaluations were included in the analysis. Also, only progeny of sires with EPD's in the 1991 genetic evaluations of their respective breeds were included in the current analysis. Data on 200-day weaning weight of three-breed-cross calves (n = 4,592) produced by mating F1 females (n = 986) to unrelated sire breeds were used to estimate breed differences adjusted for genetic trends in maternal weaning weight and net maternal (milk) EPD's.

Table 1 shows the number of sires and progeny used in the analysis of weaning weight, and the time period when breeds were used in the GPE program. Twelve breeds were included in the analysis for weaning weight. Maine Anjou EPD's were available only for birth weight and weaning weight, and Chianina EPD's were available only for weaning weight. Genetic trend was not reported for Tarentaise. The number of maternal grandsires, F1 dams and three-breed-cross progeny by each breed of maternal grandsire, and the period of time when these breeds were used in the GPE program are shown in Table 2 for the analysis of maternal weaning weight.

---

[1]Presented at Beef Improvement Federation Annual Conference, May 6-9, 1992, Portland OR.

The analytical procedures used were essentially the same as those of Notter and Cundiff (1991). The model for traits on F1 progeny included effects of dam breed-cow age-birth year-sex subclasses, and sire breed. Birth date was included as a covariate for birth weight analysis. Cow ages were coded as 2, 3, 4, ≥5 years of age. Estimates of sire breed effects were obtained by least square analyses for the different traits. Then a subsequent analysis was performed for each trait which included the regression of calf performance on the sire EPD for that trait. As recommended for the purposes of research at the 1990 BIF meeting, breed differences were adjusted to a 1982 fixed base for all breeds as follows:

$$\text{Adjusted 1982 Mean} = \text{Breed mean at MARC} + b\{(\text{1982 Breed mean EPD}) - (\text{Mean EPD of bulls used at MARC})\}$$

where,

Breed mean at MARC = Estimates of sire breed effects from the least squares analysis, and

b = pooled within breed regression coefficient of calf performance on the EPD of the sire for the respective trait (lb/lb EPD).

Similarly, two models were used for the analyses of maternal weaning weights. Model 1 included the effects of cycle (C), age of dam (A, 2-yr old, ≥3-yr old), cycle X age of dam (CA), birth year nested in CA, sex, grandsire breed, granddam breed, and sire breed nested in CA. In model 2, the previous model was augmented with either the continuous effect of the total maternal weaning weight EPD of the maternal grandsire or simultaneous continuous effects of both the milk and direct weaning weight EPD's of the maternal grandsire. The following equation was used to adjust weaning weight of the maternal grandsire breeds at MARC for sire sampling and genetic trend to the 1982 base year:

$$\text{Adjusted 1982 Mean} = \text{Breed mean at MARC} + b_{WW}\{(\text{1982 Mean Breed Wn Wt EPD}) - (\text{Mean WW EPD of sires used at MARC})\} + b_{Milk}\{(\text{1982 Mean Breed Milk EPD}) - (\text{Mean Milk EPD of sires used at MARC})\}$$

where,

b_{WW} = pooled within breed regression coefficient of calf weaning weight on the direct weaning weight EPD of the maternal grandsire (lb/lb), and

b_{Milk} = pooled within breed regression coefficient of calf weaning weight on the milk EPD of the maternal grandsire (lb/lb).

RESULTS AND DISCUSSION

Pooled within breed regressions (response in lb/lb EPD) were 1.04 for birth weight, .88 for weaning weight (direct) and 1.40 for yearling weight. These results are remarkably close to the theoretical expectation that a pound of

performance in F1 crosses will result from each one pound of EPD of the sire, especially for birth weight and weaning weight. For yearling weight, the regression for steers (1.57) was higher than for heifers (1.18). Possibly the heritability of yearling weight is greater for steers at MARC than for heifers at MARC, and higher for steers at MARC than for bulls or heifers produced in purebred herds involving diverse North American environments. Previous results have indicated higher heritability for steers than for bulls.

Pooled within breed regressions (lb/lb) of calf weaning weight on direct weaning weight, milk, and total maternal EPD's were .44, 1.02, and .99, respectively. These estimates are also remarkably similar to the expected values of .5 for direct weaning weight, 1.0 for milk and 1.0 for total maternal EPD. The estimate for weaning weight of .44 indicates that 88% of the differences in weaning weight predicted by weaning weight EPD of maternal grandsires were realized in three-breed-cross progeny.

Mean breed differences observed at MARC and mean breed differences adjusted to the 1982 genetic base, expressed as deviations from the mean of all breeds, are shown for birth weight, weaning weight, yearling weight, total maternal weaning weight (.5 direct + Milk), and net maternal weaning weight (milk) in Figures 1, 2, 3, 4, and 5. Sire breed means are ordered from lightest to heaviest based on least squares estimates of performance at MARC. Under the assumption of similar heterosis effects among different specific crosses, differences among sire breeds are indicative of one-half the difference in additive effects of genes.

The effect of adjusting sire breed means to the 1982 base varied among breeds, but some reranking of breeds occurred for the different traits. The largest changes were for Salers for birth weight (Figure 1) and for Shorthorn, Simmental and Salers for weaning weight (Figure 2) and for yearling weight (Figure 3). In general, the adjustment to the 1982 base tended to regress breed means toward the average of all breeds, indicating that the breeds are becoming increasingly similar in weight at birth, weaning and yearling ages. The differences were reduced 24% for birth weight, 25% for weaning weight, and 4% for yearling weight.

Adjustment for genetic trend and sire sampling to the 1982 base caused a 14% reduction in estimates of differences among maternal grandsire breeds for weaning weight and an 8% reduction in estimates of breed milk effects (Figure 5). In general, breeds that had a history of selection for milk produciton ranked highest in the breed maternal effects, especially net maternal effects (Milk). Breed maternal effects favored Hereford over Angus and Polled Hereford. Within breed estimates of genetic trend for milk have been greater in Hereford than Angus, particularly for the period from 1975 to 1985. Within breed estimates of genetic change for milk in the American Polled Hereford Association have been small. Nevertheless, these results are surprising because previous breed comparisons have consistently shown larger maternal effects for Angus than for Hereford.

Across breed EPD's. The deviations presented in Figures 1 through 5 can be used to estimate across breed EPD's adjusted to a fixed genetic base of 1982. If within breed EPD's were all expressed relative to a 1982 base, the breed deviations shown for each trait could be added to the within breed EPD's to compare animals on the same scale regardless of breed. Even if the genetic

base were not fixed to a common point in time such as 1982, if the mean EPD for each breed in 1982 (see Proceedings of 1991 BIF Meeting) were subtracted from the within breed EPD of each animal, the remainder could be added to the deviations shown for each trait in Figures 1 through 5 to estimate across breed EPD's adjusted to a 1982 base.

A shortcoming of across breed EPD's is that errors of estimating breed mean deviations (Figures 1 through 5) are repeated every time the breed mean deviations are used to estimate across breed EPD's. Such errors can arise from random sources of experimental error in the experimental (or field) data used to compare breeds, or they can result from errors in estimation of genetic trend in each breed. In the current analysis, it was assumed that the regression of performance on EPD's was the same for each breed. Perhaps if more data were available, it could be shown that the regression coefficients are not the same for each breed. Differential regressions are to be expected because each breed uses their own estimates of heritability and other genetic and environmental parameters in their genetic evaluations. EPD's are expected to be more compressed when low estimates of heritability are used than when high estimates of heritability are used. The consequence of such errors is amplified if breed mean deviations are applied to compare animals of different breeds. Then, every animal in a breed can falsely benefit from a favorable error and every animal in another breed can be handicapped by an unfavorable error in estimation of breed means. It is doubtful that the estimates of breed mean deviations shown in figures 1 through 5 are estimated with sufficient precision to justify their use to compare all animals on the same scale regardless of breed.

An alternative procedure is to estimate current sire breed means adjusted for genetic trends and sire sampling. Table 3 presents sire breed means, adjusted to a 1990 birth year basis, using within breed EPD's from genetic evaluations conducted in 1991. The procedures used to make these adjustments are essentially the same as before except that 1990 mean EPD's are used instead of 1982 mean EPD's for each breed in the adjustment equations. These estimates have the advantage of being more current (1990 versus 1982). As sire breed means, they represent the means of F1 crosses (averaged over Angus and Hereford dams) by eleven different sire breeds. Like EPD's, they reflect differences that sire breeds transmit to their progeny. Thus, they represent only half the difference expected among pure breeds. The adjusted mean differences should provide a more appropriate basis for selection of breeds than the actual experimental results that have not been adjusted for genetic trends. As a second step, intrapopulation EPD's should be used to select individuals within breeds.

LITERATURE CITED

Notter, D. R. and L. V. Cundiff. 1991. Across-breed expected progeny differences: Use of within breed expected progeny differences to adjust beed evaluations for sire sampling and genetic trend. J. Anim. Sci. 69:4763-4776.

TABLE 1. NUMBER OF SIRES AND PROGENY PER SIRE BREED, AND TIME PERIODS WHEN THESE BREEDS WERE USED IN THE GPE PROGRAM

Sire Breed	Number		Cycle			
	Sires	Prog.	I (1970-72)	II (1973-74)	III (1975-76)	IV (1986-90)
Angus	36	269	X[a,b]	X[a,b]	X[a,b]	X[a,b]
Hereford	23	266	X[a,b]	X[a,b]	X[a,b]	X[a,b]
Polled Hereford	20	203	X[a,b]	X[a,b]	X[a,b]	X[a,b]
Charolais	42	364	X[c]			X[b]
Limousin	20	346	X[c]			
Simmental	27	376	X[c]			
Gelbvieh	11	193		X[c]		
Maine Anjou	15	155		X[c]		
Chianina	20	216		X[c]		
Tarentaise	7	191			X[c]	
Shorthorn	23	155				X[c]
Salers	27	176				X[c]

[a] Sires used to create ties for breed comparisons.

[b] New sample of sires born since 1982.

[c] Sires used in only one cycle.

TABLE 2. NUMBER OF MATERNAL GRANDSIRES, DAMS AND PROGENY BY BREED OF MATERNAL GRANDSIRE, AND PERIOD OF TIME WHEN CALVES WERE BORN IN THE GPE PROGRAM

Breed	Number			Birth Year of Calves
	Maternal grandsires	Dams	Prog.	
Angus	20	86	357	1972-82,88-90
Hereford	19	89	395	1972-82,88-90
Polled Hereford	14	74	316	1974-82,88-90
Charolais	33	119	538	1972-79,88-90
Limousin	20	150	766	1972-79
Simmental	27	152	796	1972-79
Gelbvieh	11	77	439	1975-82
Chianina	19	87	495	1975-82
Tarentaise	6	78	341	1977-82
Shorthorn	17	29	60	1988-90
Salers	20	45	89	1988-90

TABLE 3. SIRE BREED MEANS ADJUSTED TO 1990 MEAN EPD

Breed	Birth weight	Weaning weight	Yearling weight	Maternal	
				Weaning weight	Milk
Limousin	83.0	462	792	458	-13.4
Hereford	83.2	463	810	463	- 7.8
Angus	79.7	464	813	455	-16.8
P. Hereford	82.6	466	801	439	-34.1
Shorthorn	82.0	468	799	479	5.2
Salers	80.6	470	797	485	10.4
Charolais	87.0	472	818	475	- .4
Maine Anjou	87.1	474	*	*	*
Chianina	*	476	*	491	13.0
Simmental	85.6	480	852	499	19.0
Gelbvieh	85.8	480	821	505	24.8

*EPD's not available.

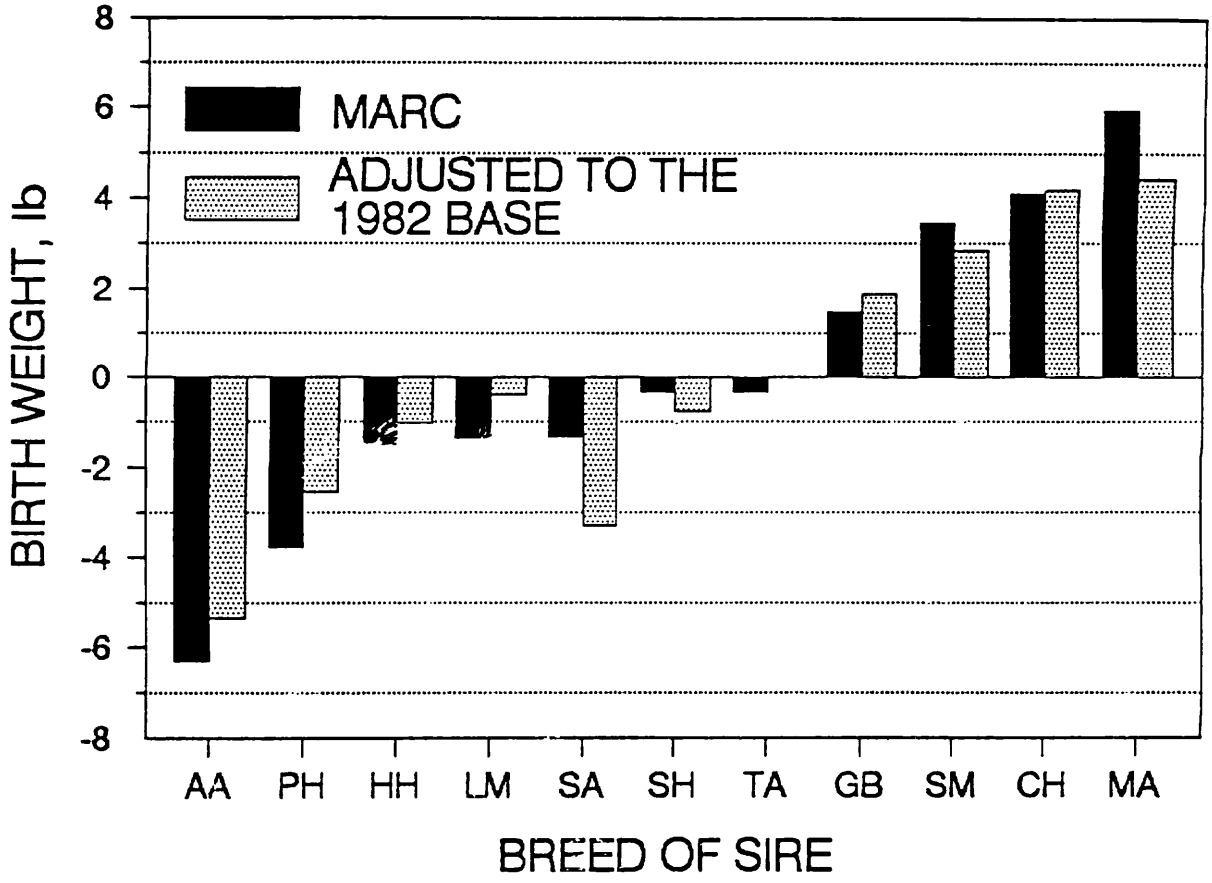


Figure 1. Birth weight means observed at MARC and means adjusted to the 1982 genetic base, as deviations from the mean of all breeds, for Angus (AA), Polled Hereford (PH), Hereford (HH), Limousin (LM), Salers (SA), Shorthorn (SH), Tarentaise (TA), Gelbvieh (GB), Simmental (SM), Charolais (CH), and Maine Anjou (MA) sire breeds.

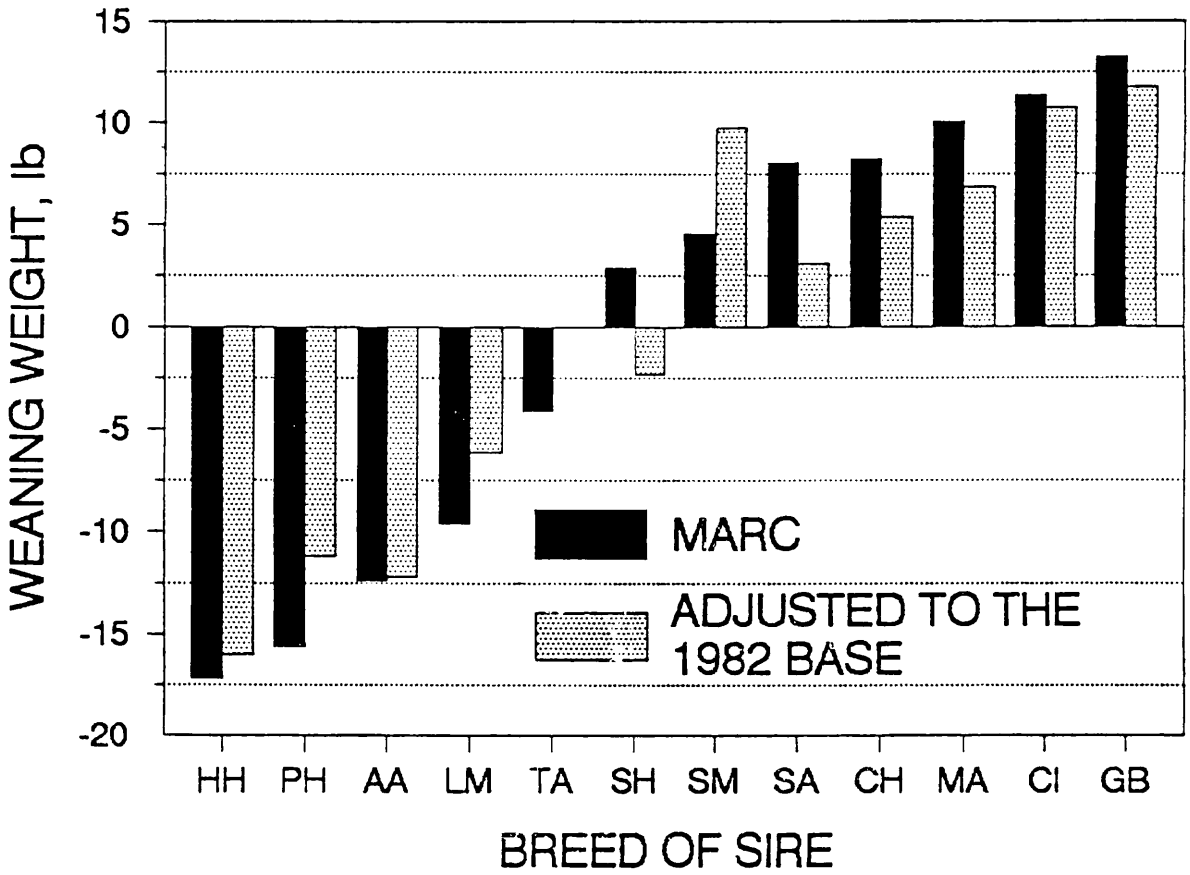


Figure 2. Weaning weight means observed at MARC and means adjusted to the 1982 genetic base, as deviations from the mean of all breeds, for Hereford (HH), Polled Hereford (PH), Angus (AA), Limousin (LM), Tarentaise (TA), Shorthorn (SH), Simmental (SM), Salers (SA), Charolais (CH), Maine Anjou (MA), Chianina (CI), and Gelbvieh (GB) sire breeds.

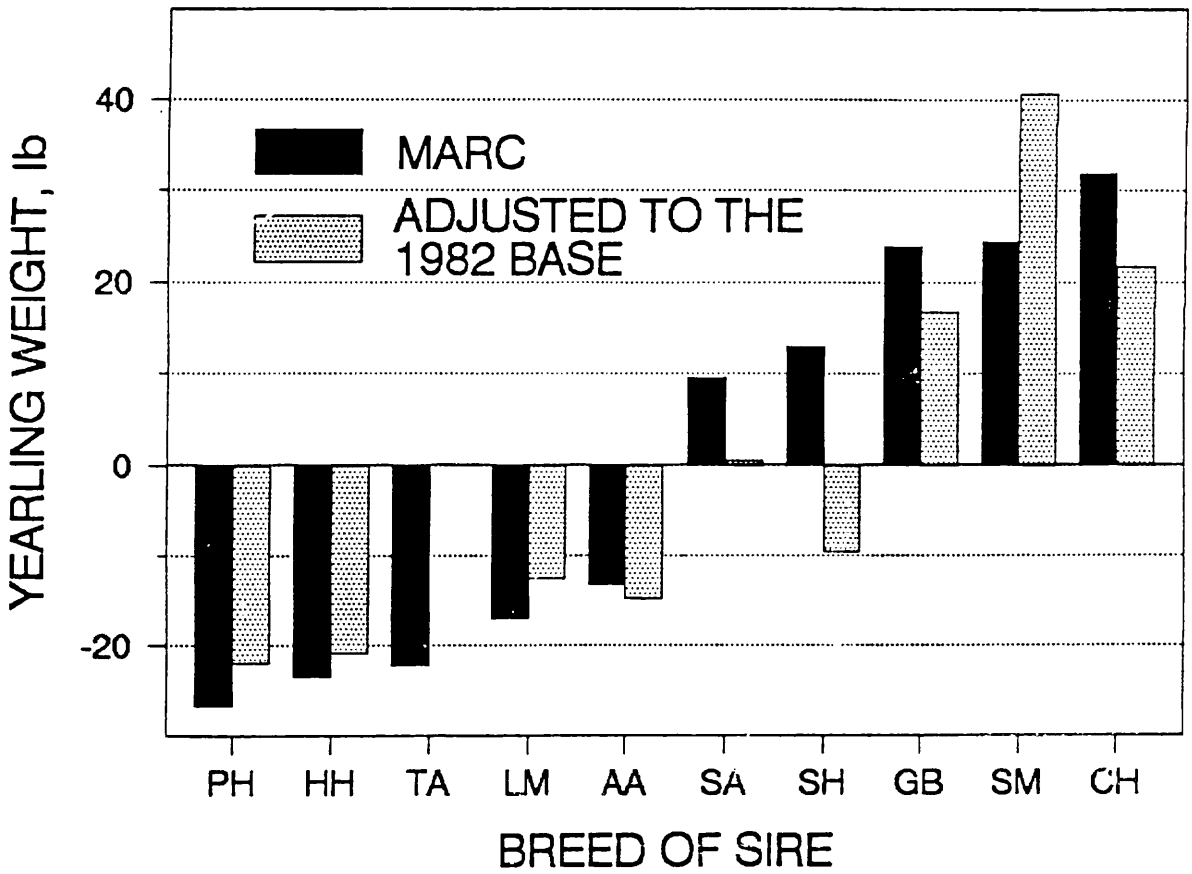


Figure 3. Yearling weight means observed at MARC and means adjusted to the 1982 genetic base, as deviations from the mean of all breeds, for Polled Hereford (PH), Hereford (HH), Tarentaise (TA), Limousin (LM), Angus (AA), Salers (SA), Shorthorn (SH), Gelbvieh (GB), Simmental (SM), Charolais (CH) and Maine Anjou (MA) sire breeds.

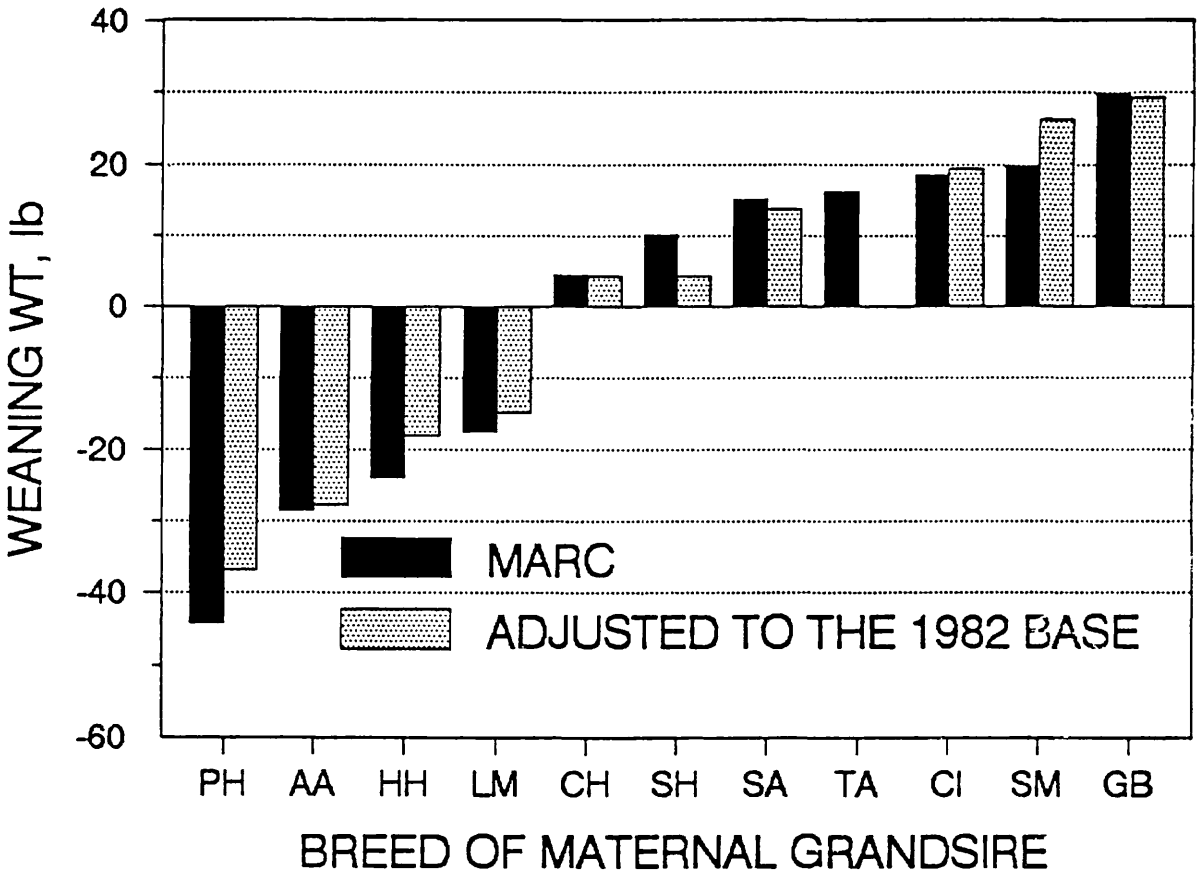


Figure 4. Weaning weight means observed at MARC and means adjusted to the 1982 genetic base, as deviations from the mean of all breeds, for Polled Hereford (PH), Angus (AA), Hereford (HH), Limousin (LM), Charolais (CH), Shorthorn (SH), Salers (SA), Tarentaise (TA), Chianina (CI), Simmental (SM), and Gelbvieh (GB) maternal grandsire breeds.

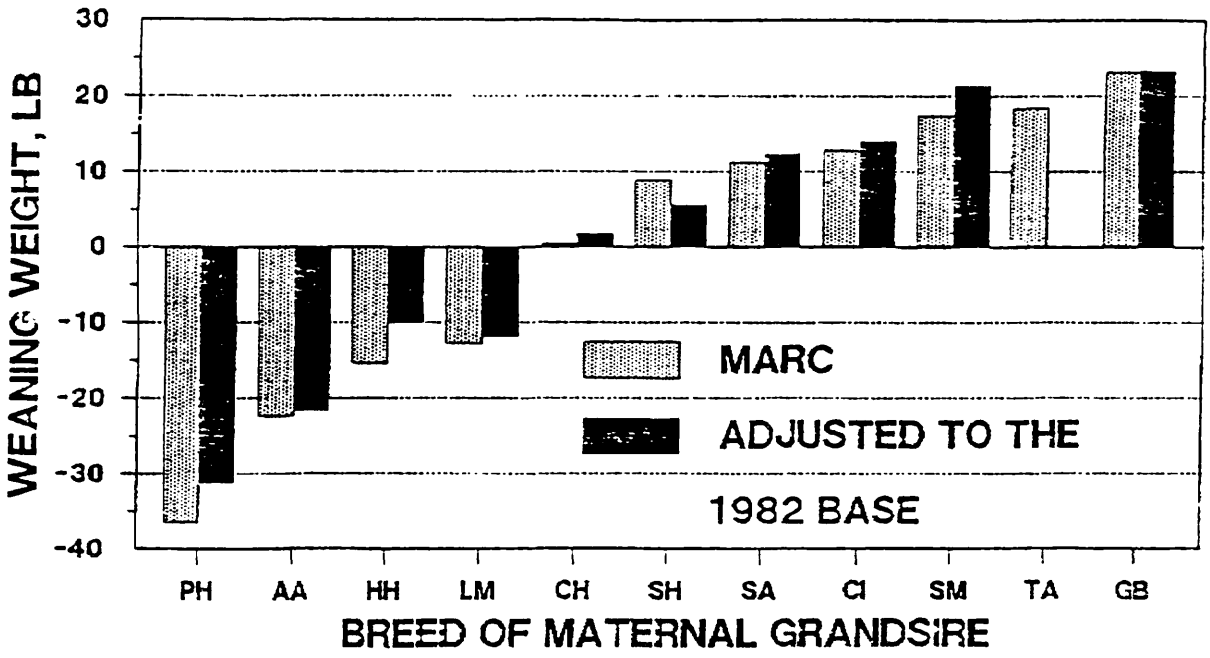


Figure 5. Net maternal (Milk) breed effects on weaning weight at MARC and means adjusted to the 1982 genetic base, as deviations from the mean of all breeds, for Polled Hereford (PH), Angus (AA), Hereford (HH), Limousin (LM), Charolais (CH), Shorthorn (SH), Salers (SA), Chianina (CI), Simmental (SM), Tarentaise (TA), and Gelbvieh (GB) maternal grandsire breeds.

A report to the BIF Genetic Prediction Committee regarding the evaluation of commercial cow records for the calculation of interbreed comparisons and breed mean tables through the Cow Herd Appraisal Of Performance Software

K.A. Ringwall and P.M. Berg

The Cow Herd Appraisal of Performance Software (CHAPS II) program is an inventory based cow herd performance testing program conducted through the North Dakota Beef Cattle Improvement Association. CHAPS II provides all the standard performance data as suggested by the Beef Improvement Federation plus the identification of those factors that are critical to the success of beef operations. A central data base has been collected through the years which is referred to as the CHAPS data storage system. This system continues to grow and currently contains 139,494 individual cow records collected since 1979. One hunderd fifty-eight herds are represented and average 128 cows per herd.

The structure of the CHAPS data base allows for the documentation of sire breeds and individual parentage information on every calf. Currently, the data base contains parentage information on 43,566 straight bred calves and 29,854 crossbred calves. Those breeds with a 1,000 or more straight bred records include Angus, Charolais, Gelbvieh, Horned Hereford, Polled Hereford, Salers and Simmental. Those breeds utilized as sires with 1,000 or more crossbred records include Angus, Red Angus, Charolais, Gelbvieh, Polled Hereford, Salers and Simmental. The actual totals for each breed are presented in the tables following this article. The member herds were surveyed early in 1991, and 93 percent of the 58 producers that returned the survey indicated that they would be interested in utilizing EPD sire information regarding calves produced within their herd.

Of particular interest, are the 18,305 records from the 56 herds which have utilized two or more sire breeds on the same base type of cow. These records and future records of this type could contribute to the development or refinement of interbreed comparisons and breed mean tables. In conclusion, this presentation was intended to present the current structure of the CHAPS data base in North Dakota. Parentage information is available that would allow for the documentation of breed and sire performance. As additional states implement the CHAPS data system, the CHAPS data base will continue to grow and provide additional information about cattle breeding systems.

CHAPS DATA

STORAGE SYSTEM

CHAPS

PRODUCER RESPONSE

93 PERCENT

COULD PROVIDE EPD
INFORMATION
FOR HERD SIRES

CHAPS

AVERAGE HERD SIZE

1991

128 HEAD

CHAPS

CHAPS DATA BASE

1979 TO 1991

139,494 RECORDS

CHAPS

PARENTAGE INFORMATION

109 HERDS

PROVIDE

- SIRE BREED INFORMATION
- COW BREED INFORMATION
- SIRE IDENTIFICATION

CHAPS

PARENTAGE INFORMATION

STRAIGHT BRED
43,566 RECORDS

CROSSBRED
29,854 RECORDS

CHAPS

PARENTAGE INFORMATION

56 HERDS

MULTIPLE SIRE BREEDS
MATED TO SIMILAR
BASE COW BREED

CHAPS

PARENTAGE INFORMATION

18,305 RECORDS

MULTIPLE SIRE BREEDS
MATED TO SIMILAR
BASE COW BREED

CHAPS

STRAIGHT BRED RECORDS
SIRE BREED

ANGUS	8769
CHAROLAIS	9376
GELBVIEH	2501
HORNED HEREFORD	8479
POLLED HEREFORD	6545
SALERS	1252
SIMMENTAL	3334

CHAPS

STRAIGHT BRED RECORDS
SIRE BREED

AMERIFAX	510
RED ANGUS	895
LIMOUSIN	115
POLLED SHORTHORN	149
TARENTAISE	993
WELSH BLACK	309

CHAPS

CROSSBRED RECORDS
SIRE BREED

ANGUS	7694
RED ANGUS	2342
CHAROLAIS	4625
GELBVIEH	3356
POLLED HEREFORD	1147
SALERS	1561
SIMMENTAL	6010

CHAPS

CROSSBRED RECORDS
SIRE BREED

AMERIFAX	441
CHIANINA	323
CONTINENTAL	475
HORNED HEREFORD	711
LIMOUSIN	296
MAINE ANJOU	110
TARENTAISE	540

CHAPS

CHAPS II
"Progress Through Performance"

by North Dakota Beef Cattle Improvement Ass'n
NDSU R&E Center, Box 1377, Hettinger, ND 58639

The Value of Information

The more documented records you have available on each of your cows, the better equipped you are to make bold, decisive decisions about culling, selection and mating systems. The managerial decisions you make today can have a huge impact on the future of your herd for many years to come.

As an aggressive cattleman competing in today's complex beef market, you need to utilize all the tools available to reduce quesswork, adding predictability to your herd performance.

What is CHAPS II?

CHAPS II (Cow Herd Appraisal Performance System) is a state-of-the art beef production record system designed to provide you with vital information about your managerial decisions and herd's performance.CHAPS II was developed by the North Dakota Extension Service through the North Dakota Beef Cattle Improvement Association (NDBCIA).

Performance Reports Available

A comprehensive analysis system, CHAPS II provides all the standard performance data as suggested by the Beef Improvement Federation.

Some of the reports can be sorted by a variety of categories as determined by the producer. CHAPS II includes the following performance reports:

✓ Calf Reports (divided by sex)
- Birthdate • Birthweight • Calving Ease
- Actual Weaning Weight • 205-Day Adjusted Weight
- 205-Day Weight Ratio • Age in Days • Frame Score
- Average Daily Gain • Weight Per Day of Age
- Conformation Grade • Calf Parentage
- Sex Group Averages • Sire Averages
- Cow Breed Averages

Summary Reports Available

✓ Sire Summaries –Progeny Averages
- 205-day weight • Birthweight • Calving Ease
- Weaning Weight • Age in Days • Frame Score
- Average Daily Gains • Weight Per Day of Age

✓ Cow Summaries
- Cow Identification • Age of Cow • Cow Breed
- MPPAs (Most Probable Producing Ability)
- Number of Calves Born • Number of Calves Weaned
- Calving Interval • Sire of Cow • Lifetime History of Individual Calf Performance

Managerial Reports Available

✓ Reproductive Analysis
- Percentage Cows Calving
- Calf Survival
- Herd Open and Abortion Rate
- Percent Cows Weaning Calf

✓ Calving Distribution
- Calves born by 21 day intervals
- Average calving date by cow age
- Average weaning weight by 21 day intervals
- Average weaning weight by cow age

✓ Overall Herd Growth Report
- Total and average actual pounds produced at weaning
- Herd calf survival
- Herd uniformity score based on calf weight
- Herd average birthweight & weight per day of age

✓ Cow Culling Report
- Number of cows died
- Number of cows sold due to age
- Number of cows sold due to physical defects
- Number of cows sold due to poor fertility or open
- Number of cows sold due to inferior calves
- Number of cows sold due to replacement stock

Yearling Reports Available

✓ 365-Day Report
- Adj. 365-Day Weight • 365-Day Weight Ratio
- Frame Score • ADG on test • WDA off test
- Sex Group Averages • Sire Averages
- Cow Breed Averages
- Pelvic Measurements & Fat Measurements (optional)

Critical Success Factors

Through analysis of 86,000 North Dakota BCIA calf records from 85 herds, four factors were identified as significant to achieving optimum beef production.

A common problem with record systems is the accumulation of mounds of data with little effective utilization of the data. The ultimate purpose of this program is to assure that each critical success factor is balanced within the operation and that all factors must be evaluated and changed simultaneously. The critical success factors are as follows:

1) Minimize total calf production time (nursing period). This will reduce pasture grazing pressure, as well as provide additional time for mother cows to regain body condition.

2) Maximize pounds of calf produced per day of age. You sell cattle by the pound; therefore, you need to increase total output. Sire selection, cow"s milk production, nutrition and range management are key factors in maximizing pounds.

3) Maximize the percentage of females calving within 42 days from the start of the mature cow calving season. Fertility, selection and nutrition affect reproduction. With reproduction the first indicator and the first trait to go, minimizing the calving season is the ultimate test.

4) Minimize replacement rate. Get the most from your designed cows. Cows don't reach peak production until they are six or seven years of age and continue excellent production into their teens. So, don't sell yourself out.

The Benchmarks

Utilizing data from 47,000 North Dakota calf records from 1986 to 1990, benchmarks were calculated for each of the "critical success factors". CHAPS II compares each individual producer's performance against the benchmarks.The benchmark values and the component traits are as follows:

1) Calf production time: 199 days.

2) Weight per day of age: 2.73 pounds; Birthweight: 86 pounds; Average daily gain: 2.37 pounds.

3) Percentage of females calving within 42 days: (heifers 86%; mature cows 83%)

4) Replacement rate: 17.2%; Average cow age: 5.3 years.

How Do I Get Started?

If you have never been involved in a performance and managerial evaluation before, you will first have to identify your cows and calves with an identification system of eartags or freeze-branding, etc. The minimum records you should keep include age of cow, calf sex, birthdates and weaning weight. CHAPS II can also evaluate birthweights, sires and dams, calving ease, conformation grades, frame scores, yearling weights and culling information. Your local county agent can help you get started.

You don't even need a computer on your ranch. If you want NDBCIA to handle the processing for you, all you have to do is report the information on the forms NDBCIA provides for you. Or if you want to process the records yourself, the CHAPS II software program is available for sale.

What Does It Cost?

NDBCIA will process your records and send you the reports for 30 cents per cow, plus a $5 annual membership fee. The CHAPS II software program is available for $200 for individual use.

Computer Equipment Needed

If you want to process your own records, you will need a computer sytem. CHAPS II requires an IBM-PC or compatible microcomputer with a minimum of 256K memory system (RAM) and a PC-DOS operating system of version 2.0 or higher.

A minimum of two 360K floppy disks is required to run CHAPS II, but a single 720K or greater floppy disk system or a system with one floppy and a hard drive is necessary to use all program features.

Turn-Around Time

NDBCIA annually processes over 12,785 calf records from over 125 herds with a turn-around time of 1.5 days.

The NDBCIA at its headquarters office in Hettinger and in cooperation with the North Dakota Extension Service, is equipped with state-of-the- art computer equipment . Coupled with a professional, trained staff, the NDBCIA is committed to serving its members and the livestock industry in North Dakota.

How Do I Enroll?

Simply contact your local county agent or the NDBCIA headquarters office at NDSU R&E Center, Box 1377, Hettinger, ND 58639 or call (701) 567-4323. They will be glad to answer your questions and assist you in implementing your performance testing program.

Management Tool

Producers are reminded that CHAPS II, like most tools, must be combined with sound business judgement and good cow sense.

Producers are encouraged to develop an IRM management team to assure that complete herd evaluation is achieved. The team evaluates management, economic and genetic forces that cause any distortion between the key critical success factors. Peak profitabiltiy and productivity are obtained when all critical success factors are in equalibrium.

Who Uses CHAPS II?

Many aggressive, progressive North Dakota cattlemen are utilizing the CHAPS II program. Both commercial and registered breeders have success stories to relate on how CHAPS has met their needs in enhancing their management strategies.

Because of the comprehensive analysis and the unique features of CHAPS II, Beef Improvement Associations and individual cattlemen from other states have purchased this program.

As a testimony to the credibility and latest technology available in this program, it is currently being utilized in the following 20 states:

• North Dakota	• Michigan	• Illinois	• Missouri	• Tennessee
• South Dakota	• Indiana	• Kentucky	• South Carolina	• Wisconsin
• New Hampshire	• Kansas	• Hawaii	• North Carolina	• Virginia
• Iowa	• Maine	• Minnesota	• New Mexico	• Oregon

CORRELATED SELECTION RESPONSES

John D. Hough, American Polled Hereford Association

The response to selection is of extreme importance to all purebred and commercial beef cattle producers. Many different traits effect profitability and consumer acceptance in the cattle business as well. The number and types of traits for selection has long been a point of discussion. Single trait selection is most easily practiced and direct response can be maximized. Cattle producers like to see the fruits of their labor. Typically the fewer the traits selected, the larger is the direct response to selection. On the other hand, multiple trait selection usually yields smaller individual responses, but positive response for additional traits.

Genetic Correlations

Both beneficial and antagonistic relationships exist for nearly all traits. Not all traits are genetically related to all other traits, but all traits are genetically related to at least some other traits of economic importance. Some genetic relationships between traits are advantageous while others are antagonistic. Selection for a trait that is beneficially related to another trait would be advantageous, while the opposite would be true in selection for antagonistic traits. Environmental correlations also play a role in breeding programs, but for this discussion I will confine my comments to genetic relationships.

Time and space constraints will not allow a complete review of genetic relationships for all economically important traits. Approximations of the genetic correlations between traits presented here were calculated from research results from several projects (Arnold et al. (1991); Benyshek and Little (1982); Bourdon and Brinks (1986); Burfening et al. (1978); Dinkel and Busch (1973); Knights et al. (1984); Koch (1978); Morrison et al. (1986); Naazie et al. (1991); Nelsen et al. (1986); Smith et al. (1989 a,b); and Toelle and Robison, (1985)).

One of the economically important traits to cattlemen is birth weight. It is generally thought to be beneficially related to growth traits and antagonistically correlated with calving problems. Average genetic correlations between birth weight and weaning weight, yearling weight, pelvic area, calving ease score, gestation length and scrotal circumference are .4, .5, .5, .6, .5 and .1, respectively. The average genetic correlations between other economically important trait, yearling weight with birth weight, weaning weight, scrotal circumference, pelvic area, ribeye area and marbling are .5, .7, .6, .4, .3 and -.2, respectively. Scrotal circumference is an easily measured trait that seems to be related to several important production and reproductive traits. The approximate genetic correlations between scrotal circumference and birth weight, weaning weight, yearling weight, yearling height, pregnancy percentage, calving interval and age at puberty are .1, .3, .6, .5, .6, -.4 and -.4, respectively. Several carcass traits are also genetically correlated among one another. The approximate genetic correlations between fat thickness and ribeye area, marbling and carcass

weight are -.3, .4 and .4, respectively. Even with moderately small genetic correlations between traits, indirect response to selection should be meaningful. With relatively large genetic correlations between traits, correlated response could be a major component.

Direct and Correlated Response to Selection

The magnitude of genetic correlations between traits is a somewhat abstract concept for many beef cattle producers. Direct and correlated response to selection in actual selection experiments may be more tangible and easily understood. Several research experiments have based selection procedures on one particular trait and measured response in that trait along with several others.

Within-herd weaning weight selection has been utilized by some researchers. Chenette and coworkers. (1982) found direct response to weaning weight selection to amount to 2.37 lb/yr. Correlated response in birth weight, post-weaning average daily gain and yearling weight was .54 lb/yr, .003 lb/d/yr and 1.86 lb/yr. Irgang and coworkers (1985a,b), in a North Carolina study, also based selection on weaning weights. Direct response to selection was 2.36 and 1.37 lb/yr for males and females, respectively. Correlated response in males for birth weight, post-weaning gain and yearling weight amounted to .02 lb/yr, -.09 lb/yr and 3.31 lb/yr, respectively. Correlated response in females for birth weight, post-weaning gain and yearling weight amounted to -.02 lb/yr, .53 lb/yr and 1.54 lb/yr, respectively. In an Oklahoma study, Aaron and coworkers (1986) in another Oklahoma study found direct response to weaning weight selection to be 3.37 lb/yr. Correlated response was .55 lb/yr, .009 lb/d/yr and 4.65 lb/yr for birth weight, post-weaning average daily gain and yearling weight, respectively.

Yearling weight has also been a selection criterion in several research projects. Nelms and Stratton (1967) found a direct response to yearling weight selection of 5.5 lb/yr. Correlated response amounted to .62 lb/yr in birth weight, 1.54 lb/yr in weaning weight and .026 lb/d/yr in post-weaning average daily gain. Anderson and coworkers (1974) demonstrated a direct yearling weight response of 8.8 lb/yr and correlated response in birth weight of .66 lb/yr and 2.40 lb/yr in weaning weight. In an Oklahoma research project, response to yearling weight selection amounted to 2.97 lb/yr, Chenette et al. (1982) . Birth weight, weaning weight and post-weaning average daily gain correlated response was .51 lb/yr, 2.05 lb/yr and .006 lb/d/yr, respectively. Hough and coworkers (1985) practiced yearling weight selection utilizing National Cattle Evaluation EPDs and across-herd selection. Yearling weight response was 13.7 lb/yr. Correlated response was .60 lb/yr, 11.0 lb/yr .020 lb/d/yr, 1.3 cm^2 and .27 cm in birth weight, weaning weight, post-weaning average daily gain, pelvic area and scrotal circumference, respectively. In another Oklahoma project, Aaron and coworkers (1986) reported a 7.74 lb/yr direct yearling weight response. Birth weight, weaning weight and post-weaning average daily gain correlated response was 1.01 lb/yr, 3.53 lb/yr and .026 lb/d/yr, respectively.

Table 1 shows predicted response to selection for calving ease, birth weight, gestation length and weaning weight (Burfening et al., 1978). Direct and correlated response to selection was in directional agreement between all traits except weaning weight, which is adversely related to these three reproductive traits. Bourdon and Brinks (1982) predicted direct and correlated response to selection. Table 2 shows response in that study in terms of the correlated response as a percentage of the response when directly selecting for an individual trait. Beneficial correlations are apparent between the reproductive traits; gestation length and birth weight as well as between the growth traits; weaning weight, post-weaning gain and yearling weight. However, antagonistic relationships are demonstrated between the reproductive traits and growth traits.

Notter and Mahrt (1991) selected for high and low maternal and yearling Polled Hereford EPDs. Regressions of weight on EPD were 1.13 ± .16 lb/lb, .55 ± .16 lb/lb, 1.14 ± .22 lb/lb and .69 ± .19 lb/lb for birth weight on birth weight EPD, weaning weight on weaning weight EPD, yearling weight on yearling weight EPD and weaning weight on milk EPD, respectively. Actual performance was slightly larger than expected for birth weight and yearling weight, but smaller than expected for weaning weight. Arnold and coworkers (1990) found selection based on adversely correlated EPDs to be quite accurate. Selection was based on high and low birth weight EPDs all within relatively high yearling weight EPDs. Selection based on Angus National Cattle Evaluation EPDs predicted 6.4 lb, 11.7 lb, 2.4 lb and 13.9 lb differences for birth weight, weaning weight, post-weaning gain and yearling weight, respectively. Response to selection was 8.2 lb, 13.4 lb, 4.2 lb and 14.6 lb for birth weight, weaning weight, post-weaning gain and yearling weight, respectively.

Gelbvieh and Polled Hereford Sire Summary Examples

Results utilizing actual sire summary examples can also be used to demonstrate the relationships between traits and the results of selection. Genetic correlations used for multiple-trait EPD calculation of weaning weight direct and maternal are -.29, -.21, -.28, -.30, -.27 and -.32 for the Brangus, Gelbvieh, Hereford, Limousin, Polled Hereford and Simmental breeds, respectively. Genetic correlations used for multiple-trait EPD calculation of weaning weight and post-weaning gain are .34, .40, .41, .34, .42 and .18 for the Brangus, Gelbvieh, Hereford, Limousin, Polled Hereford and Red Angus breeds, respectively. It is readily apparent that correlations between traits are very similar across breeds.

The following examples are from the most recent Gelbvieh and Polled Hereford sire summaries, although it is expected that results would be similar in other breeds. Table 3 shows the realized genetic correlations from the 1992 Gelbvieh Sire Summary. These values are simply the correlations between EPDs of the 1515 bulls printed in the Sire Summary. Generally reproductive traits are beneficially correlated as are the growth traits, but reproductive and growth traits are antagonistically correlated. Correlations with Milk EPDs are somewhat antagonistic to the growth traits and fairly neutral with the reproductive traits. Producers can evaluate the consequences of

selection by examining the number or percentage of bulls meeting certain EPD specifications. For example, assume a beef cattle breeder wants to decrease birth weight (BWt) and gestation length (Gest) and concurrently increase weaning weight (WnWt), yearling weight (YrWt), milk production (Milk), calving ease (CE) and maternal calving ease (MatCE). In addition, assume selection criteria for all EPDs to be above average except BWt and Gest which the criteria is for below average EPDs. Average EPD values for BWt, WnW, YrWt, Milk, Gest, CE and MatCE are .4 lb, 4.7 lb, 8.9 lb, 1.5 lb, -.2 d, 100.1 ratio and 101.0 ratio. All traits are nearly normally distributed since approximately 50% of all bulls are above or below average for each individual trait. For BWt and Gest, 49 and 50% of the bulls are below average for each EPD, respectively. For WnWt, YrWt, Milk, CE and MatCE, 51, 51, 52, 45 and 55% of the bulls are below average for each EPD, respectively. Table 4 shows the percentage of bulls that are above (or below) average for each pair of traits. For example, 16% of all sires are both below average for BWt and at the same time above average for WnWt. The higher the percentage of bulls that fit within both categories, the more favorable is the relationship between traits. Note that with even the most antagonistically correlated traits, bulls can be found that meet the 2-trait criteria. Table 5 shows examples of proportions of bulls above (or below) average for each of three or more traits. The percentage of bulls that meet the minimum criteria for unfavorably related traits is less than that of favorably correlated traits. Typically, the more traits that are selected, the smaller the percentage of bulls that meet the selection criteria.

Table 6 shows the realized genetic correlations from the 1292 bulls published in the Spring 1992 Polled Hereford Sire Summary. Similar criteria to the Gelbvieh example is utilized to demonstrate correlated selection. Assume a cattleman wants to decrease Polled Hereford BWt and simultaneously increase WnWt, Milk, scrotal circumference (SC) and YrWt. As in the prior example, assume selection criteria for all EPDs to be above average except BWt which the criterion is for below average EPDs. Average EPD values for BWt, WnWt, Milk, SC and YrWt are 3.2 lb, 20.8 lb, -.9 lb, .0 cm and 33.5 lb. Fifty-four percent of the bulls were below average for BWt EPD. For WnWt, Milk, SC and YrWt, 53, 52, 49 and 53% of the bulls are below average for each EPD, respectively. Table 7 shows the percentage of bulls that are above (or below) average for each pair of traits. For example, 15% of all sires are both below average for BWt and at the same time above average for WnWt. As in the Gelbvieh example, the higher the percentage of bulls that fit within both categories, the more favorable is the relationship between traits. Table 8 shows examples of proportions of bulls above (or below) average for each of three or more traits. Note the similarities in the proportions of bulls meeting the selection criteria between the Gelbvieh and Polled Hereford examples. There are sires in all breeds that are more desirable than average for all traits. Because of antagonistic relationships between traits, the number of these sires is quite small. Very few bulls that are extremely desirable in any one or two traits meet the selection criteria for all traits examined. On the other hand, there are bulls in all breeds that could meet the type of selection criteria used in these examples.

Beef cattle breeders must never overlook the fact that both desirable and antagonistic relationships exist between most economical traits. Response to multiple

trait selection is dependant on the selection intensity applied, heritabilities of all traits, phenotypic variation of all traits and the genetic correlations between traits. One must never forget that profitability in the cattle industry is base on many traits. The relationships between traits must be understood and considered for a successful breeding program to exist.

Table 1. Predicted response to selection. (Burfening et al., 1978).

	Selected Trait (Selection Intensity = 1σ)			
Correlated Trait	Calving Ease (score)	Birth Weight (lb)	Gestation Length (days)	Weaning Weight (lb)
Calving Ease (score)	-.20	-.70	-.05	.02
Birth Weight (lb)	-.97	-2.98	-1.10	.93
Gestation Length (d)	-.49	-.46	-1.89	-.03
Weaning Weight (lb)	-1.19	-4.89	.35	13.76

Table 2. Predicted response to selection.[1] (Bourdon and Brinks, 1982).

	Selected Trait				
Correlated Trait	Gestation Length	Birth Weight	Wning Weight	Post-Wning Gain	Yearling Weight
Gestation Length	1	.27	.29	.40	.26
Birth Weight	.23	1	-.76	-.63	-.90
Weaning Weight	.17	-.52	1	.55	.96
Post-Weaning Gain	.27	-.52	.66	1	1.05
Yearling Weight	.13	-.53	.83	.75	1

[1] Expressed as ratio of responses, correlated:direct.

Table 3. Realized genetic correlations from the 1992 Gelbvieh Sire Summary.

	Weaning Weight	Yearling Weight	Milk	Gestation Length	Calving Ease	Maternal Calving Ease
Birth Weight	.54	.50	-.15	.40	-.84	-.35
Weaning Weight		.94	-.15	.10	-.41	-.10
Yearling Weight			-.12	.05	-.38	-.05
Milk				-.08	.09	.04
Gestation Length					-.32	-.07
Calving Ease						.56

Table 4. Percentage of Gelbvieh sires above (or below) average for 2 EPDs.

	Weaning Weight	Yearling Weight	Milk	Gestation Length	Calving Ease	Maternal Calving Ease
Birth Weight	16	17	29	31	38	32
Weaning Weight		46	23	23	16	27
Yearling Weight			23	24	16	27
Milk				29	25	29
Gestation Length					28	29
Calving Ease						35

Table 5. Percentage of Gelbvieh sires above (or below) average for 3 or more EPDs.

EPDs	Percentage
BWt, Gest and CE	25
BWt, Milk and CE	22
BWt, WnWt and YrWt	14
WnWt, YrWt and CE	13
BWt, WnWt and Milk	8
BWt, Gest, CE and MatCE	19
BWt, WnWt, YrWt and CE	10
BWt, WnWt, YrWt and Milk	6
BWt, WnWt, YrWt, Milk and Gest	5
BWt, WnWt, YrWt, Milk, Gest, CE and MatCE	3

Table 6. Realized genetic correlations from the Spring 1992 Polled Hereford Sire Summary.

	Weaning Weight	Milk	Scrotal Circumference	Yearling Weight
Birth Weight	.72	-.25	.11	.72
Weaning Weight		-.26	.08	.97
Milk			.01	-.25
Scrotal Circumference				.08

Table 7. Percentage Polled Hereford sires above (or below) average for 2 EPDs.

	Weaning Weight	Milk	Scrotal Circumference	Yearling Weight
Birth Weight	15	32	24	15
Weaning Weight		22	29	49
Milk			26	23
Scrotal Circumference				30

Table 8. Percentage of Polled Hereford sires above (or below) average for 3 or more EPDs.

EPDs	Percentage
WnWt, SC and YrWt	28
WnWt, Milk and YrWt	20
BWt, WnWt and YrWt	12
BWt, WnWt and Milk	8
Wnwt, Milk, SC and YrWt	12
BWt, WnWt, Milk and YrWt	7
BWt, WnWt, Milk, SC and Yrwt	4

Literature cited

Aaron, D. K., R. R. Frahm and D. S. Buchanan. 1986. Direct and correlated responses to selection for increased weaning and yearling weight in Angus cattle. II. Evaluation of response. J. Anim. Sci. 62:66.

AGA Sire Summary. 1992. American Gelbvieh Association, Westminster, CO.

APHA Sire Summary, Spring edition. 1992. American Polled Hereford Association, Kansas City, MO.

Anderson, B. B., H. T. Fredeen and G. M. Weiss. 1974. Correlated response in birth weight, growth rate and carcass merit under single-trait selection for yearling weight in beef Shorthorn cattle. Can. J. Anim. Sci. 54:117.

Arnold, J. W., J. K. Bertrand, L. L. Benyshek, J. W. Comerford and T. E. Kiser. 1990. Selection for low birth weight and high yearling weight in Angus beef cattle. Livest. Prod. Sci. 25:31-41.

Arnold, J. W., J. K. Bertrand, L. L. Benyshek and C. Ludwig. 1991. Estimates of genetic parameters for live animal ultrasound, actual carcass data, and growth traits in beef cattle. J. Anim. Sci. 69:985-992.

Benyshek, L. L. and D. E. Little. 1982. Estimates of genetic and phenotypic parameters associated with pelvic area in Simmental cattle. J. Anim. Sci. 54:258.

Bourdon, R. M. and J. S. Brinks. 1982. Genetic, environmental and phenotypic relationships among gestation length, birth weight, growth traits and age at first calving in beef cattle. J. Anim. Sci. 55:543.

Bourdon, R. M. and J. S. Brinks. 1986. Scrotal circumference in yearling Hereford bulls: Adjustment factors, heritabilities and genetic, environmental and phenotypic relationships with growth traits. J. Anim. Sci. 62:958-967.

Burfening, P. J., D. D. Kress, R. L. Friedrich and D. D. Vaniman. 1978. Phenotypic and genetic relationships between calving ease, gestation length, birth weight and preweaning growth. J. Anim. Sci. 47:595.

Chenette, C. G., R. R. Frahm, J. V. Whiteman and D. S. Buchanan. 1982. Direct and correlated responses to selection for increased weaning weight and yearling weights in hereford cattle. II. Evaluation of response. Oklahoma Agr. Exp. Sta. MP-112:301.

Dinkel, C. A. and D. A. Busch. 1973. Genetic parameters among production, carcass composition and carcass quality traits of beef cattle. J. Anim. Sci. 36:832.

Hough, J. D., L. L. Benyshek and J. W. Mabry. 1985. Direct and correlated response to yearling weight selection in Hereford cattle using nationally evaluated sires. J. Anim. Sci. 61:1335.

Irgang, R., E. U. Dillard, M. W. Tess and O. W. Robison. 1985a. Selection for weaning weight and postweaning gain in Hereford cattle. II. Response to selection. J. Anim. Sci. 60:1142.

Irgang, R., E. U. Dillard, M. W. Tess and O. W. Robison. 1985b. Selection for weaning weight and postweaning gain in Hereford cattle. III. Correlated responses to selection in milk yield, preweaning and postweaning traits. J. Anim. Sci. 60:1156.

Knights, S. A., R. L. Baker, D. Gianola and J. B. Gibb. 1984. Estimates of heritabilities and of genetic and phenotypic correlations among growth and reproductive traits in yearling angus bulls. J. Anim. Sci. 58:887-893.

Koch, R. M. 1978. Selection in beef cattle. III. Correlated response of carcass traits to selection for weaning weight, yearling weight and muscling score in cattle. J. Anim. Sci. 47:142.

Morrison, D. G., W. D. Williamson and P. E. Humes. 1986. Estimates of heritabilities and correlations of traits associated with pelvic area in beef cattle. J. Anim. Sci. 63:432.

Naazie, A., M. Makarechian and R. T. Berg. 1991. Genetic, phenotypic, and environmental parameter estimates of calving difficulty, weight, and measures of pelvic size in beef heifers. J. Anim. Sci. 69:4793-4800.

Nelms, G. E. and P. O. Stratton. 1967. Selection practiced and phenotypic change in a closed line of beef cattle. J. Anim. Sci. 26:274.

Nelsen, T. C., R. E. Short, J. J. Urick and W. L. Reynolds. 1986. Heritabilities and genetic correlations of growth and reproductive measurements in Hereford bulls. J. Anim. Sci. 63:409.

Notter, D. R. and G. S. Mahrt. 1991. An update on the relationship between actual and predicted performance of crossbred calves by divergently selected Polled Hereford sires. J. Anim. Sci. 69(Suppl. 1):218 (Abst).

Smith, B. A., J. S. Brinks and G. V. Richardson. 1989a. Estimation of genetic parameters among reproductive and growth traits in yearling heifers. J. Anim. Sci. 67:2886-2891.

Smith, B. A., J. S. Brinks and G. V. Richardson. 1989b. Estimation of genetic parameters among breeding soundness examination components and growth traits in yearling bulls. J. Anim. Sci. 67:2892-2896.

Toelle, V. D. and O. W. Robison. 1985. Estimates of genetic correlations between testicular measurements and female reproductive traits in cattle. J. Anim. Sci. 60:89-100.

PRIORITIZING TRAIT SELECTION

Rick Bourdon
Colorado State University

Perhaps the most enduring question asked by beef cattle breeders is, "What traits should I select for, and how much emphasis should I put on each?" There is no easy answer. This is partly due to the large number of traits that are of importance in beef production, and partly due to the fact that the relative importance of traits depends on the natural environment, management, and economic conditions. And to make matters worse, some traits seem to work against each other; if you improve one, another one deteriorates. This is what is meant by the term "genetic antagonism." Dealing with genetic antagonisms is difficult because it involves compromise, and as is so often the case in any endeavor, negotiating compromise is hard.

I would love to be able to supply truly objective advice, preferably in precise mathematical terms. And someday the state of computer simulation may be such that I can do that. But right now the best that I can do is offer an approach for managing genetic antagonisms and addressing the larger issue of prioritizing traits. I call this approach a "thinking" model.

A "Thinking" Model

The model I have in mind involves three basic steps:

1) Understand the basic nature of genetic antagonisms.

2) Become familiar with mitigating factors and breeding strategies that affect the seriousness of genetic antagonisms.

3) Reevaluate the severity of genetic antagonisms for specific situations relevant to your operation, and make selection decisions accordingly.

And one more thing -- be sure to do all of the above from the standpoint of a commercial producer. This may seem an odd approach to seedstock breeders, but remember that the ultimate goal of seedstock production is (or ought to be) to meet the practical needs of the commercial industry. That can only be done if those needs are well understood. So even if you are a seedstock breeder who operates under conditions quite different from those of commercial production, address the question of trait selection from the perspective of a typical commercial customer. I will discuss how seedstock breeders can apply the information gained in this way in the last part of this paper.

Traits and Antagonisms Between Them

If we were to define the ideal beef cow, we would probably come up with something like the following:

i) She conceives at an early age and breeds regularly thereafter.

ii) She calves unassisted.

iii) She produces healthy calves that gain fast and efficiently, resulting in high yielding, high quality carcasses of appropriate weight.

iv) She eats very little.

This is not a complete list; I would be tempted to add statements relating to temperament, soundness, and adaptability to specific environments. But if, for the purposes of this discussion, we limit ourselves to the above list, the following traits appear to be important: fertility, calving ease, milk production, growth rate and efficiency, carcass yield and quality, and maintenance efficiency.

Clearly not all of these traits are compatible. There are genetic antagonisms between them, specifically:

1) Milk production and growth rate (size) vs fertility

2) Growth rate (size) vs calving ease

3) Lean yield vs carcass quality

4) Milk production and growth rate (size) vs maintenance requirements

We know that heavier milking cows and faster growing, larger cows often have a more difficult time rebreeding. It is not that these animals are inherently less fertile. In fact, there is reason to believe that more milk is associated with greater inherent fertility. It is just that these animals have greater demands placed upon them for lactation, growth, and maintenance, and these demands compete for energy needed for good fertility.

Growth rate and calving ease are clearly antagonistic. This is largely due to the mathematically positive but unfavorable relationship between growth rate and birth weight. With some exceptions, the larger the mature size of a breed, the greater the degree of calving difficulty.

Lean yield and carcass quality are antagonistic because of the way they depend on carcass fat. Yield improves as fat content decreases, but quality improves as fat increases. It's hard to have it both ways.

We have long assumed that maintenance requirements were a simple function of body size. Thus larger cattle need more feed to maintain weight. Now we find out that maintenance requirements are a function not just of body weight, but of the relative weights of more metabolically active tissues like gut and liver or "vital organs." Faster growing and especially heavier milking animals (or just animals with genes for heavier milk production) have greater vital organ mass and therefore higher maintenance requirements.

Mitigating Factors

The antagonisms outlined above can be very serious, or they can be relatively benign depending on mitigating conditions or factors. In general, these factors fall under the categories of natural environment, particularly nutritional environment; management, mainly as it relates to nutrition, but not exclusively; and economics, namely the costs of feed and labor, and the prices of cattle. Let's examine how mitigating factors work for each antagonism.

Milk production and growth rate (size) vs fertility. Heavy milking and fast growing (more productive) animals need not be less fertile if they get enough to eat. So it is possible to feed our way out of this antagonism, provided of course that feed is both abundant and cheap. Some environments provide a consistent supply of adequate quality forage. These environments are conducive to larger, heavier milking animals. Some environments provide good forage much of the time, but occasionally they fall short, especially in periods of drought. More productive animals may be optimal in these environments three years out of four, but they incur greater risk. Cattle with less milk and size are a safer bet. Some environments don't provide outstanding grazing, but supplemental feed, e.g. silage, is so cheap that more productive cattle make sense anyway.

The type of limit on feed intake imposed by the environment affects milk and size antagonisms in different ways. Feed quality limits forage intake; the lower the quality, the lower the intake. Larger animals can eat more low quality feed than smaller animals simply because they have larger vats to store it in and larger tubes to push it through. And although larger animals have greater requirements, their ability to consume low-quality forage outstrips their increased requirements. This is why elephants thrive in the African savanna where coarse feed is plentiful. So when feed quality is limiting, larger cattle may actually have an advantage.

Feed intake can also be limited by feed availability. This will occur when a manager is reluctant to provide necessary levels of winter supplement. More typically it occurs when forage is so sparse or the time animals spend traveling or staying in the shade or out of the weather is so great that there simply isn't sufficient time in the day to eat enough forage. Under these conditions, larger animals cannot eat much more than smaller animals, but they have greater requirements. So when feed availability is limiting, smaller cattle have an advantage. Large cattle and desert environments do not go together.

Heavy milking cows may have a greater incentive to eat than light milking cows, but they have no particular physical capabilities for consuming more forage. As a result, heavier milking cows are at a disadvantage when feed intake is limited for whatever reason. Because of this, I think we need to look more critically at milk production and be very careful not to put too much milk into range cattle.

Another mitigating factor is strictly economic in nature. It involves the relative value of cull cows vs replacement heifers and the relative costs of maintaining mature cows vs raising replacements. When cull cows are relatively valuable and(or) when replacements are cheap to raise or buy, fertility becomes less important. We can afford to breed more heifers and cull more cows. Under these conditions, the trade-offs between milk production and fertility or between size and fertility are less serious. This is not the case when cull cows are relatively less valuable and(or) when replacement heifers are expensive to raise or buy.

Growth rate (size) vs calving ease. One of the reasons that larger cattle have more calving difficulty as first-calf heifers is that they have not been allowed to reach a size at calving commensurate with the size of their calves. So to some extent anyway, we can feed our way out of this antagonism too. Again, for this to work, feed must be abundant and cheap.

The problem is also less severe when cheap labor is available. Calving difficulty is not so costly if calf losses are kept to a minimum by helping heifers and cows in trouble. Size of operation can be a factor in this. Faster growing cattle may be more appropriate on small farms or ranches where the cattle are watched carefully at calving.

In contrast to antagonisms involving fertility, antagonisms involving calving difficulty are essentially unaffected by the relative value of different classes of cattle. A dead calf represents a clear loss; unlike an open cow, it has no trade-in value.

Lean yield vs carcass quality. The antagonism between lean yield and carcass quality can be managed to some degree by controlling age and time on feed. For every biological type, there is probably some optimum set of feeding periods and slaughter weights and ages for which this antagonism is minimized.

Consumer preferences and grading systems have a strong effect. If Americans were to adopt European tastes and grading standards tomorrow, the conflict between yield and quality would virtually disappear; quality would be of little importance.

Milk production and growth rate (size) vs maintenance requirements. Maintenance requirements are important because such a large proportion of total feed is used just to maintain the cow herd. Increased maintenance is not such a problem if enough feed is available, however. So again, more productive, higher maintenance cattle can be justified if feed is abundant and cheap.

Term of ownership is also a factor. If calves are not sold at weaning, but owned to slaughter, there will be more product sold per cow maintained -- more product to offset the overhead of maintenance. Maintenance costs then assume less importance.

Breeding Strategies

The seriousness of genetic antagonisms is affected by breeding strategy. In this context I conceive of two basic strategies. The first is to find a "happy medium" by choosing appropriate breeds, breed combinations, and individuals within breeds. Some breeds or breed combinations are simply better with respect to a particular antagonism. For example, some breeds are sufficiently fertile that they can tolerate more milk and size before fertility becomes limiting. Some breeds and breed combinations represent better compromises. British x continental crosses, for example, generally do better at producing carcasses with both quality and cutability.

The same is true of individuals within breeds. There are "needles in the haystack" out there -- individuals which seem to defy the rules. There are bulls which are easy calving, yet sire fast growing calves, and there are bulls whose daughters produce lots of milk, yet maintain body condition and rebreed well. These individuals are rare and hard to identify, but they are truly valuable. If they show up in sire summaries, it makes good sense to use them or their sons. There are also individuals that don't defy the rules, but rather represent a reasonable compromise. They are not outstanding in any particular respect, but they have no great faults either. These animals can work too.

The second breeding strategy is to avoid genetic antagonisms by using terminal sires and heifer bulls. With terminal sires, we can have fast growing, efficient calves and still have a maternal cow herd that is fertile and easy to maintain. Moreover, we can probably get carcass yield and quality as well. By using heifer bulls, we can largely avoid calving difficulty in first-calf heifers (who are the biggest problem anyway), and still get fast growing calves from the older cows.

Prioritizing Traits

Let's return to the "thinking" model outlined at the beginning of this paper. The first two steps were to study genetic antagonisms and the mitigating factors and breeding strategies which affect them. The third step is to relate this information to the specifics of your own operation, determine how serious the genetic antagonisms are in your case, and prioritize traits accordingly. This is not an easy step, and it will be a rare situation where the choices to be made are perfectly clear. And in the midst of this procedure you may find that management and(or) breeding strategies need changing. If so, this third step will have to be repeated.

Few decisions can be made with perfect objectivity, and that is certainly the case in this last step of the trait selection process. If there is art in beef cattle breeding, it probably enters here. But at least this art will not be free-form; it will have a method.

Lessons for Seedstock Producers

I think that one of the most important things for a seedstock breeder to know is how his(her) cattle fit in a commercial program. Are they general purpose cattle? Or are they specialized cattle, e.g. calving ease, calving ease/maternal, or terminal types? Many seedstock producers raise more than one kind.

If the cattle are general purpose, then the breeder should evaluate the seriousness of antagonisms for his(her) customers. This is complicated because for every seedstock breeder there are many commercial customers, and no two commercial situations are exactly alike. The breeder needs to define the situation of a "typical" customer or of several categories of customers. The next step is to select for appropriate compromises in terms of growth rate (size), milk, and composition. And always search for "needles," the animals that defy the rules.

If the cattle are special purpose (and the breeder is honest enough to admit it), then prioritizing traits is easier. Select for only those traits that are important to the specialization and forget the rest.

HOW I USE EPDs and OTHER GENETIC PREDICTORS

Gary Johnson, commercial producer
Johnson Farms
Dwight, Kansas

I would like to report to you that the commercial industry is alive and well, at least my sector. I do, however, need one more big year just like I needed last year and the year before that, to make everything work.

My wife and I are the mainstays in our family operation which is located in the Flint Hills of Kansas. It's the most wonderful steer grass in the world. It's really good cow grass for three months, and by my calculation that leaves us nine more months, and so that makes us need some specific things out of our cows. Our current ranch entails about 8600 acres. We use Hereford and Angus cattle in our cross breeding program. We retain many of our female replacements and sell several others as bred females or pairs. We also background our steers to approximately 800 pounds and have been selling them as feeders to others. The only thing we don't sell private treaty is our cull cows. Everything else is sold private treaty and we really like it when we can receive premium prices. Usually the only way to do that is to have cattle that have met or exceeded the fellow's expectations when he bought them.

I had a fellow come out the other day that wanted to buy some cows. I could tell he was somewhat disappointed because we seemed to have received some publicity on what we were doing, and he said these cows really don't look any different then anybody else's cows. I guess it's amazing to me how we are perceived in this industry and we think that what we see is what there is. I have a hard time convincing people that what cows do is more important than how they look.

Our goal will always be to keep our operation cost-effective with known inputs, and yet remembering that we don't want to sacrifice anything for minimum inputs. We still want to keep our optimum level of production.

Our ranch is self-sustaining because it has to be. I think the only thing that's probably better than success and acceptance is profit.

The number one thing that we are concerned about at Johnson Farms is fertility because everything else is meaningless if we can't get the cow bred.

The second consideration is efficiency and what it costs to keep that cow. One of the things that is often overlooked is longevity. The cost of depreciation can run anywhere from $50 to $100 per year depending how long you keep that cow in your herd.

A fourth factor is milk. We happen to be in an area with moderate resources, but our most determining factor of weaning weight is how much milk the calf gets.

We also must consider that we background our steers and every day that we keep a $600 steer on our place costs us about $.17 in interest. That would buy quite a bit of additional feed for a cow.

Because I gave a lessor priority to other traits doesn't mean they aren't important, it means they aren't as economically important to us. An example is polled versus horned. It takes us approximately one minute with acid to dehorn a calf and I would hate to give up a pound of growth for that. Actually, our job is labor and management and hopefully the overall picture is to sell more pounds and have more profit.

Table one contains a summary of the specifications we use in selecting bulls. We use the same specifications for bulls whether he's an AI or a natural service bull, the only thing is if he's an AI bull we use progeny proofs.

When I talk about moderate size in bulls, what I'm most concerned about is the size of his daughters.

Regarding frame size, we've always selected bulls in the 5 to 6.5 range.

Table 1

Bull Specifications
(Natural and A.I.)

Trait	Min	Max	Breed Ave
Birth Weight EPD (lbs.)			
Angus-Heifers	-2.0	+3.8	+3.2
Angus-Cows	+2.0	+6.0	+3.2
Hereford-Cows	0.0	+4.0	+1.9
Weaning Weight EPD (lbs.)			
Angus	+ 20	+ 30	+21.7
Hereford	+ 25	+ 35	+23.0
Yearling Weight EPD (lbs.)			
Angus	+ 40	+ 55	+34.3
Hereford	+ 45	+ 60	+35.0
Milking EPD (lbs.)			
Angus	+ 6	+ 28	8.1
Hereford	+ 14	+ 30	7.0
Mature Size	Moderate		
Frame Size	5.0	6.5	

Table 1 (con't.)

Bull Specifications
(Natural and A.I.)

Trait	Min	Max	Breed Ave
Scrotal Circum. (cm)	32	-	
Pelvic Area (sq. cm)	Ave.	-	
Ribeye Area (sq. cm)	1.1	1.4	
Individual Performance	Above Average		

Production Records of Dam

*Calving interval
*Previous caves performance

We also carefully scrutinize his dam's production records as it's essential that the cow has had a calf every year. I expect as much fertility out of the bulls I purchase as the cows that I have at my place. We have a policy that open cows are featured at McDonald's. We don't have an annual production sale so we can't get rid of them there. We like the mothers' of those sires to have really good udders, and we like them to be somewhat feminine but not frail. We don't want coarse females because it does affect fertility.

There are some common sense things we need to think about when we are selecting. For instance, I can envision us getting really enthused about carcass quality to the point where we get a ribeye that must be cut paper thin to have a 6 oz. serving. In the future, carcasses must fit the market place. As an industry, commercial cattle people, registered people and animal scientists, need to work on the end-products. I'm sure that General Motors is fairly concerned about the acceptance of their vehicles. I'm also fairly sure that they don't have a 20% failure rate. I'm amazed that people keep coming back for beef. It must be a preferred meat and what we need to do is get our quality at a higher level.

Our selection criteria at Johnson Farms has really varied very little over the last 10 years. We strive for bulls in the 40 to 50 pound yearling weight for 10 years. The big thing I'd say is that they are much easier to find now than they were 10 years ago. We try to buy a lot of 3/4 and 7/8 brothers, this ensures uniformity of type and performance leading to a more uniform calf crop.

The results of our selection criteria have been somewhat interesting to me. Fertility has increased approximately 8% *from* 90% to 98%. Actually our percent calf crop from conception to weaning has remained at 95% for the last four years. Our weaning weights have increased from 420 to 600 pounds while our percent of calf weaning weight to cow

weight ratio is above 50%. Our cows weigh, on an average, a little over 1100 pounds.

Mature cow size has increased very little at our place, but the type of cow has changed quite a bit. We used to have big, flat back cows, but now they are much more angular.

Our actual production costs have increased approximately $25, but we've added 8% fertility and 180 pounds to weaning weight. We adjusted it the best we could for inflation and I think that's a pretty good profit. Anyone who's been to my ranch could tell that my cows are not pampered. Many people would consider them survivors. I really don't mind that kind of a label on my cows.

The next thing we will look at is what this selection has done to our steers. One of the things that I consider a benefit, we've changed those steers from 22-months of age for slaughter to 15-months. Shown in table 2 are summaries of two sets of steers we have recently tracked through the CAB Program. One group was 65-head in Nebraska and I won't go through all of the data because you can read them as well as I can. The second group was caught at a time that they were not making any money, in fact, it was a reverse deal where they were losing money and they got fed just a little bit too long. The interesting thing is that the first bunch of steers were put on fed at 800 pounds, and the cattle gained faster than we thought they would. This year we have sold our steers at a lighter weight and they assured me they would not feed them quite as long and hopefully we can have a carcass that fits the box. I would like to point out that these are steers out of five frame, 1100 pound cows that can stay on feed at 4 pounds a day and go to a 1393 pound pay weight. How big do our cattle really need to be?

This year we sold our steers back to the same people over the phone for a premium.

Table 2

What My Selection Criteria has Meant to our Steers

A. Age at slaughter has decreased from 22 months to 15 months.
B. Data on 2 groups of steers with the Angus CAB Program.

1. Group 1 65 steers fed in Nebraska

   A. Fed 121 days
   B. Gained 4.01 pounds per day
   C. Converted 6.1 pounds feed to 1 pound of gain
   D. Feed cost $.05 less than the lot average
   E. Pay weight 1288 pounds
   F. 97% graded Choice or better
   G. Average age at slaughter 14.5 months
   H. 51% Accepted CAB

Table 2 (con't)

What My Selection Criteria has Meant to our Steers (con't)

2. Group 2 125 steers fed in Kansas

A. Fed 146 days
B. Gained 3.98 pounds per day
C. Converted 6.2 to 1
D. Feed cost $.06 less than the lot average
E. Pay weight 1393
F. 95% graded Choice or better
G. Average age at slaughter-15 months
H. Yield Grade-6-4's; 103-3's; 18-2's
I. Average Yield grade-3.5
J. Average Back Fat-.39 inches
K. 52% Accepted CAB-4 times national acceptance rate

How we use EPDs? First of all we evaluate our cow herd and their progeny to determine what the job description for the bull is going to be. When I receive information out of sale catalogs, I always go down and look through the bulls that fit the description of what I need. I also seek out bulls that are out of high accuracy sires (not only on the sire side but also on the dam side). Finally, we consider all the information then look at the cattle to make sure they are the type that will survive in our environment.

What about sale catalogs? EPDs are like having a race car without a patrolman or road signs to tell us what we need to do. We believe EPDs are great, and while individual bulls may not live up to their expectations, groups of bulls surely do. Each rancher needs to look at his environment, his resources and his management skills to determine what values he should assess to the bulls he's going to purchase. Bigger is not always better, most of the time it's just bigger. What we really want to look at is profit. Our yearling weights don't always mean higher profit. Usually larger framed, growthier cattle have larger females to maintain.

What about lower birth weights? If we don't challenge our cows a little bit, we will be disappointed in the performance of the calves. Birth weights are never a problem until they start causing calving difficulty. Sometimes people select so they can have more moderate birth weights and brag to everybody how they never assisted a heifer this year. How many pounds of beef we sell and what our profit potential is.

I visited one time with an area field man and I asked him how many real breeders he had? He thought for a minute and replied that he had eight breeders and 700 multipliers. We need to watch what classification we might be in.

In closing I would like to say, the shortest distance to the end is a straight line. We need to think of ourselves as businessmen first, cattlemen or ranchers secondly, and look at EPDs as an asset. Let's temper some of our emotion and some of the tradition that we have in the cattle business with a new EPD called "common sense". Let's not use tunnel vision of each segment of the industry, but let's look and think in terms of what makes the industry work as a whole.

HOW I USE EPDs and OTHER GENETIC PREDICTORS

Paul Bennett, seedstock producer
Knoll Crest Farms
Red House, Virginia

We run three breeds of cattle, not because we're dissatisfied with any one of the three. Rather, we feel that in order to produce specification cattle that will meet different needs for different people, we can't expect to do that with one or two breeds. We may not be able to it with three breeds. We've come to the realization that in order to best service our bull customers it's going to take more then one breed. At least having more than one breed will make our job a lot easier in meeting the needs of our commercial bull customers.

Our operation is a family business. My father, James Bennett, is the second generation involved in purebred beef cattle production at Knoll Crest Farms. Currently, I'm involved full-time along with two younger brothers and another brother who is still in college and not committed at this time. This has certainly opened some doors and presented some real opportunities for us as a family to be able to do some things. At the same time, it's presented us with some real challenges because you have to cut the pie into more pieces.

We've been working with Polled Herefords for quite some time, dating back to the early 40's. We have not brought in an outside female since 1966. Our cow herd has been closed for 26 years. Every Polled Hereford female on our place has got a lot of KCF prefixes along the bottom side of her pedigree. There are a couple reasons for taking that approach. By knowing that you have a closed cow herd, and everyone else knows you have a closed cow herd, you can go to a production sale and nobody questions why you didn't buy something. We don't get into any "back scratching" and so when we make a sale it was an honest sale not based on somebody owing something. The most important reason is that we've been working with those cattle so long that we know what we have. I'm not going to say that we are satisfied but we're really pleased with their consistency which we attribute to the many generations of consistent and persistent selection.

We've been working with Gelbvieh since 1982. We feel very fortunate to have been exposed to those cattle at the Meat Animal Research Center. We felt like that was the breed that could really make a contribution to the commercial industry in our part of the United States (Virginia). We had a couple of very fortunate opportunities to buy large numbers of cattle that came out of the hearts of two very progressive breeding programs. Even though we've only been involved in that breed for ten years, the cattle have been exposed to our kind of selection for much longer than that.

We've just recently added Angus. I'll show a little bit about where we are with that breed.

Given our business and our mission as seedstock producers, without any doubt, our primary goal is to produce commercial bulls. Everything else produced is considered a by-product. Commercial bulls are the heart of our objective as seedstock producers. My father's goal as a seedstock producer was to produce cattle to meet the needs of the commercial industry, and in doing so you hope you can produce a few that the commercial industry couldn't afford. That's our philosophy.

In addition to selling commercial bulls, we do sell a fair number of bulls and semen into other seedstock operations, so we deal with meeting the needs of a lot of different people.

From a management standpoint, we need to look at putting that into perspective. We like to think that we run our cattle as if they were commercial. Our philosophy is if our cattle are going to work for the commercial man, they have to be selected and scrutinized under the same environment as the progeny of those commercial bulls. As we have increased numbers we've had to spread management, and in some respects that's put us at a disadvantage. From a pure genetic standpoint, we're at an advantage because our cattle have to do more with less management and less feed resources.

Also, without any doubt, we have concluded that our cattle must be problem-free, not only for our management systems, but for the management systems of our customers. As a part of that, we've certainly found that moderate frame, "middle of the road" cattle are the type that work best for us.

Any serious purebred breeder should take a business approach to what they are doing and their goals must be long-term. It's easy to get caught up in things that get hot quick, but the things that get hot the quickest, get cold the quickest too. As purebred breeders we need to maintain long-term goals, and we will always need to be projecting what the cattle will be producing next year and the year after that, and ten years down the road. Hopefully, we will still be in business.

As a seedstock producer, we've got to produce a variety of cattle to serve our customers' needs. Looking at the kind of people that we sell bulls to, we have a Bill Brockett on one end of the spectrum. As you could tell, Bill's a very large operator, very cost conscious, very progressive and innovative in what he does, and we've got to meet his needs if we want to maintain him as a customer. On the other hand, the larger percentage of our bull buyers are part-time farmers and people that own 20-30 cows.

In our selection program, we're dealing with traits that are antagonistic with each other, which presents a real problem.

We must keep things in perspective and try to come up with a happy medium.

EPDs are a very big part of our breeding program being one of the primary tools that we use to select cattle. However, polledness is a very important economic factor especially east of the Mississippi River.

Fleshing ability is important since we need to produce cattle that are adaptable to different environments--not only cattle that work in our environments, but cattle that can go out of our environment and work in other environments.

Shown in table 1 are the selection specifications we use for different traits for each breed.

Table 1

Knoll Crest Farms
Trait Specifications For Offspring Sold

Trait	Min.	Max.	Breed Avg. '91
Birth Weight EPD			
Polled Hereford	-	+ 5	+ 3.6
Gelbvieh	-	+ 3	+ 0.3
Angus	-	+ 5	+ 3.2
Weaning Weight EPD			
Polled Hereford	+20	-	+22.5
Gelbvieh	0	-	+ 4.8
Angus	+40	-	+21.7
Yearling Weight EPD			
Polled Hereford	+35	-	+36.4
Gelbvieh	0	-	+ 9.1
Angus	+40	-	+34.3
Milk EPD			
Polled Hereford	+10	+30	+ 0.6
Gelbvieh	0	+10	+ 2.0
Angus	+12	+25	+ 8.1
Frame Size			
Polled Hereford	4.5	7.0	
Gelbvieh	5.5	7.5	
Angus	4.5	7.0	
Scrotal Circumference			
Polled Hereford	34	-	
Gelbvieh	34	-	
Angus	34	-	

Table 1 (con't.)

Knoll Crest Farms
Trait Specifications For Offspring Sold

Trait	Min.	Max.	Breed Avg. '91
Pelvic Area			
Polled Hereford	165	-	
Gelbvieh	170	-	
Angus	165	-	

Birth weight is becoming increasingly important and I feel quite comfortable with where we have set our maximum EPDs. We've set our minimum weaning and yearling weight goals at similar levels for Angus and Polled Hereford while our Gelbvieh minimums are at 0.0. Our minimum milk EPDs are set above breed average for Polled Hereford and Angus while the Gelbvieh standard is actually slightly below breed average. Like Bill Brockett said earlier, average milk in Gelbvieh is very acceptable. You can get too much, that's why we also have set maximum milk EPDs for each breed.

When we look at the frame size needs of our commercial bull customers, we need to keep our Polled Herefords between 4.5 and 7.0 which will catch 98% of our customers. We definitely see resistance to British breed bulls that are above 7.0 frame. We've got a strong market for Gelbvieh bulls between 5.5 and 7.5. Based on where Gelbvieh cattle are fitting into our customers' cross breeding programs below 5.5 is too small and we sure feel like anything above 7.5 puts us into trouble with other traits.

We'd like to target 34 centimeters as a minimum yearling scrotal circumference on a bull that we sell. We will sell some bulls that are just slightly under that at 32 or 33, but if we can get them to 34 that's a very acceptable level.

Table 2 shows a comparison of the sires used in the Knoll Crest program versus breed average and the average of our Polled Hereford cows compared to the average of all active cows in the Polled Hereford breed. A comparison of projected EPDs for our fall 1992 and spring 1992 calves is also listed.

Table 2

Knoll Crest Polled Hereford
Compared to Breed Average

Trait	Sires		Cows		1992/93 Calves	
	Knoll Crest	Breed Ave.	Knoll Crest	Breed Ave.	Knoll Crest	Breed Ave.
Birth Weight	3.0	3.6	2.7	2.2	2.8	3.6
Weaning Weight	30.8	22.5	23.1	15.2	27.0	22.5
Yearling Weight	52.4	36.4	35.2	24.5	43.8	36.4
Milk	18.5	0.6	12.7	1.7	15.6	0.6

These data clearly represent the results of our selection emphasis. Our cows are significantly above breed average for milk while being at breed average for birth weight and above average for growth. As you can see, our 1992/93 calves will be below average for birth weight, well above average for growth and significantly (15 bs.) above breed average for milk. Again, our many years of consistent selection are paying off.

We've put a lot of emphasis on calving ease and milk because our customers use Polled Hereford bulls in calving ease situations and they want problem-free cows that will milk.

In pelvic area, I've set our Polled Herefords and Angus at 165 centimeters and the Gelbvieh at 170 just simply because of Gelbvieh's larger frame size.

Given in table 3 is the same information for our Gelbvieh cattle.

Table 3

Knoll Crest Gelbvieh
Compared to Breed Average

Trait	Sires		Cows		1992/93 Calves	
	Knoll Crest	Breed Ave.	Knoll Crest	Breed Ave.	Knoll Crest	Breed Ave.
Birth Weight	-1.5	0.3	-0.1	0.3	-0.8	0.3
Weaning Weight	15.0	4.8	6.0	2.7	10.5	4.8
Yearling Weight	26.0	9.1	10.5	5.1	18.3	9.1
Milk	4.0	2.0	4.1	1.2	4.0	2.0

As was stated earlier, one of our primary selection concerns in Gelbvieh is calving ease. The average birth weight EPD of the nine bulls used was -1.5 (1.8 lbs. below breed average). Our fall 1992 and spring 1993 Gelbvieh calf crops will be about 1.1 lbs. below breed average for birth weight. On the other hand, our calves will be well above average for growth and 2.0 lbs. above breed average for milk. Again,

milk is not a major consideration in our Gelbvieh program since the cattle are already high in milk.

Table 4 shows the average percentiles for the bulls we are using in our program for each breed. What you will notice is that we are emphasizing balanced selection.

This is really something that has been difficult for us to do, as I think we would all agree. As we meet the needs of the industry now and in the future, we absolutely must have cattle that are trait balanced, and we are going to have to find those bulls that Roy Wallace calls "outliers", the bulls that can give us the level of growth and maternal traits that we want, but they have got to be within birth weight parameters as well.

Table 4

Average Percentile Ranking of Service Sires Used at Knoll Crest

Trait	Polled Hereford (%)	Gelbvieh (%)	Angus (%)
Birth Weight	40	17	5
Weaning Weight	18	5	24
Yearling Weight	12	5	17
Milk	0.5	25	3

If I could leave you with one thought, as we look at EPDs and we try to utilize EPDs to make them work for us and for our customers, it's extremely important that we have long-term goals. We've all got different reasons for having long-term goals, and I have two very good reasons--my son and daughter. The only way we are going to make genetic improvement with EPDs over time is through years and generations of consistent and persistent selection using EPDs. It's going to take a lot of patience.

Thank you.

HOW I USE EPDs and OTHER GENETIC PREDICTORS

John Bruner, seedstock producer
Bruner Limousin
Winfred, South Dakota

Bruner Limousin is located in East-Central South Dakota on the very western edge of the Corn Belt. As you travel west of us you rapidly get away from row crop production and move into native grass pastures. Most of our pasture land consists of ground that is too rough, too steep or too wet, to raise crops. The trees in our area are nearly all planted in nice neat rows. We cultivate them for several years to get them established, and where they don't grow is because of limited rainfall. The feed resources are moderate and we seldom have plush grazing for any extended period time other than early spring and early summer. That is the basis for how we have designed our program. Cows are grazed in the summer on grass and feed in the winter on low value, low cost residues.

We are a family operation consisting of my wife, me and the four children, the oldest of the children being a junior in high school. I did call home this morning to check-in and got a report on how many cows are in heat and getting serviced, so I guess everything is all right. We're primarily a seedstock operation where our bulls are sold in a production sale on the last Wednesday in March. Our program is designed to sell commercial bulls although over the last few years, more of our cattle are being sold into the seedstock industry.

We started our Limousin program in 1973 and currently are adding a few Shorthorn cattle to compliment our customers' cross breeding programs. My comments today, however, will be specifically for the Limousin breed since we have more experience and are more comfortable with where we are with the EPDs. Our initial desire was to establish a breeding program that would increase performance to yearling time and maintain moderate birth weights. We selected Limousin as the breed of our choice, based on the data from MARC.

At the time I evaluated the data, the birth weights of the Limousin breed averaged in the mid-line of the commercial industry that was acceptable in the environment in which we work. They had good growth, particularly as measured on the basis of red meat yield per day. Also at about that time, during the early 70's, Dr. Dickerson, from the University of Nebraska, had developed an index for simultaneously selecting for growth and birth weight. The formula was: Index=yearling weight minus 2.7 x's birth weight. It allowed for 90% of the available increase in growth rate, while making very little change in the birth weight and the corresponding calving difficulty. The important part to me was while making progress in a highly economic, highly inherited trait, he was making little change in a highly correlated trait. We used that as a basis for our start

with the desire to expand upon it. However, once sire summaries and EPDs evolved and became available, we turned our attention to using those instead of ratios.

In building the foundation of our program, we selected bulls with high growth rate potential that had moderate birth weights within the breed, rather than high birth weights. On heifers we put more emphasis on birth weight, trying to make sure that bulls used on heifers had at least above average growth rate based on their yearling weight EPDs. That's the way we initially used all of our EPDs in our breeding program, keeping in mind that we had made the assumption that the average birth weight of the breed was in the mid-line of acceptability for the commercial cattle industry as we knew it in our particular environment.

We are working within a given environment and will produce cattle in that environment. As you would expect, when we mated those heifers to lower birth weight bulls we did lower the growth rate potential, but on the other hand, we were able to satisfactorily implement the use of EPDs and get the expected calving results.

Rather then selecting criteria for the sires that we incorporate into our herd, we set up a given set of parameters for each individual calf that we desire to produce. We then select a specific bull to mate with that particular cow to reach that end-point. The end-result is, if we have an animal that is very low on yearling weight and has an acceptable birth weight, we can incorporate a bull with high yearling weight for that particular mating.

All of our cattle are bred to have a moderate birth weight and we define that in our program to get the bulk of the calves between 75 and 95 pounds combined with a high yearling weight.

Those are the two primary selection tools that we use. The bulk of the other factors of economic importance are based on independent culling levels.

Table 1.

Bruner Limousin
Trait Specifications
(Progeny Targets)

Trait	Min	-	Max.	ACC	1991 Bulls
Birth Weight EPD	-		2.0	.30	.6
Weaning Weight EPD	12.0		-	.30	3.5
Yearling Weight EPD	25.0		-	.30	6.7
Milk EPD	2.0		5.0	.30	.2
Frame Size	5.5		7.9		
Age at Puberty	-		17 months		

Shown in table 1 are the trait specifications we use. When we make our plan for matings, on an individual basis, and most of our progeny are production of artificial insemination, we want a maximum birth weight EPD of 2.0 for our cows. I don't really have a minimum or a maximum on either weaning or yearling, this is a ball park figure where we would like to come in at as a minimum. At present we will accept as much growth as we can get, providing we don't go over the two pound birth EPD, and we can keep our milk EPD between plus two and plus five.

I indicated a preferred accuracy figure although it will vary depending on the proof behind the sire and dam. If I'm mating a yearling bull to a first calf heifer, my accuracy level is not going to be high enough. However, when I am the owner of the sire and dam of that bull we have more control.

The bulk of our frame scores will run between 5.5 and 7. We don't select for frame size directly. Basically, we control mature weight and frame size by controlling our birth weight. Too much frame size has not been a problem at our place, if anything, for the seedstock business, too small a frame score has been an inhibition for marketing until the last couple of years.

I indicated a maximum age at puberty of 17 months since every yearling heifer must cycle during our A.I. season to be bred and calved as a two-year-old. There is independent culling in our program in that if the yearling heifers do not cycle, or don't get bred during our A.I. season, they don't stay. If they do not come in pregnant, they also do not stay.

The maximum birth weight EPD we use on cows, as I stated is a 2.0, and when we make the matings on our yearling heifers, we use a maximum of about a 0.0 on birth weights, trying to keep the growth between two and five pounds. I do think that at some point we probably can get too much growth especially if we try and maintain that kind of a birth weight. I haven't reached that limit yet and I'm not sure where it is. Using the parameters that I have set forth for birth weight EPDs in our program, we have little or no calving difficulty.

When we set our parameters in this manner, it allows us to use a large diverse group of bulls. We will have some bulls that will be mated to a large number of cows, some that may be mated to one cow.

Also because of market demand, we have started a milk line and try to get as much milk as we can. This does limit the number of sires we have available and the progress that we can make.

We do designate in our bull sale a group of bulls based on EPDs, pedigree and actual birth weight, that we feel are

suitable for use on first-calf heifers. About 35% of the bulls that were in our sale this spring, were designated as such. Many of them were bought and used on first-calf heifers with very good success.

A couple of related things that have evolved from this selection system, by increasing growth rate and maintaining constant or near constant birth weight, we seemed to have controlled mature size. We have increased the slope of the growth curve in the middle and flattened it at the end. When we started that, while increased growth rate was highly desirable, the negatives that were often associated with it made it totally unrealistic. When we increased growth rate without the birth weight and the mature weight going up, we made the cattle more fertile and better able to maintain body flesh on minimum resources, particularly in years of drought and/or harsh winter conditions.

Table 2 shows the breed averages for birth, weaning, yearling and milk EPDs for the current sires of the Limousin breed, and it also shows the EPD averages for the 1991 bull crop that we sold in our March bull sale.

As you can see, our sale bulls were equal to Limousin breed average for birth weight while being 8.3 pounds and 17.4 pounds heavier for weaning and yearling weight, respectively with a 3.3 pound advantage over breed average for milk EPD.

In addition, our cows are slightly less than breed average for birth weight while being 7.1, 14.1 and 3.3 pounds heavier for weaning weight EPD, yearling weight EPD and milk EPD.

Table 2.

Bruner Limousin Compared to Breed Average

Trait	Bulls		Cow	
	Bruner	Breed Ave.	Bruner	Breed Ave.
Birth Weight	0.6	0.6	0.1	0.2
Weaning Weight	11.8	3.5	8.0	0.9
Yearling Weight	24.1	6.7	16.3	2.2
Milking Ability	3.5	0.2	3.4	0.1

The cows on the average that we will mate this summer will have birth weights in the top 30%, meaning the (lightest 30% ranking of the Limousin breed), the weaning weights are in the top 20%, yearling weights are in the top 20% and the milking ability is in the top 20%. The bulls that we sold in our spring production sale ranked in the top 60% for birth weight while the weaning weight EPDs on those bulls ranked in the top 10%, yearling weight in the top 5%, and the milking ability in the top 20%. That is the end-result of 20 years of selection, and a desire to maintain the birth weights we started with in 1973 and make some improvements in the performance of the bulls.

One of the earlier speakers this morning made a reference to looking for those "needles in the haystack". They are an important part of our program when we search for sires and also when we try to identify particular bulls that we produce in our program. At our place we call them "outliers" or "genetic freaks." We desire to produce and to identify those bulls that don't follow the normal spectrum that we expect. We want to find and identify the bull that has a low birth weight suitable for use on first calf heifers with very high probability. We want to identify the bull that has acceptable or moderate births for use on a large spectrum of the cow herds in the industry with high growth in the breed and still has acceptable milk. There aren't very many of them. We have to incorporate an AI program to make them work in our program and we virtually must use artificial insemination and planned mating to make them all function. Thank you very much.

HOW I USE EPDs and OTHER GENETIC PREDICTORS

Bill Brockett, commercial producer
Virginia Beef Corporation
Haymarket, Virginia

Virginia Beef Corporation is a diversified agricultural business concern in an odd area of the country for large farming operations. We're located in northern Virginia and generally we can drive to the White House anywhere from 1 to 1 1/2 hours from any location on our farm. We have about 40,000 acres in that general area, and I'm not sure how many million people. Of our 40,000 acres we raise about 10,000 acres of grain, 2,000 acres of sod, and the balance is our cattle operation. In that section of the country, land is extremely dear in price so we own less then 10% of the land that we have and the balance is cash leased.

Our cattle operation is divided into two parts. First, is our cow-calf operation and the second is the development and sale of replacement heifers. The steer calves are sold on a nationwide video auction sale. Generally, I establish a minimum price that I'm willing to accept. With video sales you have the right to no-sale, and for a fee you can figure out what your cost will be, then I go ahead and feed them out. Otherwise, I let somebody else take the risk. Replacement, bred heifers are sold each fall at our series of annual fall production sales.

Going back 47 years, our cow herd has been basically a black/black-baldy cow herd. Starting seven years ago we began breeding Gelbvieh on our black-white faces and now we're into a three-way rotational cross breeding program using Angus, Gelbvieh and Charolais. We take the Angus-sired cows and breed them to Gelbvieh bulls, those offspring are mated to Charolais bulls and then the Charolais-sired cows are bred back to an Angus bull. What works for me (I'm on the other side of the hill), may not work for anybody else. I'm not recommending any programs, I'm just explaining what we are doing.

For a long time I've followed documented genetics. This means looking at the real genetic makeup of an animal. Today we have the information on most breeds which makes our bull selection job easier, but yet a whole lot more complex. Not too many years ago, it was common practice to just "eyeball" replacement bulls with little information, but now we have numbers that mean something. We all have enough general information to prove that EPDs are for real, they do mean something. We can prove them ourselves. There's only one breed that I'm still using (on heifers) that I don't have any information on (Longhorns). I can select breeds and individuals within the breeds to emphasize normal characteristics of certain breeds. With the information we have available, I don't need to sacrifice strong points of that breed in doing my cross breeding. It works well to just know that you have a good milking breed (Gelbvieh for

example) so you have good maternal characteristics. Gelbvieh have early puberty and good milking ability so I can breed them to Charolais. The Charolais I have chosen to use from one particular herd are moderate framed (no more than frame 7), with thickness and fleshing ability. We end up with what we consider good offspring.

I carry about 1000 heifers a year and I don't want to challenge those heifers so I mate them to Longhorn bulls. I want those heifers to do three things for me. I want them to get bred, I want them to have live calves and wean them and I want them to get bred back. Eight or nine years ago when I started breeding with Longhorns, I thought I would have to accept smaller calves, smaller prices etc. I select Longhorn bulls for beef type that mature at a ton. All of them have birth weights in the 30 to 50 pound category, all of them have weaning weights above 600 pounds. I've been very successful. I haven't had to take the $10 per hundredweight discount that I have heard stories about. We have selected for beef type and solid color. Sixty percent are black and the other 20 percent are usually a solid red. I have reduced our workload which is essential when you are trying to calve out as many females in the spring as we do.

Calving ease is my number one priority whether it's for heifers or cows. We handle large numbers and we're spread over a large area. We've got to have those calves come easy. We don't have time to pull calves. What we're looking for is calving ease on the heifers and on the cows. Anybody who has more then one bull has one bull that's easier calving than the other. For example, we have a large number of bulls so we select the easiest calving low birth weight EPD bulls to mate to the first-calf cows. These females are not mature yet so we want to give them the easiest time possible. We still have to remember that we have to get a live calf, we have to have a marketable calf and we have to get that cow bred back. Using this approach, we have reduced the number of problems with young cows not claiming their calves.

Last year we had 57 Angus bulls that were either Traveler or Bando so I compared their offspring with the offspring of the Longhorns. The Longhorn-sired calves out-weighed the Angus-sired calves by 46 pounds. They also sold for basically the exact same dollar. I'm not promoting Longhorns it's just that this is what works on my side of the hill. Remember, I'm calving large numbers.

When selecting bulls, I'm probably one of the worst for wanting all of the information possible. I can't get enough information. I want all the EPDs that a breed might have, I want all the traits that you can supply, I never do any single trait selection, but I do start with a single trait. I will look at one specific individual trait before I go any further. That's just the way I make my selections. I'm very hard to satisfy. I have specific criteria and I am a firm believer that there are enough cattle in the United

States that I don't have to sacrifice what I have set up for my program. Yes, I do travel more miles to buy bulls than you may think you can.

We worked out a computer program a number of years ago to compare bulls statistically, and then I had the good fortune this past year to participate in one of the Polled Hereford Genetic Focus shows. After I did that, we changed our computer program and adapted some other material into it. We use a trait weight percentage and a 10 point scoring system using five to eight traits (depending on what's given to me). With this information I can statistically compare bulls within one herd or within herds of the same breed.

Everyone has different production levels and different levels of importance for different EPDs and traits across various breeds. Shown on the following chart are the three primary breeds that I use with the respective criteria for bull selection.

Table 1.

Virginia Beef
Trait Specifications for Bulls

Trait	Min.	Max.	Min. ACC	Breed Ave. 1991
Birth Weight EPD (lbs)				
Angus-Heifers	-3.5	0.0	.70	+3.2
Angus-Cows	0.0	+7.0	.70	+3.2
Gelbvieh	-6.0	+2.0	.70	+0.3
Charolais	-4.0	+3.0	.70	+1.0
Weaning Weight EPD (lbs)				
Angus-Heifers	+ 10	+ 45	.70	+21.7
Angus-Cows	+ 25	+ 70	.70	+21.7
Gelbiveh	+ 5	+ 25	.70	+4.8
Charolais	+ 15	+ 50	.70	+7.0
Yearling Weight EPD (lbs)				
Angus-Heifers	+ 10	+ 55	.70	+34.3
Angus-Cows	+ 30	+ 70	.70	+34.3
Gelbvieh	+ 5	+ 20	.60	+9.1
Charolais	+ 20	+ 50	.70	+10.7
Milk EPD (lbs)				
Angus-Heifers	+ 5	+ 25	.70	+8.1
Angus-Cows	+ 5	+ 25	.70	+8.1
Gelbiveh	0	+ 10	.30	+2.0
Charolais	0	+ 10	.70	-1.4
Calving Ease EPD (ratio)				
Gelbvieh	100	130	.50	100.4
Maternal C.E. EPD (ratio)				
Gelbvieh	100	130	.30	101.2

Table 1. (con't.)

Virginia Beef
Trait Specifications for Bulls

Trait	Min.	Max.	Min. ACC	Breed Ave. 1991
Gestation Length EPD (days)				
Gelbvieh	-3.5	+1.0	.30	-0.2
Mature Size (lbs)				
Angus-Heifers	1500	1900		
Angus-Cows	1700	2000		
Gelbvieh	1800	2400		
Charolais	1800	2400		
Frame Size				
Angus-Heifers	5.0	6.0		
Angus-Cows	6.0	7.5		
Gelbvieh	6.0	7.5		
Charolais	6.0	7.5		
Scrotal Circum. (cm)				
Angus-Heifers	32	42		
Angus-Cows	32	42		
Gelbvieh	32	42		
Charolais	32	42		
Pelvic Area (sq. cm)				
Angus-Heifers	170	250		
Angus-Cows	170	250		
Gelbvieh	170	250		
Charolais	170	250		
Fat Thickness (in)				
Angus-Heifers	.10	.30		
Angus-Cows	.10	.30		
Gelbvieh	.10	.30		
Charolais	.10	.30		
Ribeye Area (sq. in/cwt)				
Angus-Heifers	1.0	1.5		
Angus-Cows	1.0	1.5		
Gelbvieh	1.0	1.5		
Charolais	1.0	1.5		

I have classified Angus for heifers and Angus for cows. The accuracy levels on all of these reflect the sires of the bulls that I'm buying. Since EPDs are not comparable across breeds the specifications vary relative to breed average. These specifications are from our own information. Each year I have one herd that I consider culling for age or body misfunctions or something like that. I'll mate them to the bulls that have the highest birth weight EPDs.

When putting everything into priority, birth weight is my number one priority. If I can't get them born, everything else is for nothing. When I'm looking at a sale catalog, the first thing I do is look at the EPD for birth weight. If it doesn't fall in my category, I go to the next and the next one. After it has met that criteria, the next criteria I look at is weaning weight.

I do have limitations on weaning weights. I'm not interested in something that goes off the moon because in today's present grading system, 800-1000 pound calves won't work. I will be more tolerant of weaning weights in Angus for heifers. I'm asking for a lower birth weight EPD and this will knock down my weaning weight usually on the Angus cows.

Yearling weight is really not that important to me, but I do make sure that it doesn't get too high. Excessive yearling weights usually tells me that I'm going to have too big of a cow. A certain number of animals go overboard on yearling weight and I'm not interested in that 1500 pound cow.

Milk is a trait I emphasize very little when selecting Gelbvieh bulls because it is a given that Gelbvieh will milk. In fact, I could actually put my milk EPD minimum below 0.0. By the same token, since Charolais are being mated to Gelbvieh cows, milk is not a major factor when selecting Charolais either. I really don't need more milk in the cross.

Calving ease in Gelbvieh is essential so we want to use a minimum of 100 calving ease EPD.

Regarding mature size, I would prefer that 2400 pounds be the maximum potential size, however, since I don't feed my bulls, they are not likely to reach that weight. Frame size has always bothered me and I have never purchased a bull that exceeded 7.5. I prefer to buy bulls in the frame six category. They fit our market requirements and cow size for the weaning weights we hope to get.

For seven years we've bought all of our bulls with a known pelvic area. We have used 170 square centimeters as a minimum. We just bred approximately 1000 heifers about three or four weeks ago. The technicians didn't know anything about my bull selection, and they actually said, "This is a most amazing group of heifers that we have ever seen. You have a very large pelvic area all the way through." Even though it's not highly inherited, if enough generations were selected for this as a minimum, we must be accomplishing something. Between our birth weight EPDs and pelvic area, I feel like we are accomplishing something since our calving problems have been dramatically reduced over the last five to seven years.

When you set up these maximums and minimums, you've got to do them for your own operation. If they exceed your maximum

or minimum, it is a stopping point. If a bull goes above or below on a single trait, that's reason enough to say "okay there's another bull I can look at".

Shown in table 2 is a summary of how we view the importance of each trait within the four breed types. There are a lot of 1's because there are a lot of traits that are important. As can be seen, my priorities are fairly consistent across breeds. There are a few differences such as fleshing ability which is a given in Angus but must be considered more in Gelbvieh and Charolais. Since our operation is based on roughage, our bulls must be able to maintain their condition without supplemental feed.

Table 2.

Virginia Beef
Importance of Traits

(Level of Importance: 1= very important; 5= unimportant)

Trait	Angus-Heifers	Angus-Cows	Gelbvieh	Charolais
Body Capacity	1	1	1	1
Calving Ease	1	1	1	1
Carcass Cut-ability	2	2	2	2
Color	5	5	3	5
Eye Appeal	3	2	2	2
Fertility	1	1	1	1
Fleshing Ability	2	2	1	1
Growth	2	1	2	2
Milk	2	2	2	2
Muscling	2	2	2	2
Pelvic Area	1	1	1	1
Polledness	5	5	2	2
Problem-free	1	1	1	1
Structural Soundness	1	1	1	1
Temperament	2	2	1	2
Udder & Teat Soundness	1	1	1	1

I would prefer to put a minimum of 75% of the emphasis on my bull selection on numbers, which include EPDs, certain traits and individual animal statistics, and less than 25% on the physical characteristics. However, I don't mean to make it sound like I don't want to see any bulls. I have bought bulls over the telephone on a sale where the buyer/owner of the cattle has said, "Yes, they are sound. I guarantee it". However, any trait, EPD, or physical characteristic that doesn't meet our needs, will just be passed by. As our levels of scrutinizing become harder, we will be doing more AI. Only about 3% will meet the criteria. This is very important.

All traits can be taken to extreme in both ways, and this is where I think we really have to watch it.

In summary, we as an industry need to get a real important message through to the showring judges. You as seedstock producers are showing bigger cattle and from what I have seen a 9.2 frame bull that is made grand champion isn't in the cards for a commercial man to utilize. Somehow or another the BIF needs to get a message through to the judges we can't stand 9 frame animals. I really don't know if we can stand 8 frame. I can't. We don't need cattle made champions and put up as examples of what seedstock producers say are the kind we should produce. We've got to get away from that and get the message through that whatever you as seedstock producers produce, should fit the commercial breeders' programs. We are the ones that are trying to fit the feedlot so that we can fit the consumer. We all must fit the consumer. We are all limited on our income, and if we get these giant size animals that make steaks that are too big, we are losing what we are after.

Thank you for your time.

BIF'S MODERNIZED MISSION

Jim Leachman, President Beef Improvement Federation

Next year marks the 25th anniversary of the Beef Improvement Federation. Your board of directors felt that a review of our history and future is important. Thus, we changed the format of our mid-year board meeting. In the past we have flown into Kansas City, arrived late, worked for a short period of time, and tried to get out of there as fast as we could. With the cooperation of Jim Gibb of the American Gelbvieh Association and the North American Limousin Foundation, we were able to locate and rent a facility where the board could arrive on Thursday evening, and spend three days in a very relaxed atmosphere brainstorming the future of this organization.

My objective in setting up that type of atmosphere was to (1) create more interaction between the directors who represent different segments of the beef industry, (2) take the time to concentrate on our business, and (3) have time to do this brainstorming.

As yet, we are not in a position to present our mission statement, but I would like to share with you some of the significant statements made by your board members. These represent some of the major statements made and are not intended to represent a particular area, or any particular person, or any particular point.

1. "Efficiency and competitiveness is more important than productivity."

2. "Total productivity marries performance with the financial."

3. "There is a vast difference between information and education."

4. "Genetic improvement is a competitive edge."

5. "Cattle are a renewable resource to meet the needs of people."

6. "Beef cow improvement can best be done on a standardized basis on a population basis."

7. "There is a need for greater interaction between scientists and the cowboys."

8. "A standardization of different measures helps marketing."

9. "It's our role to facilitate the transfer of technology to industry."

10. "The beef industry is a worldwide industry. We need to have a common standardized language!"

Now I would like, as Henry Gardner did years ago, to change hats for a different perspective. I'd like to take off my hat as president and speak to you as a cattle breeder. I do that just as an ordinary producer or "cowboy" as the board called us.

The last couple of days we have heard that the war on fat is not won. Neither is the war on performance won. Yes, for the last 25 years producers have used science to increase the growth of our cattle, and it's worked.

We've also heard that some of the cattle are too big. We no longer hear that too many of them are too small. We do have the science to improve growth. We have heard facts and figures to indicate that yield, carcass yield, and carcass quality have not improved. However, as a producer, I ask where are the EPD's that measure and control frame and mature size? Our cattle do need to fit the target parameters of the market place to remain competitive.

If we are going to be measured by SPA (Standard Production Analysis) and if reproduction is the most important factor in that measurement, where are the EPD's to measure reproduction?

The C.A.R.D.S. program is leading a change to value-based marketing and I believe it will succeed. Finally, carcass quality, meaning yield and quality, are going to be important in marketing. But, I ask, where are the measures, the live measures for us to use to improve the carcasses? Where are the EPD's?

If our customers are going to crossbreed, and I believe they are, where are the across breed comparisons to do it effectively?

No the war isn't won. We've made lots of progress. But there is still misunderstanding in the industry that we are comparing cattle on equal grounds. There still are cattle that receive preferential treatment in our management practices.

We still compete in a seedstock market place where probably half of the population have no performance data. We are faced with a continued overemphasis on shows and show ring winnings. Some are fueled by urban areas that wish to attract you and me to their cities, for their own financial benefit.

I'm fortunate to have within my family some individuals with exceptional abilities with computers. I've realized of late we have stretched the producer to his technological limit, given his background and his need to concentrate on production. Yes, he believes in EPD's. He has bought computers, but he has gone as far as he can go without some additional direction and uniformity.

In any industry, time is money and lost time is lost money. It is time, while the beef industry is in the best shape it has ever been in, to do what many industries do when they have an asset that is not valued correctly. That is to take a hit, take a write

down, do it all at once, and move on. And what am I talking about? It's time to standardize our data. If you go through our guidelines and mission statement, the first word in it is uniformity. The very first word. Have we faced that in this meeting?

We are in a period of objective genetic and financial measures. In this meeting and in this group of scientists, we're talking about the biological part of that formula. The successful breeders of the future, will be the ones that market the use of these objective measures. They have the added benefit of having used those measures within their own herd to move it in a predicted direction.

Years ago as a kid, I was fortunate enough to be exposed to many of the old pros in this business. They would come to our place and work with us. There was one particular individual, and there's no need to identify him, that with his experience could dissect and criticize any animal that walked. He could do that so well that he could never make a decision on which animals to mate or purchases to make. From that I drew the conclusion that the mating of animals is really finding the good in them, and bringing them together, and trying to minimize the bad.

And it's not only true with cattle, it's true with people, and it's true with organizations. To build, you don't tear down. You take the good parts and put them together trying to minimize the bad/or weak parts.

What's that got to do with what we're doing here? I have heard every good reason why we should not standardize our data or why we should not have across breed comparison. But it is now time to move ahead and find out the good reasons why we can and why we should build for the future.

Again time is money and lost time is lost money. The last thing on our mission insists on building confidence. We sit in North America with one of the best genetic evaluation programs ever designed in the world, the MARC data base. We have attempted to use every reason to discredit it. But it is time to sit back and say that it is the best information that has ever been created in cattle breeding, and lets go ahead and use it. We are in a position in this country, competitively, to become the leaders in the world in the genetic production of beef cattle. We, breed associations, the breeders, the AI studs (that is what this organization is made up of), must leave all of our differences behind to come together and move ahead.

LIVE ANIMAL AND CARCASS EVALUATION COMMITTEE MINUTES

The committee convened at 1:45 p.m., Friday, May 8, 1992. The program consisted of the following presentations:

"NCA's Cattleman's Carcass Data Collection Service" by Director John Stowell.

"Beef Cattle Ultrasound Technician Certification: Proposal for Revised Guidelines" by chairperson Dr. Ronnie D. Green, Texas Tech University

Following the meeting chairman Crouch requested Dr. Green and his subcommittee of Mark Tallman, Dr. Keith Bertrand, and Dr. Doyle Wilson condense the recommendations for approval by the board and for inclusion as a supplement to the BIF Guidelines.

Also following the meeting chairman Crouch appointed the following to serve as the Beef Cattle Ultrasound Certification Committee:

Breed Associations; Dr. John Hough, Donny Schiefflbein
NCE Research Institutions; Dr. Keith Bertrand, Dr. Doyle Wilson
University Research; Dr. Ronnie Green
USDA; Dr. Jim Wise
Host Institution; (to be announced)
BIF; John Crouch

As a final order of business, Dr. Brett Middleton, American Polled Hereford Association requested the committee revise the current frame score chart to extend through 36 months of age and through frame score 11. Chairman Crouch requested Dr. Middleton rsearch this matter, consult with Dr. Bob Schalles, Kansas State University, and render his recommendations to the committee by October 1, 1992.

The committee adjourned at 5:00 p.m.

Respectfully submitted,

John Crouch
COMMITTEE CHAIRMAN

BEEF CATTLE ULTRASOUND TECHNICIAN CERTIFICATION: PROPOSAL FOR REVISED GUIDELINES

Submitted by:
Ronnie D. Green, Texas Tech University, Chairperson

BIF ULTRASOUND AD HOC STUDY COMMITTEE:

MEMBERS:
J. Keith Bertrand, University of Georgia
R. Mark Thallman, Texas A&M University
Doyle E. Wilson, Iowa State University

May 8, 1992

With the declaration by the Value Based Marketing Task Force of the National Cattlemen's Association of the "WAR ON FAT", we stand at a time unprecedented in our history . The reality of the situation is that even though we have given great lip service to improving carcass merit of our fed cattle population, we have not changed much in the past twenty years. In the recently completed phase of the National Beef Quality Audit, comparison between carcass data of the average fed steer in 1974 and that in 1991 revealed that we have made little change in most of our measures of carcass value (see Table 1). Thus, the need for implementation of national carcass data bases should be high priority for the industry. We have identified on numerous occasions in meetings like this one that the most efficacious method for developing these databases would be through live animal measurement of carcass composition. The proceedings of all of the BIF meetings since 1988 have concluded that the most promising way for us to achieve this goal is through the use of real-time ultrasound technology (RTU).

Table 1. Carcass Parameters of Average Fed Steer in 1974 vs. 1991[a]

Trait	1974 Avg.	1991 Avg.	Change
Carcass Weight, lbs	678.7	759.0	+80.3
Fat Thickness, in	.58	.59	+.01
Ribeye Area, in2	11.8	12.9	+1.1
REA/CWT, in2/ 100 lb	1.74	1.69	-.15
KPH Fat, %	3.0	2.2	-.8
USDA Yield Grade	3.40	3.16	-.24
Marbling Score	Small +	Small 24	0

[a]From results of National Beef Quality Audit (1991).

At last year's BIF meeting in San Antonio, I reviewed the current state of some of the research efforts related to the application of RTU for this purpose. At that time, I also reviewed the history of ultrasound technician certification. This followed an informal discussion of a group of researchers involved in the RTU area including some previously BIF certified technicians and Alex McDonald and Dorothy Robinson from the Australian National Carcase Evaluation Project. Concerns were raised in these discussions regarding the BIF Ultrasound Technician Certification guidelines. After discussion by this group and in the Live Animal and Carcass Evaluation Committee meeting, Chairman Crouch appointed this ad hoc study committee with the charge:

To thoroughly review the current status of RTU technology for the development of breed carcass databases and to develop recommendations for how BIF Ultrasound Technician Certification should be performed in the future.

The purpose of this report is to summarize our findings and recommendations to this charge. In the interest of clarity and brevity, the committee has chosen to address the charge by directly answering a series of questions related to issues in the RTU and technician certification area. Before I present our conclusions, I would like to recognize the efforts of Bertrand, Thallman and Wilson for serving as members of this study committee. We have corresponded on several occasions by phone, fax and mail and have spent considerable time in arriving at this final report for the Live Animal and Carcass Evaluation Committee's consideration. I personally appreciate their commitment to this project since it made my job much easier.

I. Why is this study and report needed?

The industry has received mixed signals regarding the application of RTU for development of carcass NCE databases over the period of the last four years. Initially, efforts such as the LACES program sponsored by Texas A&M University were highly promoted by BIF. Two clinics and workshops were held in 1988 following the formation of an ad hoc BIF committee to set up implementation policies for ultrasound measurements. Texas A&M hosted the first BIF sanctioned technician certification in January of 1989 which resulted in certification of seven technicians by the standards in place at that time. It seemed that things were off to a good start. The results of that certification were presented at the 1989 annual meeting in Nashville and enthusiasm was high. In January of 1990, a second proficiency exam was hosted by Auburn University. This exam resulted in the certification of an additional six technicians, but was much more difficult to administer because of lower than desired results. Additionally in 1990, the debate was waged at the NCA Mid-Year Meeting regarding whether efforts should be encouraged in carcass EPD's using ultrasound and actual carcass data or in the mapping of the bovine genome. The decision of NCA's Research Committee to question the efficacy of ultrasound derived carcass EPD's led to some industry concern in following the RTU path. Also in this same time period, the LACES program at Texas A&M was discontinued. The combination of these events along with the skepticism placed upon RTU by some university personell,

produced a dark cloud in the sky of RTU. This was the point we were at when accepting this charge as a committee last May.

II. Should real time ultrasound be used to develop carcass databases for national cattle evaluation programs?

Research results continue to indicate that the accuracy of RTU measurements of USDA yield grade components has reached acceptable levels. Additionally, since no other technology has been developed for assessment of carcass composition from live animal measurement which exceeds the practicability of RTU, it seems feasible that we should pursue efforts in this area. Research results continue to indicate that skilled technicians can achieve levels of prediction of retail yield approaching that of the USDA yield grade equation using live weight, ultrasonic backfat thickness and ultrasonic ribeye area or depth of slaughter cattle. Research efforts in the ultrasonic prediction of intramuscular fatness are gradually closing the gap on what has previously been an unachievable target. Additional efforts in measurement of alternative muscle groups and intermuscular fat depots are also being waged by several research groups. Funding from checkoff dollars for the carcass EPD project and efforts of the NC-196 Genetics of Body Composition cooperative research project will aid greatly in making further advances. **Currently the committee recognizes backfat thickness (BFT), rump fat thickness (RFT, Australian P8 site) and ribeye area (REA) as measurements in which current equipment and techniques are adequate for data collection.**

III. Should BIF support national data recording of RTU measurements of fat thickness and ribeye area?

Given the stated goals of the Value-Based Marketing Task Force Report (1990) of decreasing fat by 20% and increasing lean by 6% by 1995, the message is clear that we need to provide all possible tools to breeders to accomplish this objective. The Australians have reported to us at this meeting the last several years about their progress in collecting carcass merit information using RTU. Alex McDonald tells us that they continue to be pleased with the development of their national RTU database.

We seem to have been "hung up" on wanting to 100% accurately predict fat thickness, ribeye area and marbling from the live animal using RTU but have often failed to realize that we can do this as accurately as many of the traits we already take forgranted. Simple weight traits as predictors of growth rate to specific ages also possess inherent error due to fill differences but we have been able to make tremendous progress in growth from NCE programs. USDA graders also are not perfect either since reports show error rates in grading of 8-15%. Could it be that we probably would have been much farther along in the implementation of RTU generated breed databases if cattle were all sold on a grade and yield basis ?

RTU technology and measurement techniques will undoubtedly continue to evolve and improve. As research results accumulate and techniques become further

refined for these traits and others that may be even more valuable, guidelines for data collection may be reevaluated and strengthened. **The committee recommends that BIF move ahead in this arena. Guidelines should be published in the next printing of "Guidelines for Uniform Beef Improvement Programs" for collection of RTU data for the traits of backfat thickness, rump fat thickness and ribeye area from yearling bulls, heifers and slaughter progeny. These should be developed to complement the new National Carcass Data Collection Service of NCA. Implementation of these guidelines should go into effect as soon as feasible. Only data from certified RTU technicians should be acceptable under the guidelines. Guidelines should be revised as new measurements are developed that add to predictability of carcass merit from RTU. Measurements should only be added after adequate research documentation regarding their accuracy and repeatability.**

IV. Should BIF be the sponsoring organization for certification of RTU technicians for data collection?

This issue was discussed at length by the group at last year's meeting. The consensus was that BIF should continue to be the sponsoring organization for technician certification. **The committee recommends that BIF should be responsible for this task.**

V. Who should be certified?

Since NCE programs are only as good as the data available for analysis, it is important that RTU carcass information be collected by competent technicians. A certification program would formally recognize those technicians considered proficient enough to provide highly repeatable RTU carcass measurements, and thus, some quality control would be assured if NCE data were from certified technicians.

One additional issue that needs to be addressed is how do NCE programs handle other RTU measurements besides REA and BFT? In past certification clinics, only BFT and REA were the traits for which the technicians were evaluated. As data becomes available for new traits like marbling, palatability and other measures of fat and muscle, there will likely be a desire to incorporate these into NCE programs. Breed associations should be encouraged to make their technicians take multiple measurements on new traits so that repeatability can be determined. However, until additional traits are added to the guidelines, only BFT, RFT and REA should be accepted.

VI. Should ultrasound research only be published from data collected by certified technicians?

It is important that research and creativity in the area of live animal RTU carcass evaluation be encouraged. **It would not be in the best interests of science or the beef cattle industry to restrict the publication of ultrasound research work in the**

Journal of Animal Science or other publication outlets to only those studies conducted by certified technicians. However, just like any other measurement procedure that is subject to possible technician errors, the authors should provide information on the repeatability of the ultrasound carcass measures being taken. This would give the reviewer and reader more information to use in judging the validity of data collected.

VII. Should certification be allowed of teams of more than one technician?

In some instances, RTU data may be collected by teams of two persons. In these cases, one technician may actually operate the ultrasound unit keypad while a second technician operates the transducer on the animal. In order for the certification process to be fair and standardized to all persons, **each person of the team would be required to pass the certification examination. In cases where two persons are required for the collection of RTU information, the procedure used to collect field data will be used for the practicum portion of the examination.**

VIII. How should technicians be prepared for the certification examination?

A written and video study guide should be developed for use by those preparing for certification. A subcommittee should be appointed to develop these materials. The written materials should contain information on the scientific principles of ultrasound, skeletal, fat and muscle anatomy, machine and probe differences and capabilities, possible imaging problems, and various measurement techniques on the live animal. Video instructional materials regarding equipment, techniques and measurement sites would significantly enhance these study materials. Additionally, video footage demonstrating proper measurement technique along with the interpretation of a standard set of RTU carcass images would be beneficial teaching tools. Both good quality and poor quality images from several different RTU units should be included on the tape. The video materials could be commercially produced and made available for educational programming on RTU in other settings as well. Thus, the cost of production would be assumed by the commercial educational video firm. Persons desiring the video materials would purchase them at their own cost from the commercial vendor.

Scanning workshops should be encouraged on a timely interval (once per year). It is not important where these are held as long as a variety of animals in terms of breed, sex and condition are available to scan. USMARC or a university are logical choices as hosts but the workshops could also be held at individual operations, shows or fairs. It is conceiveable that these workshops could serve as a "national standards session" similar to that being implemented under the Agriculture Canada system where technology development would be evaluated. Such evaluations could then serve as the basis for elevation of requirements and incorporation of new certifiable measures.

IX. How often and where should certification proficiency examinations be conducted?

The certification should be conducted on an annual (or as needed) basis. A minimum of five participants should be required for an exam to be held each year to justify the time and expense involved.

A central and constant location would be preferable for the certification examinations. Central location might aid in reduction of travel expenses to participants while constant location would provide continuity of examination conditions. Since the host would be required to invest a significant amount of time in setting up and conducting the examinations, only an openly willing host should be used. **A logical choice would be either USMARC or one of the universities with current strong emphasis in RTU research in beef cattle.**

X. Who should oversee the certification program?

A committee structured similarly to the previously defined BIF Proficiency Guidelines Implementation Committee should oversee the certification process. This committee should be composed of representatives from USDA, BIF Live Animal and Carcass Evaluation Committee, breed associations, researchers from universities currently conducting NCE analyses, a minimum of two researchers from universities (or industry) actively engaged in RTU beef cattle carcass research and the host institution representative. The committee should appoint all personell who will be involved in the certification exams. They should also approve all educational materials developed as study information. This committee would also be responsible for evaluation of new measurements to be included as acceptable RTU carcass data and for incorporating guidelines for certification of technicians for these measures.

XI. How often should a technician be required to certify?

There are many factors associated with maintaining proficiency in the collection and interpretation of RTU images. Skill level can deteriorate in the absence of collecting and interpreting images. RTU may improve and research may indicate that additional anatomical positions need to be scanned for improved carcass merit predictability.

Recertification of technicians under the full set of requirements should be required once every two years to ensure that technicians keep current with the development of RTU technology and techniques. Certified technicians should be required to attend the annual scanning workshop in the year between consecutive certification examinations (i.e. every other year). This will allow them to stay abreast of any new certification criteria or measurements.

XII. Should RTU equipment be subject to BIF performance specifications in order for the images collected and interpreted using this equipment to be

included in breed association and other data bases for national cattle evaluation programs?

The highest possible accuracy of measurement of body composition traits in live beef cattle must be given highest priority. **It is recommended that performance specifications for equipment be established by BIF and updated every two years.** The following are proposed as the initial specifications:

Transducer frequency: 3.5 to 7.5 MHz
Transducer length: 17 cm or greater
Gray scale: 64 shades
Transducer guide: Designed to conform to the curvature of most 12-14 months of age beef animals at the 12-13th rib juncture and of sufficient length to accomodate the transducer (guide material must meet BIF attenuation specifications)

Persons requesting certification would be required to use their own equipment in the practicum examination. The certification personell would verify that said equipment met BIF minimum specifications.

XIII. Should phantom models be developed for use by RTU technicians to calibrate their equipment before and after collection of images?

Phantom models that mimic the acoustical properties of an image taken at the 12-13th rib juncture on a live animal may be necessary when those images being collected will be used in the determination of marbling or other tissue characteristics of the longissimus dorsi. The procedure would be for the technician to record an image of the phantom model at the beginning of the scanning session and at periodic intervals during scanning. This would allow detection of effects of any environmental changes during the course of the scanning period. Histogram statistics of the phantom image would then be used to scale subsequent images taken on the live animal. **At this time phantom images would not be required since the committee does not recommend development of criteria for certification of RTU technicians for measurement of marbling or tissue characteristics.**

XIV. Should ultrasound technicians be certified only for the equipment they are currently using?

So long as the RTU equipment meets the specification standards as set forth by BIF, then there should be no need to re-certify the technician for any different equipment that they may use.

XV. What should the proficiency examination consist of?

a. Should a person desiring to be certified as a real- time ultrasound technician be required to take and pass a written examination?

Proficiency in the use of RTU equipment requires that the technician be knowledgeable in the basic understanding of how real-time ultrasound works, in the anatomy of beef cattle where scans are obtained and in the interpretation of images. Additionally, persons seeking certification by BIF for collection of data that will be used in NCE analyses should have some knowledge regarding national cattle evaluation and the BIF guidelines for recording of carcass performance data. **In order for a person to be certified, a passing grade should be achieved on a written examination that will test knowledge in these areas.**

b. Should a person desiring to be certified as a RTU beef cattle technician be required to take and pass a laboratory practicum?

Testing knowledge by means of a written examination is not sufficient to ascertain the skill level of a person desiring certification. Proficient eye and hand coordination in combination with mental knowledge are required assets of a skilled RTU technician. There are two different skill levels that must be evaluated: 1) skill level in collecting a correct image and 2) skill level in the correct interpretation of an image for BFT and REA. **In order to be certified, a person must successfully pass a laboratory practicum which tests these two skill levels.**

c. What are the resources required to conduct a certification lab practicum?

The laboratory practicum should include twenty (20) live beef animals that are of the breed, age and degree of finish characteristics similar to the cattle that will be scanned by the technician. It is assumed that most of these animals will be steers. Typically, steers are more difficult to scan than bulls, so the laboratory practicum may be more difficult in terms of getting consistently clear and well defined images. The committee would have the option in any certification examination to have animals representing more than one sex class in the twenty head.

d. What authorities should be present during the laboratory practicum?

One BIF representative with authority to sanction the validity of the laboratory practicum resources, procedures and carcass data collection. In addition, two currently certified technicians should be in attendance to assist in administering the practicum and to serve as reference technicians for analysis of results.

e. What live animals scans must be taken during the laboratory practicum?

Each participant should be required to collect one image and a repeat image at the 12-13th rib juncture of each animal. The repeat image must occur after all of the animals have been scanned once by each participant. The animals should be randomly sequenced through the scanning facilities and not follow the same order from the first scan to the repeat scan. Participants will be encouraged to refrain from watching other participants scanning protocol and technique in so much as possible. It would be preferable to have all other participants secluded in a separate room

during the scans. However, this is not feasible for the movement of animals through the facilities in the interest of time and welfare of the test animals.

The two certified technicians will also be required to scan the animals. Images collected by the certified technicians will be used as a reference to score images collected by participants. Images collected by the certified technicians will include three or four scans per animal which vary in quality from poor to excellent (excellent if possible since in some cases excellent images cannot be obtained). Images collected by the technicians will serve three purposes: 1) the best image will be used to subjectively score the images of participants, 2) all of the certified technicians' images will be used to test the interpretation skills of persons taking the practicum and 3) serve as a reference point for determining pass/fail criteria in the event of extremely poor results (similar to the case in the Auburn 1990 exam).

f. What carcass measurements must be collected from the laboratory practicum animals post-slaughter?

Fat thickness and ribeye area at the 12-13th rib juncture should be collected on the carcass by either qualified graders or qualified meat scientists. Two persons should separately measure the carcasses. Fat thickness measurements differing by more than .05 inches will be retaken jointly by the persons collecting the carcass data. Area measurements should only be taken on the side scanned with those differing by more than .5 square inches to be retaken jointly by the persons collecting the carcass data.

XVI. How should the lab practicum results be analyzed for certification?

a. What is the standard against which the candidates measurements will be compared?

The standard must be based on carcass measurements. The best value is the average of the two sides of the carcass averaged over the two graders for FT and the average of the two graders for the side scanned for REA. It is possible that some sides, or perhaps whole carcasses, may have to be discarded due to dressing defects. Additionally, participants will forward their tapes to the committee for evaluation relative to the best images obtained by the reference technicians.

b. What test statistics should be used?

Since variation of carcass measures within contemporary groups of animals could likely be small, accuracy of measurements taken by a technician take on high priority. Since correlation methods are directly dependent on the variability of the test group of animals, they should not be used as the test criteria. **Three criteria should be used:**

1) Technician bias: measured as the average absolute deviation of a scanner's estimates from the carcass parameters. This statistic is not related to the technician's

ability to rank animals or predict differences between animals and would be part of the contemporary group effect in NCE analyses. The primary purpose of this parameter should be to standardize measurements between different technicians rather than to cull technicians. **Therefore, this statistic while informative, is the least critical of the three.**

2) Standard Error of Prediction: measured as the standard deviation of the differences between RTU and carcass measurements for a given technician. This statistic **IS THE PRIMARY MEASURE** of the technician's ability to rank or predict differences between animals. **THIS SHOULD BE THE PRIMARY PARAMETER THAT DETERMINES WHETHER A TECHNICIAN IS CERTIFIED OR NOT.**

3) Standard Error of Difference: measured as the standard deviation of the differences between repeated measurements on the same animal for a given technician. **This statistic is a measure of the technician's consistency and is independent of the problems associated with carcass data collection.**

c. How will the results be used to determine certification?

There will be maximum allowable values for bias, standard error of prediction and standard error of difference for both FT and REA. The candidate must be within the critical value for each of the test statistics for both traits in order to pass the lab practicum.

Additionally, image quality will also be critically evaluated for acceptability relative to the reference rechnician images by the committee.

d. How should the critical levels of performance for certification be determined?

This is a difficult problem. Ideally, a fixed level of performance for each statistic and each trait should be set and these should be periodically raised as the available technology improves. Unfortunately, experience from the previous two certifications has shwon that this approach may present problems. Test conditions vary greatly and the levels of accuracy that are obtainable during a test are likely to be considerably lower than when the same technicians are scanning under normal conditions.

The reference technicians will aid in resolving this problem between evaluations since they will provide a benchmark for the particular environmental conditions which may affect technician performance. If their values fall in the acceptable range, then there is no problem. If their values are not within the acceptable range, then the decision would need to be made in reference to lowering of the critical values.

The standards used by the Australians in their accreditation program would seem to be a logical place to start for BIF certifications. Thus, it is

recommended that the critical value for standard error of difference and prediction be .04 in for FAT and .9 in^2 for REA. It is anticipated that these values would be reviewed annually to determine their appropriateness.

e. At what point should identity of participants be made known to the certification committee?

The participants should remain anonymous to the data analsis until all pass/fail decisions have been made.

XVII. How should the results of the certification be reported?

The following information will be released to the public:

1) a list of the names and addresses of all currently certified technicians.
2) the critical values used to determine which candidates passed.
3) statistics that describe the carcass data of the test cattle.
4) ranges and other summary statistics for the performance of the group that passed and for the group as a whole.

The following information will be released to the candidates:

1) the official values.
2) the candidate's reported estimates.
3) the six summary statistics and any other relevant data concerning the candidate's own performance.
4) only their own individual data will be released to a participant, no individual data of other participants.

Ranking of technicians will not be released. Data and images should be provided (with anonymity of technicians) to a university for analysis and publication of results to elucidate any new and useful information regarding sources of technician error.

XVIII. How will the certification exams and scanning workshops be funded?

The certification exams will have to be funded from a user fee system. This still leaves some degree of risk with the host institution since the fee will have to be set before the number of participants is known to the host. If the host institution was USMARC, the cost may be lower due to availability of large numbers of slaughter research animals.

Scanning workshops and clinics will also have to be largely paid for on a user fee basis. If possible, it would seem prudent for BIF to encourage small amounts of funding to be made available annually for both the clinics and exam (risk portion only) from breed associations desiring implementation (or enhancement) of carcass traits in their NCE programs.

CATTLEMEN'S CARCASS DATA SERVICE

John Stowell
National Cattlemen's Association

Introduction

In an effort to improve the competitive position of beef by improving the quality and consistency, the National Cattlemen's Association is pleased to be introducing the Cattlemen's Carcass Data Service.

For nearly ten years NCA has had a policy resolution that called for an improved system for collecting carcass data for use in the genetic improvement efforts of cattle producers. In the Spring of 1990 a proposal was presented to Kansas Beef Council to provide funding for the development of the service and operating cost to sustain the program until it could be self-supportive. Kansas Beef Council approved the proposal and after several meetings with beef industry leaders, final recommendations for the program were submitted to National Cattlemen's Association. A two year trial was set up to be administered by NCA, funded by Kansas Beef Council, to be available through participating plants in Kansas, Nebraska, Colorado, Texas and Iowa. The program will utilize students from area land grant universities to collect the information. If the program is successful in these initial target areas, it can then expand to other regions of the U.S.

How Does The Cattlemen's Carcass Data Service Work?

To use the Cattlemen's Carcass Data Service one must:

1. Identify where cattle will be fed prior to slaughter. NCA will not be responsible for tracing cattle from producer to feeder if the cattle have been sold.

2. Complete an enrollment form contained in the Cattlemen's Carcass Data Service brochure and send it to the NCA office. The Cattlemen's Carcass Data Service may also be initiated by calling the manager at the NCA office within, at least, two or three days of the slaughter of the cattle.

3. The Cattlemen's Carcass Data Service manager will coordinate with the cattle feeder to determine date of slaughter and once the cattle are sold, the manager will also coordinate with the packing plant to line up data collection. Participating universities will assist in carcass data collection. Data will only be collected at participating plants.

4. Once the information is collected, a report, which will contain all individual information as well as a summary of the group of cattle collected on one trip, will be prepared and mailed to the person or organization requesting the service. A bill for the service will also accompany the report. Charges will be per head of cattle on which complete carcass data was collected and received. If data is requested and, for whatever reason, cannot be collected, there will be no charge.

COST OF SERVICE

There will be two types of carcass data services offered by the Cattlemen's Carcass Data Service.

1. FULL SERVICE

Data Report will include:

A. Individual identification when cattle are slaughtered by ear tag number and/or hide color (Tattoos or brands will not be identified).
B. Uncommon bruises, injection site damage and other visible defects will be recorded on a per lot basis if time allows.
C. Complete individual carcass information and summary of group.

Cost per head:
A. $5.00 per head for 50 to 120 head per trip
B. $4.00 per head for over 120 head per trip
C. $250.00 plus 1/2 mileage expense for less than 50 head per trip (mileage is calculated at $.275 per mile)

2. CARCASS DATA ONLY

Data report will include individual carcass information only, with no identification or information from the kill floor.

Cost per head:
A. $4.00 per head for 50 to 120 head per trip
B. $3.00 per head for over 120 head per trip
C. $200.00 per trip plus 1/2 mileage expense for less than 50 head per trip (mileage is calculated at $.275 per mile)

COMMITMENTS

If an individual or an organization provides the Cattlemen's Carcass Data Service with a commitment to request data on 1000 or more cattle in one year, then a discount of $1.00 per head for categories A and B and a discount of $50.00 per trip for category C above will apply. A breed association or other service organization can provide a commitment to the Cattlemen's Carcass Data Service and then offer services to its members or customers at a discount. If a customer who has provided a commitment fails to meet the minimum of 1000 cattle in a year, then a cash compensation of $3.00 per head will be required for the number of cattle short of 1000.

PARTICIPATING UNIVERSITIES

The participating universities for the Cattlemen's Carcass Data Service are:
Colorado State University, Fort Collins, Colorado
University of Nebraska, Lincoln, Nebraska
Garden City Community College, Garden City, Kansas
Kansas State University, Manhattan, Kansas
Texas Tech University, Lubbock, Texas
West Texas State University, Canyon, Texas
Iowa State University, Ames, Iowa

Students, both graduate and undergraduate, at these universities have been trained to efficiently and effectively collect carcass information in packing plants near the schools. These students travel to the plant the day the cattle are killed and transfer identification from the ear tags to the carcass. When the cattle are graded, these students return to the plant and collect all yield and quality grade information on the identified carcasses.

So as not to slow production at the plant, all data is collected on the moving grading rail at the plant's normal chain speeds. Additionally, procedures for collecting data at each individual plant have been designed by plant personnel to optimize safety, efficiency and reliability of the information. The USDA grader at the plant provides the marbling scores and adjustments to fat thickness as well as other subjective calls which ensures consistency with the plants grading. Students record the graders calls and estimate the internal fat on each carcass. Students also obtain ribeye area by placing a sheet of Chromatography paper on the ribeye muscle while the cattle are moving on the chain. The chromatography paper captures an effective image of the ribeye which can be measured later. If the image is not clear it is dyed with a solution of Ninhydrin and water. The process of blotting an image of the ribeye and using Ninhydrin to dye the image was developed by Dr. Evert Martin at Washington State University. The effective dilution of Ninhydrin and distilled water used by the Cattlemen's Carcass Data Service was formulated by Kim McKissack at the meats laboratory at Colorado State University.

Each participating university has a coordinator who is responsible for managing the data collections and assigning data collectors to travel to the plants. The coordinators are:

Colorado State University	=> Dr. Brad Morgan and Joe Don Eiler
Iowa State University	=> Dr. F. C. Parrish
Kansas State University	=> Fred Pohlman and Thomas Powell
Garden City Community College	=> Gale Seibert
Texas Tech University	=> Dr. Mark Miller
West Texas State University	=> Dr. Ted Montgomery
University of Nebraska	=> Dr. Dennis Bursen and Scott Eilert

These coordinators have done an excellent job of effectively organizing and training a collection of students to collect carcass information on an "on call" basis. Because of the dedication and enthusiasm expressed by these very capable and responsible coordinators, the Cattlemen's Carcass Data Service has been very effective in providing the beef industry an efficient method of collecting the important carcass information needed to strengthen the competitive position of beef products. It is our goal to collect data on 20,000 carcasses by March 1, 1993. As of late April, the time of this writing, NCA has received data request for 12,000 carcasses.

BIF Reproduction Committee Meeting

The meeting was called to order by Chairman Bruce Cunningham.

Keith Zoellner presented an update of the Scrotal Circumference project being conducted by Kansas State University. To date, they have collected approximately 3,000 records on bulls from twelve breeds. Most of these data have been collected bulls in bull test stations across the United States and Mexico. For these bulls in the data base, they have recorded weight and scrotal circumference at delivery and end of test as well as an intermediate measurement. The goals of the project are to 1) develop age adjustment for scrotal circumference in yearling bulls and 2) using on-test scrotal circumference, predict the scrotal circumference at a year of age. It was indicated that preliminary data analysis would begin sometime this year.

Next, Chairman Cunningham shared a short review of the genetic relationships between the traits involved with calving difficulty. Overall, the heritability of calving ease tended to be low compared to the growth traits. Estimates from various breeds ranged from 7% to 33%. For maternal calving ease, the heritability estimates ranged from 8% to 27%. The genetic correlation between the direct and maternal effects indicated an antagonistic relationship existed between the genes influencing the direct effect for calving ease and the genes influencing the maternal effects on calving ease. The estimates ranged from -0.15 to -0.93. In devloping breeding programs to reduce calving difficulty through sire selection, breeders need to monitor the calving traits in their replacement females. One area of research that needs to be done involves the genetic relationship between calving ease and pelvic area in the cow. For breeds with a calving ease evaluation, there appears considerable variation among bulls within a narrow range of birth weight EPD. In the SImmental breed, for bulls with a birth weight EPD between -1 and +1, there existed a range of 35% between the low and high bull based on the calving ease EPD. In the Gelbvieh breed, the range between the low and high bull for calving ease within the same limits for birth weight was 23%.

Jim Brinks from Colorado State University suggested as a future topic for the committee to investigate was the influence of gestation length on the bias in the adjusted 205-day weaning weight.

Brent Woodward from University of Minnesota discussed briefly a current project studying pelvic area using data from six cooperator herds in Minnesota.

Chairman Cunningham asked for input regarding topics for the Reproduction Committee to investigate in the future. The committee will try to investigate the evaluation of reproductive traits such as calving date, scrotal circumference, etc. This will be done in conjunction with the other committees of BIF.

Respectfully Submitted
Bruce E. Cunningham, Chairman

MINUTES OF BEEF IMPROVEMENT FEDERATION
BOARD OF DIRECTORS MEETING

YMCA of the Rockies
Estes Park, Colorado
Saturday, November 9, 1991

The BIF Board of Directors held its mid-year board meeting at the YMCA of the Rockies in Estes Park, Colorado, on November 8 and 9, 1991.

Board members present for the meeting were Jim Leachman, President; Marvin Nichols, Vice President; Charles McPeake, Executive Director; Don Boggs, Doug Hixon and Ronnie Silcox, Regional Secretaries; Paul Bennett, Glenn Brinkman, Jack Chase, John Crouch, Larry Cundiff, Bruce Cunningham, Paola de Rose, Jim Gibb, W. Norman Vincel, and Gary Weber.

Board members not in attendance were Frank Baker, Glynn Debter, Loren Jackson, Gary Johnson, Craig Ludwig, Steve McGill, Darrell Wilkes and Leonard Wulf.

Also in attendance was Chuck Lambert of NCA sitting in for Darrell Wilkes. In addition, Bill Zollinger from Oregon State University was in attendance.

President Leachman called the meeting to order at approximately 8:30 a.m. on Saturday, November 9, 1991, and the following items of business were transacted.

President Leachman welcomed Paola de Rose back from a leave of absence.

Membership Report - McPeake distributed copies of the membership report. The report showed that 31 state organizations, 22 breed associations and 19 other firms or organizations had paid membership dues as of October 25, 1991. Membership report accepted.

Motion was made by Paul Bennett and seconded by Bruce Cunningham that the minutes from the 1991 annual meeting be approved as written. Motion carried.

Discussion followed concerning BIF members, the recruitment of and responsibility to the members as examples of verbiage.

Financial report for 1991 Convention - Dr. Tom Troxel and Texas A&M did an excellent job in staging and hosting the 1991 convention. After all incomes and expenses were accounted for the convention showed a net gain of $839.99. A job well done.

Financial Statement for 1991 to Date - McPeake provided copies of the financial report to date. After the statements were read Bruce Cunningham moved and Paul Bennett seconded the report be accepted. Motion passed.

Budget for 1992 - McPeake distributed copies of the proposed budget for 1992. After study and recommendations Glenn Brinkman moved and Marvin Nichols seconded approval with changes. Motion passed.

Appointment of Nominating Committee - President Leachman appointment the following nominating committee: John Crouch, Chairman; Gary Johnson and Loren Jackson.

Appointment of Awards Committee - President Leachman appointed the following people to serve as the awards committee: Doug Hixon, Chairman; Paul Bennett, Glenn Brinkman and Bill Zollinger.

Review Standing Committees - After initial discussion concerning plans for action before the convention several interesting items surfaced for the committees.

a. Genetic Prediction - Larry Cundiff. Discussion continued that maybe an important item this committee was the development of data edit procedures for the three institutions that calculate EPD's.

b. Live Animal and Carcass - John Crouch. Suggested in the future to be addressing a revised section for the guidelines which may include such items as ultrasound certification procedures and the evaluation of cattle for carcass merit.

c. Central Test and Growth - Ronnie Silcox. Plans are in the developmental stages.

d. Reproduction - Bruce Cunningham - With a new Chairman this committee is on the threshold of studying development needed for industry standards.

e. Systems - Jim Gibb. Suggested two main areas for concentration.
    1. Determination of calf crop distribution.
    2. Economic value of different traits.

After much discussion on needs and implementation it was agreed upon that committee chairman would work on committee needs for the convention and provide information for the program by February 1, 1992.

Future Convention Sites - President Leachman lead discussion stressing the importance of host states and people within those states to host BIF. Larry Cundiff will check on the possibilities of Nebraska and Doug Hixon on Wyoming. Marvin Nichols invited BIF for its 1994 annual convention to Iowa. Motion was made by Larry Cundiff and seconded by John Crouch that Iowa's invitation he accepted. Motion passed.

Board action on standing committees - Genetic Prediction. Within this committee considerable work has been done toward several unanswered questions:

1. To fix base - 10 to 6 vote for ?
2. Base year be 1982 or 1985, no clear majority?
3. If the base is fixed does it apply to sires or all animals?
4. Does this add to confusion for the masses?

The recommendation of the genetic prediction committee is to fix the base for all animals as moved by Larry Cundiff and seconded by Jim Gibb. Discussion followed. Don Boggs moved the motion be tabled until the Genetic Prediction Committee can come to a consensus of opinion on date and procedure. Doug Hixon seconded and the motion carried. Chuck Lambert moved the BIF board of directors recommend the committee move toward a common base definition. Jim Gibb seconded. The motion carried. No other board action was taken on other standing committees.

BIF News Packet - Charles McPeake discussed changes in the way to communicate with the media. The new way is through a news release packet that will be handled by Ronnie Silcox the Eastern Regional Secretary. In addition, anyone is always welcome to write or submit information for a release.

BIF Factsheet Revision - Don Boggs gave in detail the list of factsheet revisions along with proposed authors and status on stage of revision. BIF should have copies by convention time. Jack Chase suggested as new factsheet topics; pelvic area and scrotal circumference.

Fixed and Across Breed EPDs - Larry Cundiff discussed preliminary results from a study by Rafael Nunez comparing traits values to theory and describing the ranges of relationships. Cundiff summarized with two questions.

1. Do we want to make breed comparison adjusted for genetic trends?
2. Do we want to look at EPD or breed average scale?

International comparisons of EPD's - Paola de Rose handed out a study and discussed ongoing research and problems with calculating these data accurately. It is difficult at best and we don't know if its data driven or methodology driven.

Details of U.S. Genetic Evaluation Procedures - Paola de Rose suggested lack of uniformity of procedures being followed in calculating EPDs. She advised that as a first step to uniformity for those calculating EPDs to publish the following:

1. data edit procedures
2. interim procedures

Other Business - Some discussion was held concerning reserve funds and the possibilities of developing educational efforts.

Ronnie Silcox suggested a prepared BIF ad and would be mailed to members and the media as an advertisement for the convention.

The last weekend in October or October 30 and 31, 1992, was suggested as the dates for the mid-year board meeting. Norman Vincel moved and Ronnie Silcox seconded. Motion carried.

President Leachman appointed Norman Vincel to handle the election of directors during the 1992 BIF convention.

There being no further business Don Boggs moved adjournment and Jack Chase seconded. Motion passed.

Respectfully Submitted,

Charles A. McPeake

Charles A. McPeake
BIF Executive Director

BEEF IMPROVEMENT FEDERATION
STATEMENT OF ASSETS, LIABILITIES AND FUND BALANCE
CASH BASIS
DECEMBER 31, 1991

ASSETS:	
Cash in Checking Account	9,271.89
Cash in Saving Certificate	51,638.63
TOTAL ASSETS	60,910.52
LIABILITIES:	
FICA Payable	66.27
TOTAL LIABILITIES:	66.27
FUND BALANCE	
Balance December 31, 1990	47,542.48
Current Year Excess	13,301.77
TOTAL FUND BALANCE	60,844.25
TOTAL LIABILITIES & FUND BALANCE	60,910.52

BEEF IMPROVEMENT FEDERATION
STATEMENT OF REVENUES AND EXPENSE
CASH BASIS
January 1, 1991 - December 31, 1991

REVENUE:	
Dues	9,950.00
Proceedings & Guidelines	1,223.67
Interest	4,515.45
National's share convention revenue (90)	3,272.67
National's share convention revenue (91)	7,140.27
TOTAL REVENUE	26,102.06
EXPENSE:	
Accounting Services	195.00
Salaries	1,624.26
Payroll Taxes	181.02
Office Expense & Postage	872.95
Telephone	600.00
Convention Expense	3,478.69
Director's Travel	1,239.86
Mid-Year Board Meeting	1,865.00
Printing Expense	2,743.51
TOTAL EXPENSE	12,800.29
EXCESS OF REVENUE OVER EXPENSE	13,301.77

CASH BASIS
UNAUDITED
SEE ATTACHED ACCOUNTANT'S COMPILATION REPORT

AGENDA
BIF BOARD OF DIRECTORS MEETING
RED LION HOTEL/JANTZEN BEACH
PORTLAND, OREGON
Wednesday, May 6, 1992

1. Clean Agenda - Jim Leachman

2. Minutes - Charles McPeake

3. Treasurer's Report - Charles McPeake

4. Membership Report - Charles McPeake

5. Report on Oregon Convention - Bill Zollinger

6. Plans for 1992 Convention in North Carolina - Roger McCraw

7. Future Convention Invitations - Charles McPeake
   a. Iowa - 1994
   b. Sheridan, Wy, tentative - 1995
   c.

8. Standing Committee Reports - Plans for the Convention
   a. Live animal and carcass evaluation - John Crouch
   b. Central test station and growth - Ron Bolze
   c. Genetic prediction - Larry Cundiff
   d. Systems - Jim Gibb
   e. Reproduction - Bruce Cunningham

9. Election of Directors - Norman Vincel

10. Executive Director Position - Gary Weber

11. Generation of New and Revised Fact Sheets - Don Boggs

12. Elect New Officers - Nominating Committee - John Crouch, Chm.

13. New business
    a. Mid-Year Board Meeting, October 22-25, 1992 at Estes Park, CO
    b. Meeting Friday morning
    c. Gene Weise, Public Affairs Chairman, NCA

MINUTES OF BEEF IMPROVEMENT FEDERATION
BOARD OF DIRECTORS MEETING
Red Lion Hotel/Jantzen Beach
Portland, Oregon
May 6-9, 1992

The BIF Board of Directors held its convention at the Red Lion Hotel/Jantzen Beach in Portland, Oregon, on May 6 through 9, 1992.

Board members present for the meeting were James Leachman, president; Charles McPeake, executive director; Don Boggs, Doug Hixon and Ronnie Silcox, regional secretaries; Frank Baker, Paul Bennett, Glenn Brinkman, Jack Chase, John Crouch, Larry Cundiff, Bruce Cunningham, Paola deRose, Glynn Debter, Jim Gibb, Doug Hixon, Loren Jackson, Gary Johnson, Craig Ludwig, Steve McGill, Wayne Vanderwert, Norman Vincel, Gary Weber, and Leonard Wulf.

Board members not in attendance were Marvin Nichols and Darrell Wilkes. NCA was represented by John Stowell.

Also attending the meeting were Bill Zollinger and Roger McCraw of Oregon and North Carolina, respectively. They serve BIF as conference hosts.

President Leachman called the meeting to order at approximately 1:20 p.m. on Wednesday, May 6, 1992, and the following items of business were transacted.

President Leachman welcomed our hosts to the board meeting and Bill Zollinger brought the board up to date on convention activities and numbers. The board expressed thanks to Bill for a job well done.

Minutes of the Meeting - Copies of the minutes of the board meeting held Saturday, November 9, 1991, in Estes Park, Colorado, were distributed by McPeake prior to the board meeting. Jim Gibb moved that the minutes be accepted as amended to include Glenn Brinkman on the awards committee. Norm Vincel seconded and the minutes were approved as amended.

Treasurer's Report. McPeake provided copies of the treasurer's report for the calendar year 1991 and for 1992 from January through April. After discussion of comparison of financial reports for several years Frank Baker moved and Leonard Wulf seconded acceptance of the financial report. Motion carried. President Leachman asked Glenn Brinkman and a committee of personal choice to study the financial reports in an effort to develop a report to use over time. Brinkman asked Bolze and McPeake to assist in studying and developing a report.

Membership Report. McPeake distributed copies of the membership report in the information packet. A copy is attached. The report showed that 26 states organizations, 22 breed associations and 16 other firms had paid membership dues as of May 4, 1992. Frank Baker moved and Norm Vincel seconded acceptance of the membership report. Motion carried.

Plan for 1993 Convention. Roger McCraw reported that information to be provided the board was locked in a special motel room and unavailable but would distribute later.

Basically Roger brought the board up to date on current plans and contributions from organizations in North Carolina. In addition, he covered the sight seeing opportunities and recreation available. The North Carolinians are looking forward to hosting BIF at the Grove Park Inn in Asheville, North Carolina, on May 26-29, 1993.

John Crouch moved that May 26-29, 1993, be the date of the 1993 annual BIF Convention. Jim Gibb seconded and the motion was approved.

Roger McCraw stated that a representative from Grove park Inn had asked for time to address the convention as a welcome to North Carolina. It would be arranged was the consensus of the board.

After further discussion of the special 25th Anniversary President Leachman appointed the following people to meet before Friday morning to discuss the 25th anniversary activities. Frank Baker, Chairman; Richard Willham, Roy Wallace and Charles McPeake. **Convention Invitations** - McPeake reported on progress being made in Iowa toward the 1994 convention. In addition Doug Hixon reported that Wyoming wished to host the BIF convention in 1995 with the location remaining tentative. Bruce Cunningham moved acceptance of Wyoming to host the 1995 BIF convention. Frank Baker seconded and the motion passed.

Standing Committee Reports - Plans for the Convention

a. Live animal and carcass evaluation - John Crouch
   John reported that the program was accurate with the addition of Brett Middleton to handle a discussion of frame size past twenty-one months of age.
b. Central test station and growth - Ron Bolze
   Ronnie Silcox reported in Ron Bolze's absence that central test and growth were the same as on the program. Don Boggs suggested a breed chart for use by test stations and handed out a chart with breed average EPD's. Discussion continued on breed chart. Leachman ask about BIF providing a yearly list with annual updating. Gibb suggested Secretary of Genetic Predictions Committee or Central Test Committee be in charge. Leachman suggested Central Test Committee bring something to the board concerning a breed chart. John Crouch moved the genetic prediction committee produce the breed list of information to include genetic trend and forms of sire information to print in sire summaries. Loren Jackson seconded. After considerable discussion the motion and second were withdrawn. John Crouch moved to include the following: 1) genetic trend, 2) percentile breakdown, 3) averages for all sires, dams, and non-parents. This information is to be reviewed by the genetic prediction committee and put into a Guidelines supplement. With a second by Loren Jackson the motion carried.
c. Genetic prediction - Larry Cundiff
   Larry Cundiff reported as same program as printed for convention.
d. Systems - Jim Gibb
   Jim Gibb reported same as program.
e. Reproduction - Bruce Cunningham
   Bruce Cunningham reported that Bob Schalles and Keith Zoellner would be handling scrotal circumference and Bruce the genetics of calving difficulty.

Norm Vincel proposed that NAAB was interested in holding a mini-symposium on Wednesday evening before the BIF meeting starts on Thursday. Topics have not been determined. Frank Baker suggested to take a strong look at a joint meeting in light of the 25th anniversary of the Beef Improvement Federation. It was agreed to discuss further Friday morning after Norm had gathered more information.

Election of Directors - Norm Vincel discussed nomination and election of directors. He handed out information describing regions and expressed a need for information on directors, regions, addresses, terms expiring as examples. Norm was asked to develop a historical chart of who was elected when, etc.

Executive Director Position - Gary Weber discussed the need for BIF to obtain a new executive director to replace Charles McPeake at the 1993 convention. McPeake has served four years and has asked to step down at that time. Weber suggested Ron Bolze as a possible replacement and advised that administrative sources at Kansas State had approved. Jim Gibb moved and Paul Bennett seconded that Ron Bolze be approved as the Executive Director beginning at the annual BIF convention in 1993. Motion carried.

Generation of new and revised fact sheets - Don Boggs discussed a listing of new and revised fact sheets. Copies were distributed to board members in the board meeting packet. He further implied a need for a new fact sheet dealing with the genetics of reproduction, more specific: 1) scrotal circumference and 2) pelvic measurements. Jim Gibb moved that a fact sheet committee with Don Boggs, Chairman, and other members selected to serve by the chair. The committee is to bring recommendations and publish. Gary Weber seconded motion carried. Craig Ludwig moved for the subjects of four new fact sheets to include: 1) body condition scores, 2) frame size, 3) ultrasound and 4) crossbreeding. Glynn Debter seconded and the motion was approved.

Nominating Committee - Chairman of the nominating committee, John Crouch, met with the committee and concluded the following nominations, Jim Leachman for President and Marvin Nichols for Vice President. After no other nominations were made Don Boggs moved the nomination cease and the two be elected by acclamation. Paul Bennett seconded and the motion carried.

New Business - Dates were discussed for the mid-year board meeting at Barclay Lodge in Estes Park, Colorado. Glenn Brinkman moved the meeting be October 30-31 at Barclay Lodge in Estes Park. Loren Jackson seconded. Motion was tabled until Leachman determined if he can be there.

Agenda for BIF Board meeting Friday morning:

1) 25th Anniversary report
2) NAAB report
3) Genetic prediction report
4) Mid-year board meeting date

Gene Weise, chairman of Public Affairs committee for NCA, had contacted the Executive Director and asked for five minutes to visit with the BIF registrants. He expressed a sincere belief in BIF creditability and the need NCA has for help from BIF and its constituents. The board agreed and welcomed Mr. Weise to address the convention.

The board meeting was adjourned until 8:00 a.m. Friday.

At 8:50 a.m. Friday May 8, 1992, the BIF board of directors meeting was called to order by President Jim Leachman. He welcomed three new directors - Jed Dillard, Burke Healey and Roy McPhee. Further, two additional people attended - Dick Willham and Ron Bolze.

Mid-Year Board Meeting - It was discussed and decided the BIF mid-year board of directors meeting would be held on October 23-25 at YMCA of the Rockies, Barclay Lodge in Estes Park, Colorado. Plans are to arrive on Thursday evening and meet on Friday and Saturday. Discussion continued on assignments for certain board members and host as it pertained to the mid-year meeting.

Glenn Brinkman - financial report study
Frank Baker - 25th Anniversary meeting
Roger McCraw - 1993 Convention in North Carolina
Gary Weber, Don Boggs and Jim Gibb - Mission Statement
John Crouch - Certified Angus Beef (product)

Leachman suggested bringing visitors to the mid-year meeting for various reasons. John Crouch suggests a complete agenda for the mid-year board meeting. Frank Baker cautioned that the board needs to decide how intently they are going to work before bringing in guest from the outside for input.

25th Anniversary Plans - Frank Baker discussed the proposal developed and handed out by Dick Willham. The following is the proposal:

25th Annual Meeting and Book on History
TITLE: Doing Dreams,
Celebration of Cooperation,
Our Twenty-Fifth, or
Together Technology Transfer

COMMITTEE: Baker, Wallace, McPeake and Willham

LOCATION: Asheville, North Carolina

TIME: May 26-29, 1993

ANNUAL MEETING:
Symposium I: Multimedia presentation for use in Extension
Past: Organization of Dreams
Present: Dilemma of Doing Dreams
Future: Perception of New Dreams
Banquet:
Book Presentation:
The 25th Breeders and Producers:
Speaker: "You Performed", the Honorable Roy Wallace
Symposium II:
Current Problems:
The Essence of BIF - Tomorrow:

THE BOOK - HISTORY OF BIF:

TITLE: Creative Change/Twenty-fifth year of/(logo)/
A Celebration of Cooperation

PURPOSE: To share the humanity of technology transfer through facts and stories with a diverse audience.

OUTLINE:

ORIGINS OF UNIQUE FEDERATION
DIRECTIONAL LEADERSHIP
IMPACT OF SHARING SYMPOSIA
COMMITTEES WORKED
GUIDELINES ACHIEVEMENTS
INTERNATIONAL IMPACT

APPENDIX: Chronology of Advancements, Meetings and Symposia, Directors and Committees, Guideline Presentations

STRUCTURE: Human stories of cooperative interaction that brought change to an industry followed by a detail appendix. Seventy pages of copy and pictures, presentation leather covers and soft bound copies, estimated cost $5,000 per 500 copies perfect bound.

Willham described in detail the plans and execution thereof for the 25 year history with Frank Baker directing and Dick Willham writing. In discussion of preparation of multi-media materials necessary for the project some question was expressed for financial support of the project. John Crouch moved the project be supported financially up to $5,000 for the printing of the book and an additional $2,000 for travel in gathering information and meetings of the producers of the manuscript. Loren Jackson seconded and the motion carried.

Discussion continued on ways of remuneration of costs of book and suggested that membership be offered a supply of books prior to printing for an aid in determining the number of books to be printed.

NAAB Mini-Symposium - Norman Vincel reported an eagerness to hold the NAAB mini-symposium on Wednesday evening prior to the starting of the annual BIF convention on Thursday morning. Vincel gave the theme as "Manipulating Estrus in Heifers" and discussed tentative subjects with letters and authors to address each of these. He continued that the symposium would be approximately two to two and one-half hours in length and that NAAB would pay the expense of their speakers or be willing to share speakers and expenses. Paul Bennett moved acceptance of the NAAB proposal with the understanding that the NAAB meeting is separate with no endorsement from BIF. Timing of the NAAB meeting is a tentative approval by BIF. Steve McGill seconded and the motion carried. Cundiff presented the following as progress made in the genetic prediction committee.

Genetic Prediction - After some initial discussion it was suggested the composition of the genetic prediction committee be reviewed by McPeake and Cundiff by checking the minutes of past meetings.

1) BIF recommend a fixed base, year and procedure at discretion of each organization.

2) BIF publish a table of all animal non-parent mean EPD's in proceedings each year.
3) Recommend all sire evaluation reports include:
    1. Genetic trend by birth year for all animals.
    2. Average EPD's for all active sires (those with at least one calf in last two years.
    3. Average EPD's for all active dams (at least one calf in last two years).
    4. Percentile breakdown (1, 2, 3, 4, 5% and every 5% thereof).
4) Support continuing research on across breed EPD's.
5) Two breed tables to be published each year. 1) One for all 26 breed in Genetic Prediction program at MARC (for all traits). 2) Second table showing breed means adjusted for EPD genetic trends.
6) A subcommittee to develop guidelines for uniform editing and parameter estimation procedure was appointed.

Discussion followed on breed average charts.
Some discussion was held on mid-year boarding meeting agenda, the way the committees are handled and business conducted. Frank Baker added that the board had previously met at the end of the meeting for program planning. The consensus of the board was this is a good practice to use.

Don Boggs asked Steve McGill, Paul Bennett, Doug Hixon and Ronnie Silcox to serve on the fact sheet committee.

Leachman appointed Ronnie Silcox as chairman of the Central Test Committee since Ron Bolze will be Executive Director in 1993.

There being no further business the meeting was adjourned.

Respectfully Submitted,

Charles A. McPeake

Charles A. McPeake
Executive Director

BEEF IMPROVEMENT FEDERATION
STATEMENT OF ASSETS, LIABILITIES AND FUND BALANCE
CASH BASIS
APRIL 30, 1992

ASSETS	
Cash in Checking Account	14,163.21
Cash in Savings Certificate	52,760.78
TOTAL ASSETS:	66,923.99
LIABILITIES:	
None	00.00
TOTAL LIABILITIES:	00.00
FUND BALANCE:	
Balance December 31, 1991	60,844.25
Current Year Excess	6,079.74
TOTAL FUND BALANCE	66,923.99
TOTAL LIABILITIES & FUND BALANCE	66,923.99

BEEF IMPROVEMENT FEDERATION
STATEMENT OF REVENUES AND EXPENSE
CASH BASIS
JANUARY 1, 1992 - APRIL 30, 1992

REVENUE:	
Dues	8,965.00
Proceedings and Guidelines	977.50
Interest	1,122.15
Mid-Year Board Meeting Reimbursement	542.30
TOTAL REVENUE	11,606.95
EXPENSE:	
Salaries	316.56
Payroll Taxes	47.11
Office Expenses & Postage	580.00
Printing Expense (Guidelines)	3,650.85
Telephone	600.00
Convention Expense	332.69
TOTAL EXPENSES	5,527.21
EXCESS OF REVENUE OVER EXPENSE	$ 6,079.74

CASH BASIS
UNAUDITED
SEE ATTACHED ACCOUNTANT'S COMPILATION REPORT

PAID - BIF MEMBER ORGANIZATIONS AND AMOUNT OF DUES FOR 1992
As of May 4, 1992

STATE BCIA'S	DUES
Alabama	$100.00
Buckeye Beef (Ohio)	$100.00
California	$100.00
Florida	$100.00
Georgia	$100.00
Illinois	$100.00
Indiana	$100.00
Iowa	$100.00
Kansas	$100.00
Minnesota	$100.00
Mississippi	$100.00
Missouri	$100.00
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
Washington	$100.00
West Virginia	$100.00
Wisconsin	$100.00

Breed Associations	
American Angus	$600.00
American Beefalo	$50.00
American Blonde d'Aquitaine	$100.00
American Brahman	$200.00
American Chianina	$200.00
American Gelbvieh	$200.00
American Hereford	$500.00
American International 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
International Brangus Breeders	$300.00
North American Limousin	$300.00
Red Angus	$200.00
Santa Gertrudis Breeders	$200.00

Others	
Agriculture Canada - Red Meat Div.	$100.00
American Breeders Service	$100.00
Canadian Hays Converter Association	$100.00
Great Western Beef Expo	$50.00
Manitoba Agriculture	$100.00
National Assoc. of Animal Breeders	$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
21st Century Genetics	$100.00
King Ranch	$50.00
Tri-State Breeders Corp.	$100.00
Connors State College	$100.00
White Butte Ranch	$50.00

BIF MEMBERS WHO HAVE NOT PAID MEMBERSHIP DUES FOR 1992 (as of May 4, 1992)

STATE BCIA'S	
Colorado	$100.00
Hawaii	$100.00
Idaho	$100.00
Kentucky	$100.00
Montano	$100.00
New York	$100.00
Virginia	$100.00
Wyoming	$100.00

Breed Associations	
Salers Association of Canada	$100.00

Others	
Barzona Breeders Association	$100.00
National Cattlemen's Association	$100.00
North American South Devon	$100.00
Maritime Beef Testing Society	$100.00
Montana Stock Growers	$100.00
Turner Bros. Farms, Inc.	$100.00

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 Thomas	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 Dyde	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
Douglas D. Bennett	TX	1988
Don & Diane Guilford and David & Carol Guilford	CAN	1988
Kenneth Gillig	MO	1988
Bill Bennett	WA	1988
Hansell Pile	KY	1988
Gino Pedretti	CA	1988
Leonard Lorenzen	OR	1988
George Schlickau	KS	1988
Hans Ulrich	CAN	1988
Donn & Sylvia Mitchell	CAN	1988
Darold Bauman	WY	1988
Glynn Debter	AL	1988
William Glanz	WY	1988
Jay P. Book	IL	1988
David Luhman	MN	1988
Scott Burtner	VA	1988
Robert E. Walton	WS	1988
Harry Airey	CAN	1989
Ed Albaugh	CA	1989
Jack & Nancy Baker	MO	1989
Ron Bowman	ND	1989
Jerry Allen Burner	VA	1989
Glynn Debter	AL	1989
Sherm & Charlie Ewing	CAN	1989
Donald Fawcett	SD	1989
Orrin Hart	CAN	1989
Leonard A. Lorenzen	OR	1989
Kenneth D. Lowe	KY	1989
Tom Mercer	WY	1989
Lynn Pelton	KS	1989
Lester H. Schafer	MN	1989
Bob R. Whitmire	GA	1989
Dr. Burleigh Anderson	PA	1990
Boyd Broyles	KY	1990
Larry Earhart	WY	1990
Steven Forrester	MI	1990
Doug Fraser	CAN	1990
Gerhard Gueggenberger	CA	1990
Douglas & Molly Hoff	SD	1990
Richard Janssen	KS	1990
Paul E. Keffaber	IN	1990
John & Chris Oltman	WI	1990
John Ragsdale	KY	1990
Otto & Otis Rincker	IL	1990
Charles & Ruby Simpson	CAN	1990
T. D. & Roger Steele	VA	1990
Bob Thomas Family	OR	1990
Ann Upchurch	AL	1991
Nicholas Wehrmann & Richard McClung	VA	1991
John Bruner	SD	1991
Ralph Bridges	GA	1991
Dave & Carol Guilford	CAN	1991
Richard & Sharon Beitelspacher	SD	1991
Tom Sonderup	NE	1991
Steve & Bill Florschuetz	IL	1991
R. A. Brown	TX	1991
Jim Taylor	KS	1991
R. M. Felts & Son Farm	TN	1991
Jack Cowley	CA	1991
Rob & Gloria Thomas	OR	1991
James Burns & Sons	WI	1991
Jack & Gini Chase	WY	1991
Simmitcrest Farms	OH	1991
Larry Wakefield	MN	1991
James R. O'Neill	IA	1991
Francis & Karol Bormann	**IA**	**1992**
Glenn Brinkman	**KS**	**1992**
Bob Buchanan Family	**OR**	**1992**
Tom & Ruth Clark	**VA**	**1992**
A. W. Compton, Jr.	**AL**	**1992**
Harold Dickson	**MO**	**1992**
Tom Drake	**OK**	**1992**

Robert Elliott & Sons	TN	1992
Dennis, David & Danny Geffert	WI	1992
Eugene B. Hook	MN	1992
Dick Montague	CA	1992
Bill Rea	PA	1992
Calvin & Gary Sandmeier	SD	1992
Leonard Wulf & Sons	MN	1992

SEEDSTOCK BREEDER OF THE YEAR

John Crowe	CA	1972	A. F. "Frankie" Flint	NM	1982
Mrs. R. W. Jones	GA	1973	Bill Borror	CA	1983
Carlton Corbin	OK	1974	Lee Nichols	CA	1984
Leslie J. Holden	MT	1975	Ric Hoyt	OR	1985
Jack Cooper	MT	1975	Leonard Lodoen	ND	1986
Jorgensen Brothers	SD	1976	Harry Gardiner	KS	1987
Glenn Burrows	NM	1977	W. T. "Bill" Bennett	WA	1988
James D. Bennett	VA	1978	Glynn Debter	AL	1989
Jim Wolfe	NE	1979	Doug & Molly Huff	SD	1990
Bill Wolfe	OR	1980	Summitcrest Farms	OH	1991
Bob Dickinson	KS	1981	**Leonard Wulf & Sons**	**MN**	**1992**

THE COMMERCIAL PRODUCER HONOR ROLL OF EXCELLENCE

Chan Cooper	MT	1972
Alfred B. Cobb, Jr.	MT	1972
Lyle Eivens	IA	1972
Broadbent Brothers	KY	1972
Jess Kilgore	MT	1972
Clifford Ouse	MN	1973
Pat Wilson	FL	1973
John Glaus	SD	1973
Sig Peterson	ND	1973
Max Kiner	WA	1973
Donald Schott	MT	1973
Stephen Garst	IA	1973
J. K. Sexton	CA	1973
Elmer Maddox	OK	1973
Marshall McGregor	MO	1974
Lloyd Mygard	ND	1974
Dave Matti	MT	1974
Eldon Wiese	MN	1974
Lloyd DeBruycker	MT	1974
Gene Rambo	CA	1974
Jim Wolf	NE	1974
Henry Gardiner	KS	1974
Johnson Brothers	SD	1974
John Blankers	MN	1975
Paul Burdett	MT	1975
Oscar Burroughs	CA	1975
John R. Dahl	ND	1975
Eugene Duckworth	MO	1975
Gene Gates	KS	1975
V. A. Hills	KS	1975
Robert D. Keefer	MT	1975
Kenneth E. Leistritz	NE	1975
Ron Baker	OR	1976
Dick Boyle	ID	1976
James D. Hackworth	MO	1976
John Hilgendorf	MN	1976
Kahua Ranch	HI	1976
Milton Mallery	CA	1976
Robert Rawson	IA	1976
William A. Stegner	ND	1976
U. S. Range Exp. Sta.	MT	1976
John Blankers	MN	1977
Maynard Crees	KS	1977
Ray Franz	MT	1977
Forrest H. Ireland	SD	1977
John A. Jameson	IL	1977
Leo Knoblauch	MN	1977
Jack Pierce	ID	1977
Mary & Stephen Garst	IA	1977
Odd Osteross	ND	1978
Charles M. Jarecki	MT	1978
Jimmy G. McDonnal	NC	1978
Victor Arnaud	MO	1978
Ron & Malcolm McGregor	IA	1978
Otto Uhrig	NE	1978
Arnold Wyffels	MN	1978
Bert Hawkins	OR	1978
Mose Tucker	AL	1978
Dean Haddock	KS	1978
Myron Hoeckle	ND	1979
Harold & Wesley Arnold	SD	1979
Ralph Neill	IA	1979
Morris Kuschel	MN	1979
Bert Hawkins	OR	1979
Dick Coon	WA	1979
Jerry Northcutt	MO	1979
Steve McDonnell	MT	1979
Doug Vandermyde	IL	1979
Norman, Denton & Calvin Thompson	SD	1979
Jess Kilgore	MT	1980
Robert & Lloyd Simon	IL	1980
Lee Eaton	MT	1980
Leo & Eddie Grubl	SD	1980
Roger Winn, Jr.	VA	1980
Gordon McLean	ND	1980
Ed Disterhaupt	MN	1980
Thad Snow	CAN	1980
Oren & Jerry Raburn	OR	1980
Bill Lee	KS	1980
Paul Moyer	MO	1980
G. W. Campbell	IL	1981
J. J. Feldmann	IA	1981
Henry Gardiner	KS	1981
Dan L. Weppler	MT	1981
Harvey P. Wehri	ND	1981
Dannie O'Connell	SD	1981
Wesley & Harold Arnold	SD	1981
Jim Russell & Rick Turner	MO	1981
Oren & Jerry Raburn	OR	1981
Orin Lamport	SD	1981
Leonard Wulf	MN	1981
Wm. H. Romersberger	IL	1982
Milton Krueger	MO	1982
Carl Odegard	MT	1982
Marvin & Donald Stoker	IA	1982
Sam Hands	KS	1982
Larry Campbell	KY	1982

Lloyd Atchison	CAN	1982
Earl Schmidt	MN	1982
Raymond Josephson	ND	1982
Clarence Reutter	SD	1982
Leonard Bergen	CAN	1982
Kent Brunner	KS	1983
Tom Chrystal	IA	1983
John Freitag	WI	1983
Eddie Hamilton	KY	1983
Bill Jones	MT	1983
Harry & Rick Kline	IL	1983
Charlie Kopp	OR	1983
Duwayne Olson	SD	1983
Ralph Pederson	SD	1983
Ernest & Helen Schaller	MO	1983
Al Smith	VA	1983
John Spencer	CA	1983
Bud Wishard	MN	1983
Bob & Sharon Beck	OR	1984
Leonard Fawcett	SD	1984
Fred & Lee Kummerfeld	WY	1984
Norman Coyner & Sons	VA	1984
Franklyn Esser	MO	1984
Edgar Lewis	MT	1984
Boyd Mahrt	CA	1984
Don Moch	ND	1984
Neil Moffat	CAN	1984
William H. Moss, Jr.	GA	1984
Dennis P. Solvie	MN	1984
Robert P. Stewart	KS	1984
Charlie Stokes	NC	1984
Milton Wendland	AL	1985
Bob & Sheri Schmidt	MN	1985
Delmer & Joyce Nelson	IL	1985
Harley Brockel	SD	1985
Kent Brunner	KS	1985
Glenn Harvey	OR	1985
John Maino	CA	1985
Ernie Reeves	VA	1985
John E. Rouse	WY	1985
George & 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 Adamsson	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 & Diana Hooper	OR	1990
James & 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
Robert A. Nixon & Son	VA	1991
Murray A. Greaves	CAN	1991

James Hauff	ND	1991
Pat Hardy	GA	1991
J. R. Anderson	WI	1991
Ed & Rich Blair	SD	1991
Reuben & Connee Quinn	SD	1991
Dave & Sandy Umbarger	OR	1991
James A. Theeck	TX	1991
Ken Stielow	KS	1991
John E. Hanson, Jr.	CA	1991
Charles & Clyde Henderson	MO	1991
Russ Green	WY	1991
Bollman Farms	IL	1991
Craig Utesch	IA	1991
W. B. Allen	**TN**	**1992**
Mark Barenthsen	**ND**	**1992**
Ray Boyd	**AL**	**1992**
Charles Daniel	**MO**	**1992**
Jed Dillard	**FL**	**1992**
John & Ingrid Fairhead	**NE**	**1992**
Dale J. Fischer	**IA**	**1992**
E. Allen Grimes Family	**ND**	**1992**
Kopp Family	**OR**	**1992**
Harold, Barbara & Jeff Marshall	**PA**	**1992**
Clinton E. Martin & Sons	**VA**	**1992**
Lloyd & Pat Mitchell	**CAN**	**1992**
William Van Tassel	**CA**	**1992**
James A. Theeck	**TX**	**1992**
Aquilla M. Ward	**WV**	**1992**
Albert Wiggins	**KS**	**1992**
Ron Wiltshire	**CAN**	**1992**

COMMERICAL 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 & Diana Hooper	OR	1990
Dave & Sandy Umbarger	OR	1991
Kopp Family	**OR**	**1992**

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
Dick Crow	**Western Livestock Journal**	**CO**	**1992**

PIONEER AWARDS

Jay L. Lush	Iowa State University	Research	1973
John H. Knox	New Mexico 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	Tifton, 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. Henderson	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
Hoon Song	Agriculture Canada	1990
Jim Wilton	University of Guelph, Canada	1990
Bob Long	Texas Tech	1991
Bill Turner	Texas A&M	1991
Frank Baker	**Arkansas**	**1992**
Ron Baker	**Oregon**	**1992**
Bill Borror	**California**	**1992**
Walter Rowden	**Arkansas**	**1992**

CONTINUING SERVICE AWARDS

Clarence Burch	OK	1972	Mark Keffeler	SD	1981
F. R. Carpenter	CO	1973	J. D. Mankin	ID	1982
E. J. Warwick	DC	1973	Art Linton	MT	1983
Robert De Baca	IA	1973	James Bennett	VA	1984
Frank H. Baker	OK	1974	M. K. Cook	GA	1984
D. D. Bennett	OR	1974	Craig Ludwig	MO	1984
Richard Wilham	IA	1974	Jim Glenn	IBIA	1985
Larry V. Cundiff	NE	1975	Dick Spader	MO	1985
Dixon D. Hubbard	DC	1975	Roy Wallace	OH	1985
J. David Nichols	IA	1975	Larry Benyshek	GA	1986
A. L. Eller, Jr.	VA	1976	Ken W. Ellis	CA	1986
Ray Meyer	SD	1976	Earl Peterson	MT	1986
Don Vaniman	MT	1977	Bill Borror	CA	1987
Lloyd Schmitt	MT	1977	Daryl Strohbehn	IA	1987
Martin Jorgensen	SD	1978	Jim Gibb	MO	1987
James S. Brinks	CO	1978	Bruce Howard	CAN	1988
Paul D. Miller	WI	1978	Roger McCraw	NC	1989
C. K. Allen	MO	1979	Robert Dickinson	KS	1990
William Durfey	NAAB	1979	John Crouch	MO	1991
Glenn Butts	PRI	1980	**Jack Chase**	**WY**	**1992**
Jim Gosey	NE	1980	**Leonard Wulf**	**MN**	**1992**

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

Francis & Karol Bormann
Bormann Farms
Livermore, Iowa

Francis and Karol Bormann have been in the cattle business 58 years and the latter 21 of those years has been devoted to seedstock. They currently own 220 cows in their seedstock breeding herd which is composed of three beef breeds: Red Angus, Simmental, and Limousin.

Francis has maintained performance records for the past twenty years and provides complete performance data to his customers. This performance-oriented seedstock producer annually sells 50 top quality bulls. A strong advocate of performance evaluation, Bormann conducts on-farm bull tests and selects sale bulls based on performance.

Artificial insemination accounts for 90% of their breeding program. For twenty-five days they visually detect heat and breed accordingly. Then home raised clean-up bulls are turned out for another thirty-five days.

Francis is a past president of Iowa Red Angus Association and currently vice president. He also was a director of the Kossuth County Cattlemen.

Nominated by Iowa Cattlemen's Association

Glenn Brinkman
Brinks Brangus
Eureka, Kansas

Over the past twenty-four years, Brinkman has built up his program to encompass 563 registered Brangus and 282 commercial cows. Brinkman terms this group of cattle his new genetics herd.

Glenn began developing his herd in 1974 by using the parent breeds of Angus and Brahman cattle. The new genetics herd was built while still maintaining a foundation herd of 600 Brangus cows. In 1989, Brinkman and his brother, L.D., decided to disperse the foundation herd leaving the new genetics herd.

Through embryo transfer Brinks Brangus was the first Brangus operation to implement the use of embryo transfer in 1976. Approximately 80% of the herd sires produced the last 10 years at Brinks Brangus resulted from embryo transfer.

Glenn is currently chairman of the IBBA Breed Improvement Committee, as well as a past IBBA president; a BIF board member; and a member of the NCA's Seedstock Council.

Nominated by Kansas Livestock Association

Bob Buchanan Family
Buchanan Angus Ranch
Klamath Falls, Oregon

Buchanan Angus Ranch owns 60 Black Angus along with 60 commercial cows.

Synchronization and heat detection are used accordingly with the 98% artificial insemination program. This year 80% of their calves were born the first fourteen days of calving season.

The average weaning weights have increased from 530 lbs twenty years ago to over 700 lbs now for bulls with a more dramatic change in yearling weight from 885 lbs. to 1103 lbs in 1991 with only a 4 lb increase in birth weight.

Bob was the Oregon Cattlemen Beef Improvement Committee Chairman and has been an Oregon Cattlemen's Association Director.

Nominated by Oregon Cattlemen's Association

Tom & Ruth Clark
Bel-Vue Farm
Wytheville, Virginia

Tom Clark began the Simmental operation as a partnership with his father-in-law some 18 years ago. The herd was started by selecting the best feeder heifers for replacements in his father-in-law's herd. They were Angus, Angus-Hereford crosses, Charolais and other crosses. Now the Clarks have registered Simmental breeders.

Artificial insemination is used on 100% of the cows. The AI sires are based on EPD's and physical traits in relation to cows in the herd.

Calving ease, growth, disposition and eye appeal are all important criteria in the selection process for this seedstock herd.

Tom has served as a director of the Virginia Simmental Association and as a member of the Virginia BCIA Southwest Central Test Station.

Nominated by Virginia Beef Cattle Improvement Association

A.W. (Buck) Compton, Jr.
Compton Charolais
Nanafalia, Alabama

For fifty years, Compton Charolais has been in the cattle business and currently own 185 cows in a seedstock breeding herd that runs on 1200-acres.

During the past six years, "Buck" has documented a 20 lb increase in weaning weights for bull calves and a 43 lb increase in heifer weights, while trying to maintain a low birth weight.

Since a large majority of the breeding is done by natural service, a large emphasis is top performance herd sires. Not only do they believe in EPD's and actual records, but the pedigree and a keen evaluation of the dam are of utmost importance.

"Buck" was the 1991 President of the American International Charolais Association; President of the Alabama Cattlemen's Association; and a member of the National Beef Board.

Nominated by Alabama Beef Cattle Improvement Association

Harold Dickson
Dickson Angus Farm
Clarence, Missouri

Dickson Angus Farms seedstock operation consists of 100 cows and the farming operation of row crops.

The objective in-herd records have been used for twenty-five years to guide the selection for economic value traits. About 40 registered performance tested bulls are sold annually. A production sale is held annually and cattle are consigned to state breed sales and the Missouri Performance Tested Bull Sales.

The performance records are important especially during drought conditions. Rebreeding, cow condition, and calf weaning weight reflect the environment. Harsh conditions make it hard to distinguish improvements, so they rely on performance records.

Harold is presently serving as president of the Missouri Beef Cattle Improvement Association.

Nominated by Missouri Beef Cattle Improvement Association

Tom Drake
Drake Farms
Davis, Oklahoma

Tom Drake has been in the seedstock business for forty years with the latter twenty-six years focusing on the collection and use of performance information, with active participation in the Angus Herd Improvement Record program.

Tom operates the seedstock breeding herd consisting of 450 Angus females and 250 commercial cows.

Drake Farms, owned with brother Bob, has a planned breeding program geared for performance optimums in traits based on the environment and management, supported and strengthened by the use of a sound performance testing program. Records compiled through AHIR indicate that the within-herd genetic trend for growth has increased 92 lbs for weaning weight and 106 lbs for yearling weight.

Tom has been a member of the NCA Board of Directors for six years; American Angus Association Board of Directors for six years holding officer positions as president, vice-president, and treasurer.

Nominated by Oklahoma Cooperative Extension Service

Robert Elliott & Sons
Robert Elliott & Sons
Adams, Tennessee

Robert Elliott & Sons was started in 1935 by Robert Elliott at age 18 upon completion of high school. Sons Joe and William first entered the operation with their 4-H steers and heifers and later full time after graduation from the University of Tennessee.

The operation raises 300 acres of row crops, runs 70 purebred Angus cows and varying numbers of commercial cows and stockers.

Their philosophy is that through time the form of cattle will change, but their function must remain the same - to economically convert forage into food thus making money for the commercial cowmen who helps feed the world.

Robert Elliott & Sons trademark - "Form Follows Function....think about it."

Nominated by Tennessee Beef Cattle Improvement Association

Dennis, David & Danny Geffert
Geffert Hereford Farm Inc.
Reedsburg, Wisconsin

The Geffert Hereford Farm operation is 720 acres with 110 mother cows and 25 to 35 replacements annually concentrating on both Horned and Polled Herefords.

Artificial insemination accounts for 90% of their breeding program. When selecting a herd sire they use the full EPD spectrum, individual performance and the bull's potential influence on the cows is determined with emphasis on milk and growth.

Geffert Hereford Farm has always been able to carry between 87 and 98% calf crops. Our average weaning weights and yearling wights have increased 50 to 75 pounds.

Nominated by Wisconsin Beef Improvement Association

Eugene B. Hook
Hook Farms
Tracy, Minnesota

Eugene Hook is owner and operator of Hook Farms, a diversified crop and livestock farm. The original farm was purchased in 1901 by Eugene's Grandfather George Hook and this original farm is still managed by Eugene today.

Eugene graduated from the University of Minnesota with degrees in Agronomy and Agricultural Economics with a minor in Animal Husbandry. In 1957 Eugene started farming in partnership with his father Bert Hook and today farms with his son Thomas Hook.

Hook Farms consists of 140 Simmental cows with selection criteria stressed on total performance in the herd with a balanced trait selection and EPD's being heavily used.

Eugene has served as a director and treasurer of the Minnesota State Simmental Association and a member of the Minnesota Beef Cattle Improvement Association.

Nominated by Minnesota Beef Cattle Improvement Association

Dick Montague
Sunny Brook Ranch
Paso Robles, California

After graduating from Cal Poly in 1952, Dick's initial experience was with Hereford cattle for six years. In 1958, he become associated with the Sunny Brook Ranch, a purebred operation, and relocated in 1961 to become a managing partner.

The goal of SBR has always been to raise performance cattle with low birth weights and a cow herd with a strong maternal instinct. Today the seedstock breeding herd consists of 103 Angus cows. Over the years, the cow herd has been bred closely enough to assure the consistency in structure, soundness, body capacity and muscle development.

With a 60-75 day breeding period, calving percentage has increased from an extended breeding period. Weaning weights have grown over 30% and yearling weights by nearly 40%, while birth weights have grown only 13% over the years.

Dick has been a director of the California Angus Association and an officer and director of the San Luis Obispo County Farm Bureau.

Nominated by University of California Cooperative Extension Service

Bill Rea
Stonylonesome Farm
Stahlstown, Pennsylvania

Stonylonesome Farm has been in the cattle business for 38 years and currently their seedstock breeding herd consists of 85-90 Angus cows and 50 crossbred recipient cows.

Bill with the help of his manager have developed a program based on balanced EPD's, easy calving, and high fertile cattle. Bulls merchandised have won acceptance by commercial breeders for their predictability and performance.

Since artificial insemination accounts for 95% of the seedstock breeding, the objective to select a sire is to produced balanced EPD's in the herd, so potential herd sires are also required to be balanced. The emphasis is usually on maternal traits while keeping birth weight EPD's moderately low, yet maintaining some emphasis on growth.

Stonylonesome Farm have increased weaning weights in bulls by 191 lbs and 213 lbs in heifers since 1975. The entire calf crop has positive EPD's for weaning, yearling, and milk, while keeping birth weight EPD's low to modest.

Nominated by Pennsylvania Beef Cattle Improvement Association

Calvin & Gary Sandmeier
Sandmeier Charolais
Bowdle, South Dakota

The Sandmeier's have been involved in the cattle business for the past twenty-two years, and over the past sixteen years have developed a Charolais herd with a performance reputation. Today the operation consists of 375 registered Charolais cows.

Performance records emphasized include all growth traits, the reproductive traits, scrotal circumference, pelvic area and carcass data.

By judicious use of all performance records, weaning weights have increased by 100 pounds and yearling weights by 150 pounds.

Leadership activities include director and past president of South Dakota Charolais Association, member North Central Livestock Association, and member and past president of local cattlemens group.

Nominated by South Dakota Beef Cattle Improvement Association

Leonard Wulf
Wulf Limousin Farms
Morris, Minnesota

Leonard Wulf has been a registered Limousin breeder since 1971. The Wulf operation consists of approximately 6,000 acres of tillable land, 1,500 acres of pasture, and 730 Limousin cows and about 6,000 head of fed Limousin cattle marketed in Minnesota annually.

In addition to 21 years of birth, weaning and yearling data, the Wulfs have collected complete carcass data on over 500 head of purebred Limousin cattle, have pelvic measured and evaluated reproductive performance of replacement heifers for fifteen years and have routinely emphasized scrotal and frame size data.

All cattle produced are evaluated through the Genetic Evaluation program of the North American Limousin Foundation. Over the years, a large number of Wulf bulls and females have been recognized in this Manual.

Leonard has served as president of the North American Limousin Foundation for two terms, was part of the NCA Value Based Marketing Task Force and is a member of the BIF Board of Directors.

Nominated by North American Limousin Foundation

WULF NAMED TOP SEEDSTOCK PRODUCER OF THE YEAR

Leonard Wulf has been a registered Limousin breeder since 1971. The Wulf Limousin Farms is located in Morris, Minnesota. The operation consists of approximately 6,000 acres of tillable land planted to corn, wheat and beans, along with 1,500 acres of pasture, over 700 Limousin cows and about 6,000 head of fed Limousin cattle marketed in Minnesota annually. In addition, the Wulfs have twenty-one years of birth, weaning and yearling weight data, the Wulfs have collected complete carcass data on over 500 head of purebred Limousin cattle, have pelvic measured and evaluated reproductive performance of replacement heifers for fifteen years and have routinely emphasized scrotal and frame size data.

In 1991, the Wulfs were recognized as the 16th largest seedstock producer in the United State by the National Cattlemen's Association in their "Directions" publication. The quantity of registered cattle produce by the Wulfs is matched only by their quality. Favorable genetic trends and customer acceptance have occurred over the years. Leonard has served as president of the North American Limousin Foundation for two terms, was part of the NCA Value Based Marketing Task Force, is a member of the BIF Board of Directors and has served the overall industry in a number of additional capacities.

Pictured left to right: Mrs. Leonard Wulf and Mr. Leonard Wulf

NOMINEES FOR COMMERCIAL PRODUCER OF THE YEAR

W.B. Allen
Allendale Farms
Clarksville, Tennessee

Allendale has been in the family for 1796, and Mr. Allen has the original deed which was recorded in Clarksville when this area was the Western Territory of North Carolina. Beef cattle have been an important part of this operation for 195 years. Currently there are 100 head of commercial cows.

Mr. Allen enrolled his herd in the Tennessee Beef Cattle Improvement Program in 1956 and has participated in this program continuously. He has practiced a rigorous culling program, using performance resources to replace low producing and open cows.

All replacement females come from the herd and are selected according to their index of weaning weights along with structural soundness and temperament.

Mr. Allen states that the BIF can help the commercial cattlemen by promoting sound and uniform performance programs that will improve efficiency and profitability in beef production.

Nominated by Tennessee Beef Cattle Improvement Association

Mark Barenthsen
Barenthsen Farm & Ranch
Powers Lake, North Dakota

Mark Barenthsen joined the cattle business in 1976.

The goal of the family operation has been to produce a calf that will give the greatest return to investment and still maintain longevity and produce cattle types acceptable to the industry.

The farm and ranch consists of 1800 tillable acres and 2600 acres pasture and hay land. A rotational pasture system is utilized during the summer grazing season. The harvested forage for winter consumption consists mainly of grass and sweetclover hay and some silage crops. Normally brood cows are fed five to six months.

The growth rate of the herd has increased from 2.9 lbs weight per day of age to 3.3 pounds weight per day of age since 1984. The percentage of heifers calving within 42 days from the start of the calving season has improved for 82% in 1984 to 100% in 1990.

Nominated by North Dakota Beef Cattle Improvement Association

Ray Boyd
Ray Boyd Farms
Enterprise, Alabama

Ray Boyd started farming in 1977, while still attending Enterprise High School. In 1980, purchased 160 acres, 95 acres of cropland and 65 acres of woodland. Ray began the operation with 10 head of crossbred heifers and 50 acres of peanuts. Ray has made significant progress in improving the efficiency of his cow herd. In 1990, he had the number two BCIA herd in the Alabama. In 1991, Ray had the top BCIA herd in Alabama and the highest 205 day adjusted weight which was 629 pounds.

Ray now farms 300 acres of peanuts and maintains a 60 brood cow herd on 800 acres of cowned and rented land. Ray is from a non-farm background and has established himself as an iniviative crop and livestock producer.

Nominated by The Alabama Beef Cattle Improvement Association

Charles Daniel
Charles Daniel Family
Greenfield, Missouri

Charles Daniel's farm consists of 4800 acres that are owned and 1600 rented acres. Besides 550 beef cows which calve in the winter and fall, the livestock enterprise includes 100 sows in a farrow to finish operation.

They entered a steer feedout in 1988 an have learned valuable information about performance in the feedlot.

Emphasis on sire selection has increased sale weights by 150 pounds in five years and focuses on yearling weights in the 1200 to 1300 pound range, moderate frame, calving ease.

Charles has served on the Bull Buyer Panel at the 1991 Beef Seedstock Seminar in Springfield.

Nominated by Missouri Beef Cattle Improvement Association

Jed Dillard
F.A. Boyd & Sons
Greenville, Florida

Jed Dillard has managed the F.A. Boyd & Sons cattle operation since 1982, which has been in the cattle business for 52 years.

The commercial breeding herd currently consists of 270 head of cows and has had fewer than 10 outside females since 1940.

Since beginning to identify and weigh calves in 1982, weaning weights have increased 130 pounds. The Boyd operation emphasizes fertile, adapted brood cows which fit the total farming system.

Jed is past president of the Florida Beef Cattle Improvement Association and the Jefferson County Cattlemen's Association and chairs the Florida Cattlemen's Association Integrated Resource Management Committee.

Nominated by the Florida Beef Cattle Improvement Association

John & Ingrid Fairhead
JF Ranch
Merriman, Nebraska

JF Ranch is located in south-central South Dakota and dates back to 1884, when G.O. Fairhead relocated to the area from England.

The operation consists of 600 commercial cows which are largely Angus-Hereford crosses and since 1983 have been bred to Simmental bulls as a terminal cross. In addition, the replacement heifers are produced via an aggressive artificial insemination program.

John has obtained the carcass data on his cattle in the past and has had the foresight to realize that the cattle industry is headed toward a value based marketing system.

John is a member and past director of the Sandhills Cattle Association.

Nominated by South Dakota Beef Cattle Improvement Association

Dale J. Fischer
Fischer Land & Cattle Company
Thornton, Iowa

Dale and Phyllis Fischer began a cattle herd forty-four years ago that continues to be a family operation.

The Fischer program evolved from a purebred Polled Hereford herd. They now breed via artificial insemination to Polled Hereford, Simmental, and Angus and use Polled Hereford and Simmental bulls as clean-up in their three breed rotational cross herd. All the replacement heifers are AI sired.

Over the past three years there has been a 74% conception from the AI program. The past two years they have been involved in an ET program where frozen embryos are implanted in their cows, incubated, calved and then returned to their breeder when weaned.

Dale is a charter member of ICA and NCA and formerly a member of Iowa Beef Improvement Association.

Nominated by Iowa Cattlemen's Association

E. Allen Grimes Family
Echo Valley Ranch
Scranton, North Dakota

Echo Valley Ranch is now in a third generation ownership and E. Allen Grimes' two daughters are the fourth. They raise cattle, hogs, alfalfa and tame grass mixture for hay, along with wheat, oats and barley.

The main interest of the ranch is cattle which has 150 head of cows. In 1971, they bought their first Charolais bulls when they began a cross-breeding program from straight Angus to improve weaning weights and develop more hybrid vigor in the herd.

Through the use of performance records and visual appearance they have raised weaning weights over 200 pounds since the use of production records. They believe that by using records it has been possible to steadily improve the size and quality of the cow herd thus allowing an improved and increased size of the calf crop each year.

When selecting replacement females they concentrate on performance records to describe weaning weight, daily gain, 205 day adjusted weight and index.

Nominated by American-International Charolais Association

Kopp Family
Kopp Ranch
Pilot Rock, Oregon

The Kopp Ranch was established in 1900 with commercial cattle as the primary enterprise. Today 300 cows roam the land.

The original Hereford base cows are now crossbred. The breeding program the last five years has been primarily Simmental/ Angus and purebred Red or Black Angus bulls on percentage cows.

Charles took over the management from his father in 1948. Cattle were basically Hereford until 1970 when Charolais and Angus were introduced into the herd. Then in 1972 the Simmentals were used. All the decisions were based on the performance data compiled through retained ownership of cattle through the feedlot.

The Kopp family believes the BIF can help the commercial cattleman by encouraging seedstock breeders to continue providing performance tested bulls with all data possible.

Nominated by Oregon Beef Cattle Improvement Committee

Dale J. Fischer
Fischer Land & Cattle Company
Thornton, Iowa

Dale and Phyllis Fischer began a cattle herd forty-four years ago that continues to be a family operation.

The Fischer program evolved from a purebred Polled Hereford herd. They now breed via artificial insemination to Polled Hereford, Simmental, and Angus and use Polled Hereford and Simmental bulls as clean-up in their three breed rotational cross herd. All the replacement heifers are AI sired.

Over the past three years there has been a 74% conception from the AI program. The past two years they have been involved in an ET program where frozen embryos are implanted in their cows, incubated, calved and then returned to their breeder when weaned.

Dale is a charter member of ICA and NCA and formerly a member of Iowa Beef Improvement Association.

Nominated by Iowa Cattlemen's Association

E. Allen Grimes Family
Echo Valley Ranch
Scranton, North Dakota

Echo Valley Ranch is now in a third generation ownership and E. Allen Grimes' two daughters are the fourth. They raise cattle, hogs, alfalfa and tame grass mixture for hay, along with wheat, oats and barley.

The main interest of the ranch is cattle which has 150 head of cows. In 1971, they bought their first Charolais bulls when they began a cross-breeding program from straight Angus to improve weaning weights and develop more hybrid vigor in the herd.

Through the use of performance records and visual appearance they have raised weaning weights over 200 pounds since the use of production records. They believe that by using records it has been possible to steadily improve the size and quality of the cow herd thus allowing an improved and increased size of the calf crop each year.

When selecting replacement females they concentrate on performance records to describe weaning weight, daily gain, 205 day adjusted weight and index.

Nominated by American-International Charolais Association

Kopp Family
Kopp Ranch
Pilot Rock, Oregon

The Kopp Ranch was established in 1900 with commercial cattle as the primary enterprise. Today 300 cows roam the land.

The original Hereford base cows are now crossbred. The breeding program the last five years has been primarily Simmental/ Angus and purebred Red or Black Angus bulls on percentage cows.

Charles took over the management from his father in 1948. Cattle were basically Hereford until 1970 when Charolais and Angus were introduced into the herd. Then in 1972 the Simmentals were used. All the decisions were based on the performance data compiled through retained ownership of cattle through the feedlot.

The Kopp family believes the BIF can help the commercial cattleman by encouraging seedstock breeders to continue providing performance tested bulls with all data possible.

Nominated by Oregon Beef Cattle Improvement Committee

Harold, Barbara & Jeff Marshall
Marshall Farm
Bellefonte, Pennsylvania

Marshall Farm has 120 acres of permanent pasture and crop land plus 64 acres of woodland. Crops are hay, small grains and soybeans.

The cattle herd averages about 40 cow/calf units, two herd bulls, plus 10 to 15 yearling heifers and bulls for use as replacements or for sale. About half of the cows are registered Red Angus (either red or black, red gene carriers). The better purebred cows are used to maintain the purebred base. The remaining purebred cows and crossbred cows are outcrossed (AI bred by Barbara) to either Simmental, Maine Anjou, or Limousin bulls that are likely to produce growthy, high quality calves.

Selection based on superior bull and cow performance has improved calf weaning weights by about 100 lb per calf during the past fifteen years.

Harold has served a term on Foreign Trade Committee of the National Cattleman's Association.

Nominated by Pennsylvania Beef Cattle Improvement Association

Clinton E. Martin & Sons
C.E. Martin & Sons
Stuarts Draft, Virginia

The partnership of brothers Gary and Dale Martin along with their father Clinton E. Martin exemplifies a balance of beef cattle and cash grain crop farming. The 700 acres owned is enhanced by the 1,300 leased acres that includes a brood cow herd of 300 head.

The cow herd is composed of Herefords, Angus, Charolais, and Black-White Faced bred to Hereford, Angus, or Charolais bulls.

The bulls used on the Martin operation are performance tested bulls most of which have come out of Virginia BCIA central bull test stations.

The criteria for females is reproduction. All heifers and suspect cows are pregnancy checked. Open females are culled. Other criteria include milking ability, age, cow condition score, and failure to produce a calf to weaning and health.

Nominated by Virginia Beef Cattle Improvement Association

Lloyd & Pat Mitchell
Annavale Farm
Annan, Ontario

Lloyd and Pat Mitchell started a cow-calf operation eight years ago to utilize surplus forage and to supply replacements for Lloyd's father's feedlot. The cow herd has since grown to 100 cows, and weaning weights have improved over time.

At first they bought cows to build their program, but found the calving season too long, the calves were not uniform and the cows had a high turnover rate. This lead to crossbreeding to generate F1 replacement females.

Lloyd and Pat have been innovative producers, adopting new technology to improve production. They have used pelvic measurements to access heifers and have experimented with a creep feeding program to finish calves while still nursing cows.

Lloyd has served as president of the Grey County Beef Improvement Club which looks after the weighing of 500 beef herds and sponsors information meetings.

Nominated by Ontario Beef Cattle Performance Association

William Van Tassel
Lindenhill Ranch
Linden, California

William Van Tassel runs 1,350 mother cows on 10,000 acres of leased pasture land near Farmington in E. San Joaquin County.

Since it was necessary to buy commercial cows from time to time to stock additional pastures, they are still in the process of breeding the herd to a basic Angus-Hereford cross.

The goal at Lindenhill Ranch is to produce high performing steers that can be fed at below average cost and at the same time produce premium quality replacement females.

The last three heifer crops have shown a dramatic increase in weaning and yearling weights. This is attributed to the advent of EPD's plus the stacking of pedigrees on heifers.

Nominated by University of California Cooperative Extension Service

James A. Theeck
Mayfair Ranch
Brenham, Texas

Jim Theek is a cowman's "COW MAN". He earned that reputation as General Manager of Mayfair Ranches, where his ingenious management makes ranching a profitable and enjoyable way of life.

Under Jim's twenty-five years of leadership, Mayfair has expanded from 150 to 1570 cows, average pregnancy rates have gone from 63% to 96% and weaning weights are up more than 175 pounds. In addition 65-80% of the calf crop is dropped in the first twenty-one days of the calving season.

Mayfair markets about 400 superior commercial heifers each year at their Bluebonnet F-1 Heifer Sale.

Jim has served two terms as chairman for both the Performance Test Committee of SGBI and the Breed Improvement Committee of SGBI, was president of the Mid-Coast Santa Gertruidis Association, and served on TAEX Directions Task Force.

Nominated by Texas Agricultural Extension Service

Aquilla M. Ward
A.M Ward Stock Farm
Volga, West Virginia

Quilly's farm operation has become more sophisticated under his leadership. He utilizes a complete record keeping system.

A.M. Ward Stock Farm is a commercial crossbred cow-calf operation that utilizes a background program for yearling cattle that are sent to a feedlot for finishing through retained ownership.

Replacement heifers are raised on the farm through artificial insemination.

Bull selection using high performance bulls have increased production and improved efficiency. The calf crop has always been 95% or over. The first year's performance records only had two calves over 400 pounds. 205 day weight is over 525 pounds. Yearling cattle weights have increased from 700 to 850 pounds.

Nominated by West Virginia University Extension Service

Albert Wiggins
Wiggins Ranch
Eureka, Kansas

The Wiggins Ranch is composed of 400 acres owned and 8,000 acres leased. Virgin native grassland, primarily big and little Bluestem, is grazed year round at the rate of eight acres per cow/calf unit.

Albert has been in the commercial cow/calf operation for fifty years. Of those fifty years the past thirty-six have been devoted to use performance data when selecting herd bulls and also six years in culling the cow herd.

Six years ago they started using Brangus bulls on Angus-Hereford foundation cows. All replacement heifers are of Brangus or Angus origin and bred to Brangus bulls.

At Wiggins Ranch they strive to produce a predictable, consistent carcass that the consumer has demanded.

Albert has been a Kansas Livestock Association director.

Nominated by Kansas Livestock Association

Ron Wiltshire
Tatton Red Angus
Miniota, Manitoba

Tatton Red Angus has been in the cattle business approximately seventy years and forty of those in the commercial business.

Tatton Red Angus also runs a purebred operation. They sell bulls private treaty and females are selected on performance and eye appeal with fertility being number one in selection of sale bulls and females.

When selecting bulls for breeding Ron selects bulls with higher performance than their herd except for birth weights.

The criteria for replacement females is the gestation of the dam, average daily gain, yearling weight, eye appeal and pregnancy within 50 days of exposure.

Nominated by Manitoba Beef Awards Program

THE KOPP FAMILY HONORED AS 1992 COMMERCIAL CATTLE PRODUCER OF THE YEAR

The Kopp Family was named the 1992 BIF Outstanding Commercial Producer at their annual meeting and symposium in Portland, Oregon. Charles and Mayanna Kopp along with son, Richard, and his wife, Sandra, run 300 cows on the ranch, 15 miles south of Pilot Rock, Oregon. The Kopp Ranch was established in 1900 with commercial cattle as the primary enterprise.

Charles took over management from his father in 1948. Cattle were basically Hereford until 1970. At that time Charles introduced Charolais and Angus into the herd. In 1972 Simmental sires were used in the herd. Charles based all his decisions on the performance data compiled through retained ownership of his cattle through the feedlot. The ranch has continued using all these innovative practices until the current time. Richard and Charles handled all management and record keeping until mid-1991 when Charles passed away.

Richard took over total management decisions. Current management practices and performance records are continually monitored relative to profitability. Information collected from these records is used to evaluate and improve the cow herd and its management. Although bulls were primarily selected on post-weaning performance, cows were culled and heifers selected based on the weaning weights relative to individual and dam weights.

Pictured left to right: Mayanna Kopp, Richard Kopp and Sandra Kopp

DR. FRANK BAKER RECEIVES SPECIAL PIONEER AWARD

Frank Baker, the diplomat of the livestock world and currently the emeritus national program officer for Winrock International, received a special Pioneer Award from the Beef Improvement Federation. Frank is responsible for the creation and the development of BIF, an organization of the performance groups of the beef industry in the United States. Through quiet diplomacy, Frank Baker welder together one of the most unique organizations ever to exist in the livestock world.

Frank Baker is recognized as a leader by his peers having served as the president of the American Society of Animal Science and the Council for Agriculture Science and Technology. He is equally respected among the stockmen of the livestock industry having served as executive secretary of the Beef Improvement Federation and having been recipient of numerous industry awards each of which were given for service. He has also inspired countless youth as a graduate instructor at Oklahoma State University, a professor at Kansas State University and the University of Kentucky, a department head at the University of Nebraska, and the dean of agriculture at Oklahoma State University before joining Winrock International. He also served as Extension animal science leader in Oklahoma and later for the nation. Frank Baker has demonstrated his ability to sense problems of the livestock industry, analyze the alternatives, and gather together the expertise and foster the interaction necessary to devise solutions for the problems. From diet-health and animal welfare issues to those of performance evaluation, Frank has an industry through real transition. The many transitions led by Frank were made without destroying old trusted traditions and organizations but by building on these making the pioneers proud of their accomplishments and allowing the stockman who at first resisted change to gracefully become participating leaders. Such is the essence of diplomacy.

1992 Special Pioneer Award recipient and other Pioneer Award recipients. Pictured left to right: Walter Rowden, Frank Baker (Special Pioneer Award), Bill Borror, Ron Baker and Mrs. Baker

1992 BIF PIONEER AWARD PRESENTED TO RON BAKER

Ron Baker, owner of C & B Livestock, Hermiston, Oregon, was honored as a recipient of the 1992 Beef Improvement Federation Pioneer Award in Portland, Oregon. Ron and his family were honored for their pioneering work in the field of beef cattle breeding and marking in the Pacific Northwest. A notable speaker and innovator in beef cattle production, Ron has lead the industry in incorporating many of the new technology and genetics into breeding systems in the nations. Neighbors and customers alike have benefitted from his program of genetics and marketing.

After twenty years of progressive cattle breeding, Ron recognized the need for high quality, lean, branded beef products. In 1986, C & B leased, and later purchased, a packing plant in Pasco, Washington, and began operations under the name of Western Meat Producers, Inc. The packing operation is currently marketing branded beef under the labels of Western Natural Light Choice Beef and Western Natural Light Select Beef. These products are currently sold throughout the Pacific Northwest. The Western Meat program capitalizes on the C & B breeding program that has emphasized high feedlot performance and efficiency, and the ability to produce excellent quality, high cutability carcasses.

Ron has been honored among others as the 1976 recipient of the BIF Commercial Producer of the Year and the 1985 Businessman of the Year for the National Cattleman's Association.

Pictured left to right: Ron Baker and Mrs. Baker

PIONEER AWARD GIVEN TO BILL BORROR

Bill Borror was named the 1992 BIF Pioneer Award recipient. Bill is from a long-term record keeping family. His father and uncle began dairy cow testing in 1914. By the time they began performance evaluation of beef cattle they had been keeping dairy records for more than 25 years. When Bill started his 4-H club work in 1943 with one registered Angus heifer, a California beef Extension specialist suggested he enroll in the state performance testing program. This was the birth of Tehama Angus Ranch, Gerber, California, a performance pioneer.

During the 50's and 60's, by relying on scales instead of opinions, and the heritability of measurable traits of economic value, Tehama Ranch established a sound reputation as a source of predictable seedstock for western commercial cattlemen. The Tehama herd was enrolled in Angus Herd Improvement in 1970 and wa among the first, if not the first, Angus breeder to submit records to the association generated on a "home-made computer. Since this time Bill has designed a computer records keeping software package called Beef Herd Improvement System, which has been marketed to other cattlemen. In 1972, a fledgling program called National Sire Evaluation was planned by the American Angus Association. Mr. Borror was the owner of one of the bulls included in the first Sire Evaluation Report issued by the Angus Association in 1974.

Many honors have been conferred upon Bill Borror and Tahama Angus Ranch over the years, among which were BIF Seedstock Producer of the Year in 1974. Bill was elected to the BIF presidency in 1983 and served two terms on the board of directors. Bill is currently a member of the board of directors of the American Angus Association.

WALT ROWDEN RECEIVES PIONEER AWARD

Walt Rowden was also named recipient for the 1992 BIF Pioneer Award . He is Vice President and Manager of the Petit Jean Division of Winrock Farms, Morrilton, Arkansas. Walt was born and raised in Colorado and received his B.S. degree from Colorado State University. He also received a Masters degree from CSU, working with Dr. H. H. Stonaker.

After spending time in the service, he went to work at the Ft. Robinson Station of the Center at Clay Center, Nebraska, where he served as operations manager for all research. He was involved in the development of all the facilities at MARC and in the initial assembling of the cow herd that now numbers over 6,000 head. His next career stop was back in Colorado where he spent five years doing sire selection work and progeny testing for Internation Beef Breeders. In 1979, he moved to his present position where he manages a registered 200 cow operation which consists of Santa Gertrudis performance committee with that program.

Walt has always been an industry contributor. After moving to Arkansas, he became active in the Arkansas Cattlemen's Association and was involved at the local, state and national levels. He was County President, ACA director and area Vice President and, in 1990, served as ACA President. He is also a member of the National Cattlemen's Association and has been involved with their National IRM Coordinating Committee.

RICHARD A. CROW RECEIVES AMBASSADOR AWARD

Richard A. "Dick" Crow was named the 1992 BIF Ambassador Award. He heads a Denver-based livestock publications firm founded by his late father, Nelson R. Crow, in 1992.

In 1973, realizing that the publications would better serve the livestock industry, form a more centralized location, Crow moved the firm to Denver after having its headquarters in the Los Angeles area for fifty years. Through a business commitment that the publications serve the industry, and a personal commitment and dedication to that industry, and a personal commitment and dedication to that industry, Crow has been active on many fronts during his years at the helm of the family-owned business. He was very active in the 1970's in the former Livestock Merchandising Institute and for two years chaired that organization's Livestock Marketing Congress.

Dick is a member of the Western Stock Show Association, governing body of the National Western Stock Show in Denver. His firm is a charter member of Livestock Publications Council, and he is co-chair for the Red Meat Club of Denver which provides industry exposure to business men inside and outside the industry each year during the show.

Crow and his wife, Barbara, also are the key people in the Western Livestock Journal Tours, a subsidiary to the publishing enterprise which conducts domestic and overseas livestock study tours each year. His son, Peter, is now serving as general manager and sales director for the company.

Pictured above: Richard A. Crow

1992 BEEF IMPROVEMENT FEDERATION BOARD OF DIRECTORS

Front Row: Larry Cundiff, Roy McPhee, Jed Dillard, Jim Leachman, Paula deRose, Jim Gibb, Charles McPeake

Back Row: John Stovall, Gary Johnson, Leonard Wulf, Frank Baker, Paul Bennett, Steve McGill, Norman Vincel, Don Boggs, Bruce Cunningham, Loren Jackson, Burke Healey, Glynn Debter, Craig Ludwig

Those not pictured: Glenn Brinkman, John Crouch, Doug Hixon, Marvin Nichols, Ronnie Silcox, and Gary Weber

1992 BIF CONVENTION ATTENDANCE ROSTER

C. K. Allen
RR 3, Box 177
Savannah, MO 64485
(816)562-1155

Beecher Allison
516 Test Farm Road
Waynesville, NC 28786
(704)456-7520

William Altenburg
Am. Simmental Assn.
1604 E County Road #76
Wellington, CO 80549
(303)568-7808

Kathleen Ambrose
Drover's Journal
7950 College Blvd
Overland Park, KS
(913)451-2200

Kent Andersen
No. American Limousin
8105 S. Poplar #A103
Englewood, CO 80112
(303)220-1693

John Andersen
3428 Valley Woods Drive
Verona, WI 53593
(608)833-5960

Jerry Arnold
Oregon State Univ.
OSU Dept. of Animal
Corvallis, OR 97331
(503)737-5043

Roy Ax
4612 Ave del Cazador
Tucson, AZ 85718
(602)621-1322

Frank Baker
Winrock International
RR3 Box 376
Morrilton, AR 72110
(501)727-5435

Ron Baker
C & B Livestock
PO Box 109
Hermiston, OR 97838
(503)567-5552

Mark Baranthsan
HC 1 Box 182
Powers Lake, ND 58173
(701)464-5741

Jeff Baxter
Route 1, Box 153
Osawatomie, KS 66064
(913)755-4837

Bob Beck
64841 Imbler RD
Cove, OR 97824
(503)489-3345

Jon Beckett
1313 Wake Forest Dr. #127
Davis, CA 95616
(916)758-5961

Mary Bellin
4612 Ave. del Cazador
Tucson, AZ 85718
(602)621-9493

Bill Bennett
B&B Cattle Co. WA
Box 36
Connell, WA 99326
(509)234-4361

Gary Bennett
US MARC
Clay Center, NE 68901
(402)762-4254

James Bennett
Knoll Crest Farm, Inc.
HCR Box 39
Red House, VA 23963
(804)376-3567

Paul Bennett
Knoll Crest Farm, Inc.
HCR Box 39
Red House, VA 23963
(804)376-3567

Keith Bertrand
U of Georgia
An/Dairy Sci. Dept. UGA
Athens, GA 30602
(404)542-1852

Erik Bloomfeldt
Route 1, Box 254
Terrebonne, OR 97760
(503)923-1901

Mark Boggess
U of Idaho
1330 Filer Avenue E
Twin Falls, ID 83301
(208)734-3600

Don Boggs
South Dakota St Un.
Box 2170 SDSU
Brookings, SD 57007
(605)688-5448

Ron Bolze
Kansas St Univ.
775 W Fifth
Colby, KS 67701
(913)462-2199

Aaron Borror
23820 Tehama Avenue
Gerber, CA 96035
(916)385-1570

Bill Borror
23820 TehamuAvenue
Gerber, CA 96035
(916)385-1570

Andy Boston
214 West Main St.
Paoli, IN 47454
(812)723-3600

Rick Bourdon
Colorado St. Univ.
CSU Dept. of Animal Sci.
Fort Collins, CO 80523
(303)491-6150

Jon Bowerman
Fossil, OR 97830
(503)489-3367

Garth Boyd
Colorado State Un.
9633 N Co. Road 3
Wellington, CO 80549
(303)491-6233

Paul O. Brackelsberg
Iowa State Univ.
119 Kildee Hall, Iowa St.
Ames, IA 50011
(515)294-7235

Tom Brink
5420 S. Quebec
Englewood, CO 80111
(503)694-0323

Glenn Brinkman
Brinks Brangus
PO Box 350
Eureka, KS 67045
(316)583-5169

James Brinks
Colorado St Univ.
CSU Dept. of An. Science
Fort Collins, CO 80523
(303)491-6928

Bill Brockett
Virginia Beef Corp.
1215 James Madison HWY
Haymarket, VA 22069
(703)754-8873

Bill Broderick
Oregon State Univ.
50 Alars Drive
Hermiston, OR 97838
(503)567-5142

E. John Bruner
Bruner Limosin
Route 1, Box 80
Winfred, SD 57076
(605)482-8202

Dean Bryant
Wye Angus
PO Box 269
Queenstown, MD 21658
(410)827-6016

Robert Buchanan
13490 Algoma Road
Klamath Falls, OR 97601
(503)883-8471

Brent Buckley
Univ. of Hawaii
1800 East-West Road
Honolulu, HI 96822
(808)956-7090

Rudy Budin
Great Western Beef Expo
Route 3
Sterling, CO 80751
(303)228-4181

Glenn Burrows
Route 2, Box 80
Clayton, MN 88415
(505)374-9745

Jan R. Busboom
Washington St. Univ.
123 Clark Hall WSU
Pullman, WA 99164
(509)335-2880

David Callister
1165 S Grand #57
Pullman, WA 99163
(509)334-9726

Len Calvert
Oregon State Univ.
AdS 416N OSU
Corvallis, OR 97331
(503)737-3378

Larry Campbell
Oregon State University
200 Warner-Milne Rd.
Oregon City, OR 97045
(503)655-8631

Delbert Carstens
Carstens Simmentals
S. 801 Henry Road
Greenacres, WA 99016
(509)924-2004

Jack & Gini Chase
Buffalo Creek Land Co.
PO Box 186
Leiter, WY 82837
(307)736-2422

Louis C. Chesnut
51311 Westcliff Pl #504
Spokane, WA 99204
(509)747-6780

Chris Christensen
Route 2, Box 580
Wessington Sprg, SD 57382
(605)539-9522

Donald Clanton
C & S Cattle Co.
914 Grande
North Platte, NE 69101
(308)532-1971

Clarence Claypool
Route 1, Box 237A
Colfax, WA 99111
(509)397-4054

Gordon Colton
Rt. 2 Box 140
Baker City, OR 97814
(503)523-4077

John Comerford
351 ASI
University Park, PA 16802
(814)863-3661

Buck Compton
Alabama BCIA
Nanafalia, AL 36764
(205)736-4221

M. K. "Curly" Cook
Route 1, Box 365
Crawford, GA 30630
(404)743-8273

Larry Corah
Kansas State Univ.
An Sci Dept Weber Hall
Manhattan, KS 66502
(913)532-5820

Dr. L. Mac Cropsey
Box 38605
Denver, CO 80238
(303)237-5374

John Crouch
American Angus Assn.
3201 Frederick Blvd.
St. Joseph, MO 64506
(816)233-3101

Dick Crow
650 S Lipan St.
Denver, CO 80223
(303)722-7600

Larry V. Cundiff
USMARC NE
USMARC P.O. Box 166
Clay Center, NE 68933
(402)762-4171

Bruce Cunningham
Am. Simmental Assn.
1 Simmental Way
Bozeman, MT 59715
(406)587-4531

David Danciger
Tybar Ranch
1644 Prince Creek RD
Carbondale, CO 81623
(303)963-1391

Randy Daniel
Partisover Ranch
Rt. 1, Box 110-B
Colbert, GA 30628
(404)788-2533

Russ Danielson
North Dakota St Un
ARS Dept. NDSU
Fargo, ND 58102
(701)237-7648

Michael Davis
3273 Hawksbury Ct.
Dublin, OH 43017
(614)766-4871

Tim Davison
Davison Ranch
4853 Sherman Road
Deer Park, WA 99006
(509)276-2307

Paul Day
Oregon State University
950 W 13th St
Eugene, OR 97402
(503)687-4243

E. Paola deRose
Agriculture Canada
930 Carling Avenue
Ottawa, ON K1A
(819)994-0246

Glynn Debter
Debter Hereford Farm, Inc
Rt. 1, Box 171
Horton, AL 35980
(205)429-3553

John Dhuyretter
North Dakota St. Univ.
2120 Academy Road
Minot, ND 58701
(701)857-7682

Bob Dickinson
2831 Severin Road
Gorham, KS 67640
(913)998-4357

Jed Dillard
PO Box 704
Monticello, FL 32331
(904)997-6223

Jim Doubet
American Saler Assn.
12496 W. Chenango
Morrison, CO 80465
(303)770-9292

Tom Drake
Box 188
Davis, OK 73030
(405)369-2177

Bob Drake
Box 188
Davis, OK 73030
(405)369-2177

Elwain Dreyer
3177 TWP Road 152
Cardington, OH 43315
(419)864-3360

Dave Duncan
High Valley Ranch
Route 1, Box 740
Ellensburg, WA 98926
(509)962-1060

Roger Eakins
University of Mo.
PO Box 408
Jackson, MO 63755
(314)243-3581

Nita Effertz
BEEF TODAY MAGAZINE
2517 Greenferry Road
Coeur D'Alene, ID 83814
(208)664-9324

Arthur L. Eller
VA Tech
Dept of An Sci
Blacksburg, VA 24061
(703)231-9151

Clair Engle
324 Henning Bldg.
University Park, PA 16802
(814)863-3669

S.R. Evans
Evans Angus Farms
1604 Leflore Avenue
Greenwood, MS 38930
(601)453-5317

Byron Fagg
Purdue Univ.
RR 2, Box 513
Salem, IN 47167
(812)883-4601

Robert Felsman
PO Box 4007 UAPB
Pine Bluff, AR 71601
(501)541-6752

Frank A. Felton
912 South Walnut
Maryville, MO 64468
(816)582-2991

Xin Feng
U of Georgia
165 Northview Dr. #1
Athens, GA 30605
(404)542-0984

Lori Fink
Fink Ranch, Inc.
7101 Anderson
Manhattan, KS 66502
(913)776-9385

Richard Forgason
PO Box 386
Hungerford, TX 77448
(409)532-1352

Bob Forth
Rt 2 Box 233-A
Pendelton, OR 97801
(503)276-4751

Glen Fukumoto
PO Box 208
Kealakeua, HI 96750
(808)322-2718

Bob Ganger
1640 SW 325 Street
Hillsboro, OR 97123
(503)648-4528

Jerry Gann
12710 Hazkell Lane
Bowie, MD 20716
(301)464-3534

Henry Gardiner
Rt. 1 Box 290
Ashland, KS 67831
(316)635-2932

Joe Garrett
Am Int Charolais Assn
PO Box 20247
Kansas City, MO 64195
(816)464-5977

Warren Garrett
Beefmaster Breeders
6800 Park Ten Blvd.
San Antonio, TX 78213
(512)732-3132

Charles Gaskins
135 Clark Hall - WSU
Pullman, WA 99164
(509)335-6416

Jim Gibb
American Gelbvieh Assn.
10900 Dover Am Gelbvieh
Westminster, CO 80021
(303)465-2333

Dr. Richard Gilbert
#103-111 Research Drive
Saskatoon, SK S7N 3R2
(306)668-6644

Dr. Bruce Golden
Colorado State Univ
Dept. An. Sci
Fort Collins, CO 80523
(303)491-7128

Doug Gorman
4710 NW 18th
Camas, WA 98607
(206)693-5874

Murray Greaves
R.R. #1
Barrie, ON L4M 4Y8
(705)728-5685

Ronnie D. Green
Texas Tech Univ.
Dept An Sci
Lubbock, TX 79409-2141
(806)742-2455

Randall Grooms
PO Box 38
Overton, TX 75684
(903)834-6191

Randy Guthrie
3052 Old Route 75
Stem, NC 27581
(919)471-6872

Tim Guttridge
24787 S Springwater
Estacada, OR 97023
(503)630-4574

Hal Hamilton
1021-A State Hwy 6
Chehalis, WA 98532
(206)748-4713

Steve Hammack
Route 2, Box 1
Stephenville, TX 76401
(817)968-4144

Scott Hansen
PO Box 1730
Ames, IA 50010
(515)233-3270

Doc and Connie Hatfield
Hatfield's High Des. Ranch
Brothers, OR 97712
(503)576-2455

William Herring
U Of Georgia
Dept of An Sci
Athens, GA 30602
(404)542-0989

William D. Hohenboken
Virginia Tech
Dept. of An. Sci. VPI
Blacksburg, VA 24061
(703)231-4733

John Hough
Am Polled Hereford Assn.
11020 NW Ambassador Dr.
Kansas Ciy, MO 64153
(816)891-8400

Don Hunter
23201 SW Stafford
Tualatin, OR 97062
(503)638-1680

Loren Jackson
Int. Brangus Breeders
PO Box 696020-Int Brangus
San Antonio, TX 78269
(512)696-8231

Tom Jenkins
USDA,ARS, PO Box 166
Clay Center, NE 68933
(402)762-4247

Maribeth Johnson
Univ of Georgia
UGA Livestock-Pol Bldg
Athens, GA 30602
(404)542-1852

Ken Hartzell
21st Century Genetic
W3548 Wills St.
Shawano, WI 54166
(715)526-2141

Burke Healey
Southern Cross Ranch
PO BOX 444
Davis, OK 73030
(405)369-2711

Doug Hixon
Univ of Wyoming
PO Box 3684
Laramie, WY 82071
(307)766-3100

Jimmy Holliman
105 County Road 944
Marion Junction, AL 36759
(205)872-7878

Brian House
Select Sires
11740 US 42 N
Plain City, OH 43064
(614)873-4683

Lowell Hursh
31460 Countryview Lane
Wilsonville, OR 97070
(503)694-2650

Henry Jaeger
Box 78
Moro, OR 97039
(503)565-3252

Gary Johnson
RR #1, Box 117
Dwight, KS 66849
(913)482-3362

Mark Johnson
OSU 109C Animal Science
Stillwater, OK 74078
(405)744-6065

Glenn Harvey
29000 Hwy 31
Paisley, OR 97636
(503)943-3958

Greg Henderson
Box 2939
Shawnee Mission, KS 66201
(913)451-2200

Gordon Hodges
Route 1, Box 400
Hamptonville, NC 27020
(919)468-6363

Eugene Hook
Hook Farm
Route 1, Box 90
Tracy, MN 56175
(507)629-4848

Harlan Hughes
Box 157C RR 2
Moorhead, MN 56560
(606)257-7276

Don Hutzel
Noba, Inc.,Box 607
Tiffin, OH 41488
(419)447-6262

Jay Jenkins
Box 601
Basin, WY 82410
(307)568-2281

Jerry Johnson
Pacific Trail Cattle
Route 1, Box 130-A
Coleville, CA 96107
(916)495-2518

Randall R. Johnston
Pendleton Grain Growers
Box 263
Athena, OR 97813
(503)276-7611

Susan Jones
Canadian Limousin Assn.
5663 Burleigh Cres. SE
Calgary, AL T2H 1Z7
(403)253-7309

Brian G. Kitchen
Am Simmental Assn
1 Simmental Way
Bozeman, MT 59715
(406)587-4531

DeVon Knutson
Route 2 Box 263
Walla Walla, WA 99362
(509)529-3947

Lisa Kriese
Univ of Neb-Lincoln
A218d Animal Science UNL
Lincoln, NE 68583
(402)472-6403

Chuck Lambert
8149 S Monaco Circle
Englewood, CO 80112
(303)741-5539

James Leachman
Leachman Cattle Co.
PO Box 2505
Billings, MT 59102
(406)656-8583

Limousin World
Box 850870
Yukon, OK 73085
(405)350-0040

Keith Long
Box 184
Leiter, WY 82837
(307)736-2421

Lynn Lundquist
Pres. OR Cattlemen's
Rt. 1 Box 610
Powell Butte, OR 97753
(503)548-1215

Martin Jorgensen
Jorgenson Farms
HCR 57 Box 91
Ideal, SD 57541
(605)842-3217

Fran Kitzerow
9914 S Wildcat
Molalla, OR 97038
(503)829-5987

Kelvin Koong
Oregon State Univ
Withycombe Hall OSU
Corvallis, OR 97331
(503)737-3414

Richard H. Lacey
62 Gassland Dr.
Drummond, MT 59832
(406)288-3359

Teres Lambert
8149 S Monaco Circle
Englewood, CO 80112
(303)694-0305

Kent Lebsack
1625 Brook Ct.
Ellensburg, WA 98926
Calgary, AL T2E
(403)250-9242

Art Linton
Montana State Univ
Dept An Sci & Range Sci
Bozeman, MT 59715
(406)994-3721

Craig Ludwig
Am Hereford Assn
Box 014059
Kansas City, MO 64101
(816)842-3757

Michael MacNeil
Route 1, Box 2021
Miles City, MT 59301
(406)232-4970

Tom Kasari
Tomka Stock Farm
6349 Smith Road
Bryan, TX 77803
(409)845-3541

Kenneth Knott
59926 Comstock RD
Cove, OR 97824
(503)568-4730

Richard Kopp
Kopp Ranch
PO Box N
Pilot Rock, OR 97868
(503)443-4461

Margaret Lamb
Univ. of Guelph
Dept of An Sci
Guelph, ON N1G2W1
(519)824-4120

Lark Ranch
Route 1, Box 160
Powell Butte, OR 97753
(503)447-1189

Les Ledene
Canadian Charolais
2320-41 Avenue NE
Calgary, AL, Can T2E 6W8
(403)250-9242

Del Little
160 Crescent Road
Athens, GA 30606
(404)542-0948

Bob Lundgren
Lungren Land & Livestock
Rt. 1, Box 40A
Lowden, WA 99360
(509)525-2260

V. E. (Bud) Mahrt
Mahrt & McNutt, CPA
152 Denny Way
Seattle, WA 98109
(206)448-7424

Dave Maples
PO Box 2499
Montgomery, AL 36102
(205)265-1867

Linda C. Martin
Kansas State Univ.
129 Weber Hall Kansas St.
Manhattan, KS 66506
(913)532-6533

Jim McAdams
Route 1, Box 650
Huntsville, TX 77340
(409)295-5296

Roger McCraw
5408 Lacy Road
Durham, NC 27713
(919)515-2761

John McCullock
Capital Press Publication
PO Box 2048
Salem, OR 97308
(503)364-4674

William H. McDonald
2070 Walnut Springs Rd.
Blacksburg, VA 24060
(703)552-2520

Steve McGill
American Shorthorn Assn
8288 Hascall St
Omaha, NE 68124
(402)393-7203

Robert L. McGuire
Auburn Univ
212 ADS Bldg Auburn Univ
Auburn Univ, AL 36849
(205)844-1557

James McKinlay
RR #2
Ravenna, ON N0H2E0
(519)599-6236

Charles A. McPeake
Exec. Director BIF
Ext An & Dairy Sci UGA
Athens, GA 30602
(404)542-2585

Roy McPhee
McPhee Red Angus
14298 N Atkins Road
Lodi, CA 95240
(209)727-3335

Brett Middleton
11020 NW Ambassador
Kansas City, MO 64153
(816)891-8400

Randy Mills
721 SE Third, Suite 3
Pendleton, OR 97801
(503)276-7111

Lloyd Mitchell
RR #2
Annan, ON N0H1B0
(519)376-5001

Dick Montague
Sunny Brook Ranch
5585 Creston Road
Paso Robles, CA 93446
(805)238-0653

David Morris
VTH-300 W. Drake Rd
Fort Collins, OR 80523
(303)221-4535

Daniel W. Moser
302 L-P Bldg UGA
Athens, GA 30602
(404)542-0989

Homer Mundell
Great Western Beef Expo
19277 County Road 38
Sterling, CO 80751
(303)522-0120

Tim Neely
4020 NW Witham Hill Dr
Corvallis, OR 97330
(503)757-9766

Andra Nelson
Univ of Georgia
UGA Livestock-Pol Bldg
Athens, GA 30602
(404)542-0960

Larry A. Nelson
Purdue University
Department of An Sci
West Lafayette, IN 47907
(317)494-4831

Don Nelson
Washington St. Univ.
212 Clark Hall WSU
Pullman, WA 99164
(509)335-2922

Roger L. Nestor
Rt. 1 Box 155A
Belington, WV 26250
(304)457-3254

Wade Nichols
Hoechst-Roussel Agri-Vet
1015 Holly Lane
Canyon, TX 79015
(806)655-8721

Mark Nieslanik
Tybar Ranch
1644 Prince Creek RD
Carbondale, CO 81623
(303)963-1391

Sally Northcutt
Oklahoma St Univ.
201 An Sci Bldg OK State
Stillwater, OK 74078
(405)744-6060

David Notter
Virginia Tech
Dept of An Sci VA Tech
Blacksburg, VA 24061
(703)231-5135

Bob Nusbaum
Univ of Wisconsin
1 University Plaza
Platteville, WI 53818
(608)342-1452

Polley Owen
Oregon Cattlemen's Assn.
729 NE Oregon St Suite190
Portland, OR 97232
(503)238-7400

Richard Quaas
Cornell University
114 Morrison, Cornell
Ithaca, NY 14853-4801
(607)255-2853

Reese Richman
921 West Vine
Tooele, UT 84074
(801)882-2976

Walt Rowden
Route 3 Box 386
Morrilton, SD 72110
(501)727-5421

Chuck Sattler
Nat Assn Animal Brdrs
PO Box 1033
Columbia, MO 65205
(314)445-4406

Robert Schalles
Kansas State Univ.
560 Deep Creek Road
Manhattan, KS 66502
(913)776-6004

Joe Shelby
1313 LaConcha
Houston, TX 77054
(713)795-4444

Gary Smith
Colorado State Univ.
Dept of An Sci
Fort Collins, CO 80523
(303)491-5226

James Oltjen
Univ. California - Davis
Dept. of An. Sci.-UCD
Davis, CA 95616
(916)752-5650

Brian Pogue
Ont. Ministry of Ag
16 Ferman Dr.
Guelph, ON N1H-7E1
(519)846-0941

Steve Radakovich
RR2
Earlham, IA 50072
(515)834-2359

Kris Ringwall
NDSU Box 1377
Hettinger, ND 58639
(701)567-4326

Gary Rupp
USDA-MARC
PO Box 187
Clay Center, NE 68933
(402)762-4502

Jeff Savell
Texas A & M
348 Kleberg
College Station, TX 77843
(409)845-3935

Tim Schiefelbein
Ameerican Gelbvieh Assn
4895 W 81st Place #10
Westminster, CO 80030
(303)657-9146

Ronnie Silcox
Univ of Georgia Ext
Landrum Box 8112
Statesboro, GA 30460
(912)681-5630

Hoon Song
2305 Fox Crescent
Ottawa, ON K2B -7K5
(613)829-3192

Gerald Orr
640 4th St. NW
Portage, MN R1N -2G7
(204)239-3370

Dr. Allan K Preston
Canadian Simmental Assn.
Box 308
Hamiota, MA R0M -0T0
(204)764-2820

Harland Radomske
Venture Farms
Route 3, Box 914
Ellensburg, WA 98926
(509)968-3934

Lora Rose
564 Geesaman Road
Colville, WA 99114
(509)684-5690

Ivan Rush
University of Nebraska
4502 Avenue I
Scottsbluff, NE 69361
(308)632-1245

David Schafer
18683 Hwy 140
Hesperus, CO 81326
(303)385-4574

David Selner
21st Century Genetics
W3548 Wills St
Shawano, WI 54166
(715)526-2141

Danny Simms
Kansas State Univ
Dept An Sci
Manhattan, KS 66502
(913)532-6131

Richard Spader
Amercan Angus Assn.
3201 Frederick Blvd
St. Joseph, MO 64506
(816)233-3101

Tom Stewman
No Am Limousin
PO Box 468
Maryneal, TX 79535
(915)288-4448

Julie Stitt
Canadian Hereford Assn.
5160 Skyline Way
Calgary, AL T2E -6V1
(403)275-2662

John Stowell
Nat. Cattlemen's Assn.
5420 S Quebec St.
Englewood, CO 80111
(303)694-0305

Daryl R. Strobehn
Iowa State Univ.
109 Kildee Hall, Iowa St.
Ames, IA 50011
(515)294-2240

W. A. Stuart
Stuart Land & Cattle Co.
Box 146
Rosedale, VA 24280
(703)880-2020

John Sullivan
241 Knapp Hall, LSU
Baton Rouge, LA 70816
(504)388-2219

Steve Swigert
Noble Foundation
PO Box 2180
Ardmore, OK 73402
(405)223-5810

John Symens
Box 155
Amherst, SD 57421
(605)448-5725

Wayne Tatman
Courthouse, Rm 203
Laramie, WY 82070
(307)721-2571

Dennis Taylor
Cascade Cattleman
7005 Henry
Klamath Falls, OR 97603
(503)885-4460

Niel Taylor
HC64 Box 415
Lakeview, OR 97630
(503)947-2869

Mike Tess
Montana State Univ
Dept An & Range Sci.
Bozeman, MT 59715
(406)994-5610

Rob & Lori Thomas
Thomas Angus Ranch
Route 2, Box 85
Baker, OR 97814
(503)523-7958

Dave Umbarger
Route 3, Box 170
Pendleton, OR 97801
(503)276-4664

Bill Van Tassel
Lindenhill Ranch CA
PO BOX 683
Linden, CA 95236
(209)887-3566

David VanHeuvelen
Wolfe Creek Software
8831 E. St. Charles Road
Columbia, MO 65202
(314)474-9701

Keith Vander Velde
American Breeders Service
6908 River Road
Deforest, WI 53532
(608)846-3721

Bev VanderPlaat
Oregon State Univ.
Dept. of Animal Sciences
Corvallis, OR 97331
(503)737-4926

Wayne Vanderwert
North Amer. Limousin
NALF PO Box 4467
Englewood, CO 80155
(303)220-1693

Norm Vincel
Select Sires - VA NC
PO Box 370
Rocky Mount, VA 24151
(703)483-5123

Wayne Wagner
West Virgina Ext. Service
PO Box 6108
Morgantown, WV 26506
(304)293-3392

Roy Wallace
Select Sires
11740 US 42 North
Plain City, OH 43064
(614)873-4683

Gary Weber
USDA Washington DC
Rm 3334 South Bldg.
Washington, DC 20250
(202)720-2677

Dale Weber
Oregon State Univ.
2961 NW Grant Ave
Corvallis, OR 97330
(503)737-2144

Marilou Wegner
Amer. Int. Charolais Assn
PO Box 20247
Kansas City, MO 64195
(816)464-5977

Mary Westman
406 Campus Vista
Pullman, WA 99163
(509)332-8187

Brian Wheeler
Am Polled Hereford Assn.
5005 SW Murray Blvd, #621
Beaverton, OR 97005
(503)644-7137

Albert Wiggins
Brinks Brangus
PO Box 350
Eureka, KS 67045
(316)583-5169

Doyle Wilson
Iowa State Univ.
109 Kildee Hall
Ames, IA 50011
(515)294-2240

Brent Woodward
Univ of Minnesota
101 Haecker Hall
St. Paul, MN 55108
(612)624-4995

Leonard Wulf
Leonard Wulf & Sons
RR 3, Box 235
Morris, MN 56267
(612)392-5802

Douglas Zalesky
Louisiana State Univ
26 Knapp Hall, LA Univ.
Baton Rouge, LA 70803
(504)388-2219

William Zollinger
Oregon State Univ.
210 Withycombe Hall
Corvallis, OR 97331
(503)737-1906

Mark Wiley
21880 SE Grand Island Way
Dayton, OR 97114
(503)868-7276

Stephen Wolfe
Wolfe Ranches
69405 Baker Road
Wallowa, OR 97885
(503)886-9121

Bill Wren
BJ Enterprises WA
951 State Hwy 407
Cathlamet, WA 98612
(206)795-3332

Galen Wunsch
Grizzly Rt.
Madras, OR 97741
(503)475-7858

Mark Zimmerman
36341 Irwin RD
Barstow, CA 92311
(619)256-2221

Richard Willham
Iowa State Univ
239 Kildee Hall, ISU
Ames, IA 50011
(515)294-3533

Willard Wolf
American Hereford Assn
PO Box 141144
Spokane, WA 99214
(509)448-7544

Douglas Wright
326 Snyder Hill Road
Ithaca, NY 14850
(607)273-2464

Richard Yost
Oregon Farmer Stockman
WF-S Box 668
West Linn, OR 97068
(503)655-0107

Keith Zoellner
Kansas State Univ.
3104 Payne Drive
Manhattan, KS 66502
(913)539-2560

THE BEEF IMPROVEMENT FEDERATION AND
OREGON STATE UNIVERSITY
ACKNOWLEDGE FINANCIAL SUPPORT FROM THE
FOLLOWING ORGANIZATIONS:

American Breeders Service

Oregon Cattlemen's Association

Select Sires, Inc.

Tri-State Breeders Corporation

21st Century Genetics

Editor: Charles A. McPeake
Production Assistants: Bill Zollinger and Linda Maddox

Additional copies of these Proceedings are available at $5.00 per copy from:

Charles A. McPeake
Beef Improvement Federation
University of Georgia
Extension Animal Science Dept.
Athens, Georgia 30602