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Germ Plasm EvaluationProgram- Progress Report No. 4

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Germ Plasm Evaluation Program

Progress Report No. 4

U.S. Meat Animal Research Center

In cooperation with
Kansas State University
and the University of Nebraska

**ARS-NC-48
June 1976**



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The cattle Germ Plasm Evaluation Program at the U.S. Meat Animal Research Center is designed to characterize different biological types represented by breeds varying widely in characteristics such as milk production, growth, mature size and carcass composition at various points along their growth curves. A major objective is to characterize breeds representing different biological types in different feed environments and production situations for the full spectrum of biological traits relating to economic beef production.

A coordinated research effort is employed involving scientists from different disciplines including animal breeding, reproductive physiology, nutrition, meats and management systems. The program was initiated with the 1969 breeding season. Progress reports have been published annually summarizing current results from each cycle and phase of the program for traits of principal economic importance to the beef cattle industry.

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CATTLE GERM PLASM EVALUATION PROGRAM¹

PROGRESS REPORT NO. 4

U.S. MEAT ANIMAL RESEARCH CENTER

The cattle Germ Plasm Evaluation Program has been conducted in three cycles. Cycle I involved breeding Hereford, Angus, Jersey, South Devon, Limousin, Simmental and Charolais bulls by artificial insemination (AI) to Hereford and Angus cows to produce three calf crops (Cycle I, Phase 2) in the spring of 1970, 1971 and 1972.

Cycle II, initiated with the 1972 breeding season, involved the Hereford and Angus cows used in the first cycle. These cows were bred by AI to Hereford, Angus, Red Poll, Brown Swiss, Gelbvieh, Maine Anjou and Chianina sires to produce two calf crops (Cycle II, Phase 2) in the spring of 1973 and 1974. In addition, in Cycle II, Phase 2, Red Poll and Brown Swiss cows were added to the program and mated to Hereford, Angus, Red Poll and Brown Swiss sires.

Cycle III was initiated during the 1974 breeding season. In Cycle III, the Hereford and Angus cows used to initiate Cycles I and II were mated by AI to Hereford, Angus, Brahman, Sahiwal, Pinzgauer and Tarentaise sires to produce two calf crops (Cycle III, Phase 2) in the spring of 1975 and 1976.

Fifteen of the Hereford and 16 of the Angus sires used in Cycle I were also used in Cycle II and Cycle III to insure a more stable control population of Hereford and Angus reciprocal crosses that are used as a basis for comparison between different cycles and phases of the program. Within each cycle of sire breeds, foundation cows (Hereford and Angus, in Cycles I, II and III, plus Red Poll and Brown Swiss in Cycle II) are referred to as Phase 1. Their calves are called Phase 2 and the calves from Phase 2 cows are designated Phase 3. Specific mating plans for each cycle and phase of the program are given in the appendix.

Reports on birth and weaning traits of all Cycle I, Phase 2 calves and on postweaning growth, feed efficiency and carcass and meat traits of the steers (ARS-NC-13, Progress Report No. 1, 1974) and of growth, reproduction and maternal performance of the heifers through two years of age (ARS-NC-22, Progress Report No. 2, 1975) are available by request. In addition, a complete summary and discussion of results from birth through slaughter for Cycle I, Phase 2 steers and from birth through puberty for Cycle I, Phase 2 heifers (ARS-NC-41, Progress Report No. 3, 1976) is available by request.

¹ U.S. Meat Animal Research Center, Agricultural Research Service, U.S. Department of Agriculture, Clay Center, Nebraska 68933; Standardization Branch, Agricultural Marketing Service, U.S. Department of Agriculture; Kansas State University, Manhattan; and the University of Nebraska, Lincoln; cooperating.

This report provides data from Cycle I, Phase 2 cows for reproduction and maternal performance and size as 3-year-olds (cows born in 1970-71-72), 4-year-olds (cows born in 1970-71), and 5-year-olds (cows born in 1970). Data are presented on birth weight and preweaning growth of all calves and postweaning growth and carcass characteristics of Cycle I, Phase 3 steers (mating plan presented in appendix table 3) and postweaning growth, puberty and conception of Cycle I, Phase 3 heifers. Postweaning growth, feed efficiency and carcass and meat data on steers and on growth, puberty and conception of heifers are reported from Cycle II, Phase 2 (mating plan presented in appendix tables 2 and 4). Also, data on birth, survival and preweaning growth from the first of two calf crops in Cycle III, Phase 2 (mating plan presented in appendix table 5) are included in this report.

CYCLE I, PHASE 2

Foundation Cows. The foundation Hereford and Angus cows used in the program were purchased as calves at weaning from commercial producers in Nebraska. The cows were 2 through 5 years of age, 2 through 6 years of age, and 3 through 7 years of age at calving in 1970, 1971 and 1972, respectively.

Sires. In Cycle I, 32 Hereford, 35 Angus, 33 Jersey, 28 South Devon, 20 Limousin, 28 Simmental and 26 Charolais bulls were used during the 1969, 1970 and 1971 breeding seasons. The Hereford and Angus bulls used in this program were sampled from bulls that had been selected on individual performance information which was the basis for entering into the progeny testing programs of artificial insemination organizations. The Jersey bulls were selected at random from two commercial AI organizations and the South Devon bulls were sampled from an importation made in 1969 by a commercial organization. Simmental, Limousin and Charolais bulls were sampled from bulls available from commercial organizations and from the Canada Department of Agriculture for the Simmental and Limousin.

General releases of information on individual sires are not planned because erroneous conclusions may be drawn from the ranking of individual sires with the relatively small number of progeny per sire in this program. The objective of the program is to characterize breeds as representatives of different biological types. To do this effectively, a large sample of sires of each breed is necessary. Thus, the number of progeny per sire is generally low. A relatively large number of progeny per sire are required for a high level of accuracy in ranking individual sires on their breeding value for most economic traits.

For a cooperative study with the Canada Department of Agriculture, Hereford x Angus, Jersey x Angus, Simmental x Angus and Charolais x Angus heifers were randomly selected at weaning time and shipped, 4 to 8 weeks after weaning, to the Research Station, Lethbridge, Alberta. There were 12 heifers per breed group in 1970 and 10 heifers per breed group in 1971 and 1972. These females and their offspring are being individually fed to evaluate efficiency of production.

Matings. Cycle I, Phase 2 yearling heifers were mated to Hereford, Angus, Brahman, Devon and Holstein bulls during a 45- to 46-day AI season and to Hereford and Angus bulls for a 21- to 24-day cleanup period in 1971, 1972 and 1973 (appendix table 3). As 2-year-old cows, they were mated to Hereford, Angus, Chianina, Gelbvieh and Maine Anjou bulls for a 42- to 45-day AI season and to Hereford and Angus bulls during a 22-day cleanup in 1972, 1973 and 1974. As 3-, 4- and 5-year-olds, the cows are being mated by natural service to Brown Swiss bulls for 64 days.

Data Analysis. Calving difficulty, calf mortality, calf birth weight and preweaning growth were analyzed by least-squares procedures for unequal subclass numbers separately for each age group using a model that included the effects of breed of cow's sire, breed of cow's dam, breed of calf's sire, year, sex and most two-way interactions, with birth date as a covariate. Birth date, birth weight and 200-day weight and preweaning growth rate were adjusted to a steer basis by adjustment factors calculated from the data and shown in the footnotes of each table. Unweighted means are presented for calf crop percentage, postpartum interval, AI percentage and pregnancy rate.

Calving Difficulty. Calving difficulty scores were assigned to each calf at birth on the basis of the following system:

Score

- | | |
|-------------------------|--|
| 1 No difficulty | - Calves unassisted. |
| 2 Little difficulty | - Assistance given by hand, but no jack or puller used; assistance actually may not have been required. |
| 3 Moderate difficulty | - Assistance given with jack or calf-puller; some difficulty was encountered even with the pullers being used. |
| 4 Major difficulty | - Calf jack used and major difficulty encountered; usually 30 minutes or more required to deliver calf. |
| 5 Caesarean birth | - Performed after determination made that calf could not be delivered with a calf-puller. |
| 6 Abnormal presentation | - Assistance given: posterior, head back, leg back, etc. |

Summaries of calving difficulty in 664 births from 3-year-old cows are presented in table 1 and on 714 births from 4- and 5-year-old cows are provided in table 3. For these summaries, scores of 1 and 2 were combined and are designated no difficulty and scores of 3 and 4 are combined and are designated calf-puller.

Reproductive and Maternal Performance. Information is presented on the rebreeding performance of 3-year-olds in table 2 and of 4- and 5-year-olds in table 4. Least squares means for cow weight at fall palpation time and fall hip height measurements are also included in these tables. Preweaning growth and calf crop percentages are provided in tables 1 and 3 for calves from these same cows.

CYCLE I, PHASE 3

The mating plans to produce Cycle I, Phase 3 calves are shown in appendix table 3.

First Calf Crop, 2-Year-Old Cows. As yearling heifers, the Cycle I, Phase 2 females were bred by AI to 16 Hereford, 25 Angus, 14 Brahman, 12 Devon and 13 Holstein sires for 45 to 46 days followed by a 21- to 24-day cleanup mating period to Hereford and Angus sires to produce their first calf crops as 2-year-olds in the spring of 1972, 1973 and 1974. Information on calving difficulty and growth to weaning of calves resulting from these matings are available in a previous report (ARS-NC-22, Progress Report, No. 2, 1975).

Postweaning Growth and Carcass Traits. After weaning at an average age of about 210 days in 1972 and 1973 and at about 184 days in 1974, the steers produced by 2-year-old cows were fed the rations shown in table 5 for 246, 228 and 324 days, respectively, and then slaughtered. Data on postweaning growth and carcass characteristics are presented in table 6 according to breed of the steer's dam and in table 7 according to breed of the steer's sire. Those data were analyzed by least squares procedures with a model that included effects of year, breed of dam's sire, breed of dam's dam, breed of steer's sire and all two-way interactions.

Postweaning Growth, Puberty and Conception. The heifers produced by the Cycle I, Phase 2 cows as 2-year-olds sired by Hereford, Angus, Brahman, Devon and Holstein sires were maintained in the feedlot from weaning (mid-October of 1972 and 1973; September 23 in 1974) until spring (May 16, 1973; May 24, 1974; April 17, 1975) when they were turned on improved cool season pasture to be mated naturally to Red Poll sires.

The heifers born in 1972 were fed free-choice a ration consisting of 50% corn silage, 50% haylage supplemented with protein and minerals to meet requirements as recommended by the National Research Council. The 1973 heifers were fed free-choice a ration consisting of 50% corn silage, 25% alfalfa haylage and 25% grass haylage. The 1974 heifers were started on 50% corn silage, 50% alfalfa haylage but gradually changed to a ration consisting of 81% corn silage, 15% wheatlage and 4% supplement to meet protein and mineral requirements for the last 4 months of the wintering period.

Heifers were observed for estrus twice daily from an average of about 240 days of age through the end of the breeding season at about 16 months of age. Date of puberty was defined as the date of the first observed standing estrus confirmed by a second observed estrus within 45 days. Puberty weight was calculated by adding weaning weight to postweaning average daily gain times days from weaning to puberty.

Adjusted values were determined for age and weight at puberty for each breed group because estrus was not detected in all animals. The observed average ages and weights at puberty were biased downward by differing degrees, depending upon the percentage of heifers detected in estrus by the end of the breeding season. The mean age (or weight) at puberty was adjusted by subtracting $i\sigma$, where i is the expected (negative) deviation in σ (standard deviation) units from the true mean for the selected sample of observed ages (or weights) at puberty. Data on the postweaning growth, puberty and conception of these heifers are presented in table 8 according to breed of their dam and in table 9 according to breed of their sire. The analytical model was the same as that for the Cycle I, Phase 3 steers out of 2-year-old cows.

Second Calf Crop, 3-Year-Old Cows. As 2-year-olds, the Cycle I, Phase 2 females were bred to 19 Hereford, 20 Angus, 11 Gelbvieh, 18 Maine Anjou and 16 Chianina sires (42 to 45 days AI and 22 days cleanup to Hereford and Angus sires) to produce their second calf crop as 3-year-olds in the spring of 1973, 1974 and 1975. Information on the calving difficulty according to breed of calf's sire are given in table 10 and corresponding information on calf mortality, birth weight and growth to weaning are provided in table 11. These data were analyzed by least squares procedures using a model that included effects of breed of calf's sire, breed of dam's sire, breed of dam's dam, year of birth, sex and all two-way interactions.

CYCLE II, PHASE 2

Cows. The foundation Hereford and Angus cows used in Cycle I were continued in Cycle II of the program. The cows calving in 1973 were 4 to 8 years of age and in 1974 were 4 to 9 years of age. As previously indicated, mature Brown Swiss and Red Poll cows were added to these herds for the 1972 and 1973 breeding seasons.

Sires. In Cycle II, 15 Hereford, 16 Angus, 16 Red Poll, 11 Brown Swiss, 11 Gelbvieh, 18 Maine Anjou and 20 Chianina bulls were used during the 1972 and 1973 breeding seasons. The Hereford and Angus sires had also been used in Cycle I of the program and the other bulls were sampled from commercial organizations. The Brown Swiss sires included four domestic bulls and seven bulls imported into Canada from Switzerland and Germany.

Calving Difficulty and Preweaning Growth. Data on calving difficulty and preweaning growth for both calf crops produced (1973-74) in Cycle II, Phase 2 were summarized in a previous report (ARS-NC-22, Progress Report No. 2, 1975).

Postweaning Growth and Feed Efficiency. Postweaning growth and feed efficiency for steers produced in the 1973 calf crop are available in a previous report (ARS-NC-22, Progress Report No. 2, 1975). The present report summarizes growth and feed efficiency data obtained on 513 steers from the 1974 calf crop. Rations are presented in table 12. The number of steers per subclass and feed efficiency information are presented in table 13. Summaries of average daily gain and adjusted final weights are presented in table 14 for steers out of Hereford and Angus dams and in table 21 for steers by Hereford, Angus, Red Poll and Brown Swiss sires. The steers were serially slaughtered as described in the carcass and meats section.

At weaning, steer calves with adjusted weaning weights more than three standard deviations below the mean for their breeding group were removed from the program. There were few calves in this category. The remaining steers were placed in the feedlot in separate replicated pens by the following breed groups:

- Hereford and Angus straightbreds
- Hereford-Angus reciprocal crosses
- Red Poll-Hereford and Red Poll-Angus reciprocal crosses
- Brown Swiss-Hereford and Brown Swiss-Angus reciprocal crosses
- Gelbvieh-Hereford and Gelbvieh-Angus
- Maine Anjou-Hereford and Maine Anjou-Angus
- Chianina-Hereford and Chianina-Angus
- Red Poll and Brown Swiss straightbreds and reciprocal crosses (1 pen only)

The postweaning average daily gains are based on actual weaning weights (no weaning shrink) and final weights at slaughter. Final weights at slaughter were obtained as the average of two weights (on feed and water) taken on different days to reduce errors due to differences in fill. Adjusted final weights were obtained by adding the sum of postweaning average daily gain x days on feed, to weaning weight adjusted to 200 days of age. Average daily gains and adjusted final weights for the different slaughter groups are for only the steers slaughtered in that group. Feed efficiency for each breed group was obtained by dividing the cumulative average daily TDN consumption per steer by the average daily gain of the steers remaining on feed up to each of the slaughter dates. The measurement of feed efficiency began after about a 30-day conditioning period. Metabolizable energy (Mcal) was obtained by multiplying pounds TDN by 1.64. TDN contents of the diets were estimated by the use of TDN values for the component feedstuffs (National Research Council) and in most cases laboratory determined dry matter and crude protein.

Postweaning growth was analyzed by least-squares procedures for unequal subclass numbers using a model that included the effects of slaughter group, breed of dam, age of dam, breed of sire within slaughter group, breed of dam by breed of sire within slaughter group and breed of dam by slaughter group. The feed efficiency data are unweighted averages of pen means.

Carcass and Meats. Steers out of Red Poll and Brown Swiss cows and those by Hereford, Angus and Red Poll sires were serially slaughtered after 254, 282 and 318 days postweaning. Steers sired by Gelbvieh, Maine Anjou and Chianina bulls were serially slaughtered after 282, 318, 352 and 387 days postweaning. Steers by Brown Swiss bulls and out of Hereford and Angus cows were slaughtered at all five slaughter dates.

Steers were transported to a commercial slaughter plant approximately 12 hours before slaughter. Carcass data were obtained after a 24-hour chill. Carcasses were evaluated for conformation, maturity, marbling, color, texture and firmness and USDA Quality Grade (as revised, 1976) by representatives of the U.S. Meat Animal Research Center; Standardization Branch, Agricultural Marketing Service, USDA; and Kansas State University. Ribeye area and 12th rib fat thickness were measured and USDA Yield Grade determined. These results are presented in tables 15 to 17 for steers out of Hereford and Angus cows and in tables 22 and 23 for steers out of Hereford, Angus, Red Poll and Brown Swiss sires and dams. In addition, selected linear carcass measurements and measures of other traits were obtained but are not included in this report.

After obtaining carcass cooler data, the right side of each carcass of steers out of Hereford and Angus cows was transported from the commercial slaughter plant to Kansas State University for detailed cut-out and meat quality evaluation. The right side was separated into wholesale cuts which were processed into closely trimmed, boneless retail cuts, except that dorsal and transverse spinous processes were left in short loin cuts and dorsal spinous processes and rib bones were left in rib cuts. No more than 0.30 inch of fat was left on any surface. The amounts of retail product, fat trim and bone were determined for each wholesale cut. These results are presented on a percentage of carcass weight basis in table 18 and the yield of boneless, closely trimmed beef from the primal cuts is presented in table 19.

One steak was removed at the 11th rib from each carcass for Warner-Bratzler shear determinations of tenderness. The steaks were cooked at 350° F to an internal temperature of 150° F. After cooling for approximately 30 minutes at room temperature, one-half inch cores were removed for shear determination. Steaks were removed at the 10th rib from four representative carcasses per breed group per slaughter date, cooked at 350° F to an internal temperature of 150° F, and subjected to taste panel evaluation for tenderness, flavor, juiciness and overall acceptability by trained taste panelists. These results are presented in tables 19 and 20.

The data for the carcass and meat traits were analyzed by least-squares procedures for unequal subclass numbers using the same model as used for postweaning growth.

Postweaning Growth, Puberty and Conception. Postweaning growth, age at puberty and conception of yearling heifers born in 1973 and 1974 are presented in table 24 for those out of Hereford and Angus cows and in table 25 for those by Hereford, Angus, Red Poll and Brown Swiss bulls. The heifers were developed in the feedlot from weaning (in October, 1973 and September, 1974) until mid-April. The postweaning ration was 50% corn silage and 50% alfalfa haylage fed free choice. The 1973 heifers were grazed on improved cool season pastures until the end of a 42-day AI period which began May 20 and then moved to improved warm season pastures before a 22-day cleanup period. The 1974 born heifers were also mated by AI for 42 days beginning on May 19 followed by a 22-day cleanup period. The 1974 heifers were moved from improved cool season pasture to warm season pasture 10 days before the 22-day cleanup period.

Date of puberty, defined as date of the first observed standing estrus, confirmed by a subsequent estrus observed within 45 days, was determined by checking animals for estrus twice daily. Weights were taken every 28 days from weaning to the breeding period and again at the termination of the breeding period. Heifers were inseminated only after they were observed in standing estrus. Estrus was determined from weaning to an average of approximately 16 months of age (end of breeding season). Age and weight at puberty were computed using the same procedures as previously described for Cycle I, Phase 3 heifers.

Postweaning growth, puberty and conception traits were analyzed by least-squares procedures using a model that included the effects of breed of sire, breed of dam, breed of sire by breed of dam and age of dam.

Calving and Rebreding of 2-Year-Olds. Data on calving difficulty, calf crop percentage and birth and weaning weights of calves from 2-year-old dams (born in 1973) are presented in table 26 for cows out of Hereford and Angus dams. Data on rebreeding performance and size as 2-year-olds are given for the corresponding breed groups in table 27. The Cycle II, Phase 2 yearling heifers were bred by AI to calve as 2-year-olds to Hereford, Angus, Brangus and Santa Gertrudis bulls (appendix table 4). The calving and rebreeding data on the 1974 heifers born in Cycle II, Phase 2 are not yet available. Thus, the data presented in tables 26 and 27 are preliminary representing that for only the first of 2 years that will be obtained. Because of small subclass numbers, calving and rebreeding data on cows out of Red Poll and Brown Swiss dams will not be reported until results on both birth years of the cows (1973 and 1974) calving in 1975 and 1976 are available.

CYCLE II, PHASE 3

Sires. The mating plans to produce Cycle II, Phase 3 calves are presented in appendix table 4. There were 13 Hereford, 14 Angus, 6 Santa Gertrudis and 9 Brangus sires used by AI to produce the first (1975) of two calf crops. These sires were sampled from commercial organizations, with the Hereford and Angus sires being the same as used in other cycles and phases of the program. Calves resulting from cleanup matings to Hereford and Angus sires were also included in this summary.

Calving Difficulty. Calving difficulty (table 28) of 206 calves were analyzed by least squares procedures with a model that included breed of dam's sire, breed of dam's dam, breed of calf's sire, sex and all two-way interactions. Calves resulting from cleanup matings to Hereford and Angus sires were classified as a different sire breed than those resulting from AI matings. The same system of scoring calving difficulty was used as described for other cycles and phases of the program.

Prewaning Growth. Prewaning growth data (table 29) for 173 calves were analyzed by the same analytical model as calving difficulty. The data were adjusted to a steer basis using adjustment factors calculated from the data and given in the footnote of table 29.

CYCLE III, PHASE 2

Cows. The foundation Hereford and Angus cows used to produce Phase 2 calves in Cycles I and II were continued in Cycle III of the program (appendix table 5). The first of two calf crops to be produced in Cycle III, Phase 2 was produced in 1975 when the cows were from 4 through 10 years of age.

Sires. There were 13 Hereford, 14 Angus, 15 Brahman, 2 Sahiwal, 8 Pinzgauer and 1 Tarentaise sires used during the 1974 breeding season. The Hereford and Angus bulls had also been used in Cycle I and Cycle II of the program and the Brahman bulls were sampled from commercial organizations or purebred Brahman herds. Semen was available from only 2 Sahiwal bulls (imported from Australia) and 1 Tarentaise bull for the 1974 breeding season. Semen was available on 4 additional Sahiwal bulls and 6 additional Tarentaise bulls for the 1975 breeding season to produce the second Cycle III, Phase 2 calf crop in 1976.

A sample of about 16 heifers from each of the Angus-Hereford, Hereford-Angus, Brahman-Hereford, Brahman-Angus, Sahiwal-Hereford, Sahiwal-Angus, Pinzgauer-Hereford and Pinzgauer-Angus breed groups were transferred to the Agricultural Research Service, U.S. Department of Agriculture Station at Brooksville, Florida, for an interregional study cooperative with the Florida Agricultural Experiment Station to evaluate genotype-environment interactions involving maternal traits. A similar sample will be transferred from the

1976 calf crop. These heifers and those remaining at the U.S. Meat Animal Research Center will be mated by natural service to bulls sampled from the same population of Red Poll (for first calf crop) and Brown Swiss or Simmental (second through fourth calf crops) to evaluate reproduction and maternal performance in each environment.

Calving Difficulty. Calving difficulty (table 30) of 942 calves were analyzed by least squares procedures that included the effects of sire breed, breed of dam, age of dam, sex and most two-way interactions. The same system of scoring calving difficulty was used as described above for Cycle I.

Preweaning Growth. Preweaning growth data available on 888 calves (table 31) were analyzed using the same analytical model as for calving difficulty. The data were adjusted to a steer basis with the adjustment factors computed from the data. The adjustment factors are presented in the footnote of table 31.

TABLE 1. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
CALVING DIFFICULTY, CALF CROP PERCENTAGE, CALF MORTALITY, BIRTH WEIGHT AND WEANING WEIGHT OF CALVES FROM 3-YEAR-OLD COWS^a
CYCLE I, PHASE 2 - COWS BORN 1970-71-72

Breed of Cow		No. Calves Born	Type of Parturition, %				Calf Crop, % ^c		Calf Mortality, % ^d		Calf Wt., lb. ^e	
Sire	Dam		No Diff. ^b	Calf- Puller	C- Section	Abn. Pre- sentation	Born	Weaned	Early	Late	Birth	200- Day
Angus Hereford	Hereford	56	71.5	16.8	1.9	9.7	84.8	74.2	8.1	4.4	83.6	429
	Angus	56	65.0	25.6	1.6	7.8	87.5	80.6	5.2	2.7	83.8	411
	Average	112	68.3	21.2	1.8	8.8	86.2	77.4	6.7	3.5	83.7	420
Jersey	Hereford	54	90.7	6.7	0.0	2.9	91.5	82.7	5.3	4.3	78.7	445
	Angus	46	78.8	14.2	0.1	7.0	88.5	83.3	5.1	0.7	76.5	444
	Average	100	84.8	10.5	0.0	4.9	90.0	83.1	5.2	2.5	77.6	444
South Devon	Hereford	50	65.5	23.0	0.3	11.2	83.3	75.4	3.8	5.7	89.0	438
	Angus	46	72.8	14.5	2.3	10.4	86.8	81.2	6.7	0.0	88.9	434
	Average	96	69.2	18.7	1.3	10.8	85.0	78.3	5.3	2.8	89.0	436
Limousin	Hereford	70	73.2	21.5	4.3	1.0	87.5	77.4	2.1	9.4	87.3	431
	Angus	54	80.9	17.4	0.9	0.8	72.0	64.3	3.6	7.1	87.4	429
	Average	124	77.0	19.5	2.6	0.9	79.8	70.9	2.8	8.3	87.4	430
Simmental	Hereford	71	64.7	24.8	8.0	2.5	81.6	73.3	4.9	5.3	91.0	468
	Angus	53	70.6	22.0	4.5	2.9	81.5	73.6	4.1	5.7	86.5	464
	Average	124	67.6	23.4	6.3	2.7	81.6	73.4	4.5	5.5	88.8	466
Charolais	Hereford	62	75.8	18.0	1.6	4.6	83.8	78.9	1.6	4.3	91.0	438
	Angus	46	65.3	22.0	4.0	8.8	85.2	78.3	3.3	4.8	90.5	438
	Average	108	70.6	20.0	2.8	6.7	84.5	78.6	2.4	4.5	90.8	438
Average All Sire Breeds	Hereford	363	73.6	18.5	2.6	5.3	85.4	76.9	4.3	5.6	86.8	442
	Angus	301	72.2	19.3	2.2	6.3	83.6	76.8	4.7	3.4	85.6	437
	Average	664	72.9	18.9	2.4	5.8	84.5	76.9	4.5	4.5	86.2	440

^a Calves from these cows were sired by Hereford, Angus, Gelbvieh, Maine Anjou and Chianina bulls (appendix table 3).

^b No assistance or minor hand assistance.

^c Of cows alive at calving; cows removed from experiment only for serious injury, being open two successive years or by death.

^d Early mortality is within 72 hr of birth; late is from 72 hr after birth until weaning.

^e Adjusted to a steer basis. Least-squares adjustment factors for heifers were 6.7 lb. for birth weight and 18 lb. for 200-day weight.

TABLE 2. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
CALVING DATE, REBREEDING PERFORMANCE AND SIZE OF COWS CALVING AS 3-YEAR-OLDS
CYCLE I, PHASE 2 - COWS BORN IN 1970-71-72

Breed of Cow		No. Calving as 3-Year-Olds	Avg. Calving Date	Postpartum Interval, Days ^a	Percent Pregnant ^b	Cow Wt. at 3½ Yrs. of Age, lb.	Hip Ht. at 3½ Yrs. of Age, in. ^c
Sire	Dam						
Angus Hereford	Hereford	56	April 7	60.9	89.3	968	47.5
	Angus	56	April 8	63.9	94.6	999	47.6
	Average	112	April 8	62.4	92.0	983	47.5
Jersey	Hereford	54	March 31	64.4	98.1	858	47.7
	Angus	46	March 28	68.6	91.3	858	47.6
	Average	100	March 30	66.5	94.7	858	47.6
South Devon	Hereford	50	April 9	64.5	89.8	1035	49.9
	Angus	46	April 7	57.9	82.2	1003	49.2
	Average	96	April 8	61.2	86.0	1019	49.6
Limousin	Hereford	70	April 10	63.8	92.5	1024	50.2
	Angus	54	April 6	62.2	96.3	1017	49.4
	Average	124	April 8	63.0	94.4	1020	49.8
Simmental	Hereford	71	April 7	64.7	95.7	1047	50.3
	Angus	53	April 3	63.7	88.5	1034	49.7
	Average	124	April 5	64.2	92.1	1041	50.0
Charolais	Hereford	62	April 7	62.0	96.7	1100	50.2
	Angus	46	April 7	69.1	86.7	1099	49.5
	Average	108	April 7	65.6	91.7	1100	49.9
Average All Sire Breeds	Hereford	363	April 7	63.4	93.7	1005	49.3
	Angus	301	April 5	64.2	89.9	1002	48.8
	Average	664	April 6	63.8	91.8	1003	49.1

^a Interval from calving to first estrus.

^b Breeding period was 64 days by natural service to Brown Swiss bulls. Percent pregnant = no. palpated as pregnant ÷ no. palpated, and only include cows that calved prior to breeding.

^c Hip height measurements at 3½ years of age available only on 1971 and 1972 born cows.

TABLE 3. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
CALVING DIFFICULTY, CALF CROP PERCENTAGE, CALF MORTALITY, BIRTH WEIGHT & WEANING WEIGHT OF CALVES FROM 4- & 5-YEAR-OLD COWS^a
CYCLE I, PHASE 2 - COWS BORN IN 1970-71

Breed of Cow		No. Calves Born	Type of Parturition, %				Calf Crop, % ^c		Calf Mortality, % ^d		Calf Wt., lb. ^e	
Sire	Dam		No Diff. ^b	Calf- Puller	C- Section	Abn. Pre- sentation	Born	Weaned	Early	Late	Birth	200- Day
Angus Hereford	Hereford	61	98.4	1.7	0.0	0.0	95.5	92.3	1.9	1.6	91.7	483
	Angus	66	91.7	5.2	1.6	1.5	95.7	90.0	4.6	1.4	92.3	465
	Average	127	95.0	3.5	0.8	0.7	95.6	91.1	3.2	1.5	92.0	474
Jersey	Hereford	69	95.7	4.2	0.0	0.2	94.6	83.5	5.8	5.9	85.9	499
	Angus	42	97.7	0.1	0.0	2.3	89.6	76.9	6.7	7.5	81.2	488
	Average	111	96.7	2.1	0.0	1.2	92.1	80.2	6.3	6.7	83.6	494
South Devon	Hereford	44	90.8	4.6	2.4	2.3	93.9	93.7	0.2	0.0	97.0	491
	Angus	45	89.9	6.0	0.0	4.2	90.7	89.2	1.6	0.1	94.3	487
	Average	89	90.3	5.3	1.2	3.2	92.3	91.5	0.9	0.0	95.7	489
Limousin	Hereford	61	94.1	4.4	0.0	1.6	93.6	85.8	6.6	1.7	94.6	482
	Angus	75	86.7	9.3	0.0	4.0	98.7	87.9	11.0	0.0	92.1	469
	Average	136	90.4	6.8	0.0	2.8	96.2	87.0	8.8	0.8	93.4	476
Simmental	Hereford	70	86.5	12.0	0.1	1.3	94.6	88.4	4.9	1.8	96.6	526
	Angus	66	94.0	4.5	0.0	1.5	94.5	86.2	5.9	2.9	92.4	513
	Average	136	90.3	8.3	0.0	1.4	94.6	87.3	5.4	2.3	94.5	520
Charolais	Hereford	77	88.6	6.9	2.2	2.3	97.2	82.0	12.6	2.9	97.1	502
	Angus	38	95.5	4.8	0.1	0.0	92.8	86.9	1.8	4.6	99.9	504
	Average	115	92.0	5.9	1.2	1.1	95.0	84.6	7.2	3.8	98.5	503
Average All Sire Breeds	Hereford	382	92.3	5.6	0.8	1.3	94.9	87.7	5.3	2.3	93.8	497
	Angus	332	92.6	5.0	0.3	2.2	93.7	86.2	5.3	2.7	92.0	488
	Average	714	92.5	5.3	0.5	1.7	94.3	86.9	5.3	2.5	92.9	493

^a Calves from these cows were sired by Brown Swiss bulls (appendix table 3).

^b No assistance or minor hand assistance.

^c Of cows alive at calving; cows removed from experiment only for serious injury, being open two successive years or by death.

^d Early mortality is within 72 hr of birth; late is from 72 hr after birth until weaning.

^e Adjusted to a steer basis. Least-squares adjustment factors for heifers were 6.2 lb. for birth weight and 31 lb. for 200-day weight.

TABLE 4. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
CALVING DATE, REBREEDING PERFORMANCE AND SIZE OF COWS CALVING AS 4- AND 5-YEAR-OLDS
CYCLE I, PHASE 2 - COWS BORN IN 1970-71

Breed of Cow		No. Calving as		Avg. Calving Date	Postpartum Interval, Days ^a	Percent Pregnant	Cow Weight, lb.		Hip Height, in.	
Sire	Dam	4-Yr.- Olds	5-Yr.- Olds				4½ Yrs.	5½ Yrs.	4½ Yrs.	5½ Yrs.
Angus Hereford	Hereford	41	20	April 4	63.3	96.7	1013	1054	47.7	48.1
	Angus	43	23	April 3	57.0	97.0	1036	1108	47.8	48.2
	Average	84	43	April 4	60.2	96.8	1025	1081	47.7	48.2
Jersey	Hereford	47	22	March 29	62.5	92.8	901	1002	48.1	48.4
	Angus	29	13	March 26	65.0	89.9	885	972	46.9	47.3
	Average	76	35	March 28	63.8	91.4	893	987	47.5	47.9
South Devon	Hereford	30	14	April 5	64.0	93.0	1051	1127	49.7	50.2
	Angus	31	14	April 4	60.7	95.5	1062	1146	49.3	50.4
	Average	61	28	April 4	62.4	94.2	1056	1136	49.5	50.3
Limousin	Hereford	36	25	April 8	58.2	98.7	1037	1140	49.8	50.2
	Angus	50	25	April 3	67.4	96.0	1040	1138	49.1	49.4
	Average	86	50	April 5	62.8	97.4	1038	1139	49.4	49.8
Simmental	Hereford	49	21	April 9	58.1	98.4	1092	1189	50.7	51.5
	Angus	44	22	April 5	61.8	95.5	1060	1145	49.6	50.5
	Average	93	43	April 7	60.0	97.0	1076	1167	50.2	51.0
Charolais	Hereford	46	31	April 6	58.8	97.4	1146	1204	50.1	50.4
	Angus	26	12	April 7	56.6	91.9	1146	1260	50.2	51.1
	Average	72	43	April 7	57.7	94.6	1146	1232	50.1	50.7
Average	Hereford	249	133	April 5	60.8	96.2	1040	1119	49.4	49.8
All Sire	Angus	223	109	April 3	61.4	94.3	1038	1128	48.8	49.5
Breeds	Average	472	242	April 4	61.1	95.2	1039	1124	49.1	49.6

^a Interval from calving to first estrus. Data on 4-year-old cows only.

^b Breeding period was 64 days by natural service to Brown Swiss bulls. Percent pregnant = no. palpated as pregnant ÷ no. palpated, and only include cows that calved prior to breeding.

TABLE 5. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
STEER POSTWEANING FEEDLOT RATIONS
CYCLE I, PHASE 3 - 1972-73-74 CALF CROPS

Calf-Crop, Year	Period	Ingredients					Ration Analyses, 100% D.M. Basis ^a				
		Corn Silage, %	Alfalfa Haylage, %	Corn, %	Sor- ghum %	Wheat, %	Supple- ment, %	C.P., %	D.P., %	TDN, %	Mcal M.E./lb.
1972	Nov. 22 - Jan. 11	75.0		7.2	5.4	5.4	7.0	14.2	10.5	75.6	1.24
	Jan. 12 - Mar. 9	60.0		13.2	9.9	9.9	7.0	14.0	10.5	79.1	1.30
	Mar. 10 - May 16	60.0		12.5	9.4	9.4	8.8	14.0	10.5	79.1	1.30
	May 17 - May 23	45.0		19.5	14.6	14.6	6.3	13.1	9.7	82.2	1.35
	May 24 - Slaughter	30.0		26.8	20.1	20.1	3.1	12.2	9.0	84.7	1.39
1973	Dec. 14 - Dec. 19	40.0	20.0	18.5	18.5		3.0	12.4	8.5	76.9	1.26
	Dec. 20 - Jan. 16	30.0	20.0	23.5	23.5		3.0	12.5	8.3	78.6	1.29
	Jan. 17 - Feb. 13	20.0	20.0	29.3	29.3		1.5	11.9	8.0	80.2	1.32
	Feb. 14 - Mar. 7	10.0	20.0	34.3	34.3		1.5	12.0	8.1	81.5	1.34
	Mar. 8	10.0	20.0	34.3	34.3		1.5	12.1	8.4	81.6	1.34
	Mar. 9 - Mar. 11	10.0	20.0	34.0	34.0		2.0	12.8	8.7	81.1	1.33
	Mar. 12 - Mar. 13	10.0	20.0	33.0	33.0		4.0	13.6	9.3	80.4	1.32
	Mar. 14 - Slaughter		20.0	38.0	38.0		4.0	13.6	9.3	81.6	1.34
1974	Nov. 16 - Dec. 5 ^b	60.0	20.0	18.0			2.0	11.9	8.0	73.6	1.21
	Dec. 6 - Dec. 14 ^b	62.0	20.0	18.0			0.0	10.4	6.7	73.3	1.20
	Dec. 15 ^b	57.0	20.0	23.0			0.0	10.5	6.8	74.9	1.23
	Dec. 16 - Jan. 13	55.0	20.0	23.0			2.0	11.9	8.1	75.2	1.23
	Jan. 14 - Feb. 7	50.0	20.0	28.0			2.0	11.9	8.2	76.7	1.26
	Feb. 8 - July 3	45.0	20.0	33.0			2.0	11.9	8.2	78.0	1.28
	July 4 - July 7	38.0	20.0	40.0			2.0	11.9	8.3	79.6	1.31
	July 8 - July 11	30.0	20.0	48.0			2.0	11.8	8.4	81.3	1.33
	July 12 - Slaughter	23.0	20.0	55.0			2.0	11.8	8.5	82.5	1.35

^a Estimated composition based on proximate analysis.

^b In addition, medicated stress feed was fed at the rate of $\frac{1}{2}$ lb. per head per day from Dec. 5-15. The stress feed was 80% soybean meal, 15.3% corn, and 4.7% vitamin ADE and chlortetracycline. Crude protein level was 42.7%, digestible protein level was 36.2%, TDN was 78.7% and ME Mcal/lb. was 1.28.

TABLE 6. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
POSTWEANING GROWTH AND CARCASS CHARACTERISTICS OF STEERS OUT OF 2-YEAR-OLD COWS BY BREED OF DAM
CYCLE I, PHASE 3 - STEERS BORN IN 1972-73-74

Breed of Steer's Dam ^a		No.	Post- wng.	Adj.	Final	Hot	Dress-	USDA	Marb-	USDA	Rib- eye	Fat	% Kid.	Est.
Sire	Dam	Steers	ADG	Final Wt.	Wt. Ratio ^b	Carcass Wt.	ing %	Qual. Grade ^c	ling Score ^d	Yield Grade	Area, sq. in.	Thick.	Pel. Heart Fat	Cut. % ^e
Angus Hereford	Hereford	20	2.37	1016	101.1	610	60.1	11.3	10.5	3.1	10.6	.44	2.9	49.6
	Angus	17	2.31	993	98.8	602	60.2	11.6	11.2	3.3	10.0	.47	2.9	49.1
	Average	37	2.34	1005	100.0	606	60.1	11.4	10.8	3.2	10.3	.45	2.9	49.4
Jersey	Hereford	22	2.26	1015	101.0	611	59.8	11.4	10.6	3.3	10.5	.45	3.2	49.1
	Angus	19	2.06	961	95.6	584	60.0	11.2	10.1	3.0	10.3	.41	2.9	49.8
	Average	41	2.16	988	98.3	598	59.9	11.3	10.4	3.1	10.4	.43	3.1	49.4
South Devon	Hereford	24	2.37	1015	101.0	605	59.8	11.3	10.4	2.9	10.6	.35	2.9	50.2
	Angus	19	2.37	1035	103.0	620	59.9	10.6	9.2	2.8	10.9	.37	2.5	50.6
	Average	43	2.37	1025	102.0	612	59.8	11.0	9.8	2.8	10.8	.36	2.7	50.4
Limousin	Hereford	28	2.38	1010	100.5	612	61.0	11.0	9.6	2.9	10.8	.40	2.8	50.1
	Angus	22	2.34	1018	101.3	621	61.2	10.0	8.4	2.5	11.6	.36	2.3	51.2
	Average	50	2.36	1014	100.9	616	61.1	10.5	9.0	2.7	11.2	.38	2.6	50.7
Simmental	Hereford	32	2.39	1049	104.4	634	60.4	10.8	9.8	2.7	11.1	.33	2.6	50.7
	Angus	30	2.22	1005	100.0	610	60.0	10.7	9.6	2.6	11.0	.33	2.6	50.8
	Average	62	2.30	1027	102.2	622	60.2	10.8	9.7	2.7	11.1	.33	2.6	50.8
Charolais	Hereford	23	2.44	1049	104.4	629	59.9	10.3	8.8	2.6	11.1	.32	2.6	50.8
	Angus	19	2.27	1008	100.3	611	59.8	10.5	9.2	2.6	11.2	.36	2.5	50.8
	Average	42	2.36	1028	102.3	620	59.9	10.4	9.0	2.6	11.1	.34	2.6	50.8
Average All Sire Breeds	Hereford	149	2.37	1026	102.1	617	60.2	11.0	10.0	2.9	10.8	.38	2.8	50.1
	Angus	126	2.26	1003	99.8	608	60.2	10.8	9.6	2.8	10.8	.38	2.6	50.4
	Average	275	2.32	1014	100.9	612	60.2	10.9	9.8	2.9	10.8	.38	2.7	50.2

^a Calves from these cows were sired by Hereford, Angus, Devon, Holstein and Brahman bulls (appendix table 3).

^b Ratio computed relative to 1005 lb. average for Hereford and Angus sired calves.

^c U.S.D.A. Quality Grade as revised in 1976; 10 = average good, 11 = high good, 12 = low choice, 13 = average choice, etc.

^d Marbling Score: 9 = slight+, 10 = small-, 21 = slightly abundant+.

^e Estimated cutability = 52.56 - 4.95 (single fat thickness, adj., in.) - 1.06 (est. kidney, pelvic and heart fat, %)+0.682 (rib-eye area, sq. in.) - .008 (carcass wt., lb.).

TABLE 7. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
POSTWEANING GROWTH AND CARCASS CHARACTERISTICS OF STEERS OUT OF 2-YEAR-OLD COWS BY BREED OF SIRE
CYCLE I, PHASE 3 - STEERS BORN IN 1972-73-74

Breed of Steer		No. Steers	Post- wng. ADG	Adj. Final Wt.	Final Wt. Ratio ^b	Hot Carcass Wt.	Dress- ing %	USDA Qual. Grade ^c	Marb- ling Score ^d	USDA Yield Grade	Rib- eye Area sq. in.	Fat Thick.	% Kid. Pel. Heart Fat	Est. Cut. % ^e
Sire	Dam ^a													
Angus Hereford	Hereford-Crosses	53	2.35	993	98.8	591	60.4	11.8	11.2	3.0	10.7	.46	2.9	49.8
	Angus-Crosses	35	2.36	1018	101.3	615	60.6	11.3	10.0	3.1	10.9	.47	2.7	49.9
	Average	88	2.35	1005	100.0	603	60.5	11.6	10.6	3.0	10.8	.46	2.8	49.9
Brahman	Hereford-Crosses	30	2.41	1079	107.4	659	61.4	10.1	8.4	3.2	10.8	.42	2.9	49.5
	Angus-Crosses	34	2.19	1017	101.2	618	60.9	9.9	8.2	3.0	10.7	.42	2.6	50.1
	Average	64	2.30	1048	104.4	638	61.2	10.0	8.3	3.1	10.7	.42	2.7	49.8
Devon	Hereford-Crosses	29	2.23	979	97.4	587	59.7	11.1	10.3	2.9	10.6	.39	3.0	49.9
	Angus-Crosses	26	2.12	960	95.5	592	60.9	11.0	10.3	2.8	10.9	.38	3.0	50.2
	Average	55	2.18	970	96.5	590	60.3	11.1	10.3	2.9	10.8	.38	3.0	50.1
Holstein	Hereford-Crosses	37	2.49	1052	104.7	631	59.2	11.0	9.8	2.5	11.0	.26	2.5	51.1
	Angus-Crosses	31	2.37	1018	101.3	606	58.3	11.0	10.0	2.4	10.8	.26	2.3	51.4
	Average	68	2.43	1035	103.0	619	58.7	11.0	9.9	2.5	10.9	.26	2.4	51.2
Average	Hereford-Crosses	149	2.37	1026	102.1	617	60.2	11.0	10.0	2.9	10.8	.38	2.8	50.1
All Sire	Angus-Crosses	126	2.26	1003	99.8	608	60.2	10.8	9.6	2.8	10.8	.38	2.6	50.4
Breeds	Average	275	2.32	1014	100.9	612	60.2	10.9	9.8	2.9	10.8	.38	2.7	50.2

^a Two-way-cross cows mated as shown in appendix table 3.

^b Ratio computed relative to 1005 lb. average for Hereford and Angus sired calves.

^c U.S.D.A. Quality Grade as revised in 1976; 10 = average good, 11 = high good, 12 = low choice, 13 = average choice, etc.

^d Marbling Score: 9 = slight+, 10 = small-, 21 = slightly abundant+.

^e Estimated cutability = 52.56 - 4.95 (single fat thickness, adj. in.) - 1.06 (est. kidney, pelvic and heart fat, %)
+ 0.682 (rib-eye area, sq. in.) - .008 (carcass wt., lb.).

TABLE 8. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
POSTWEANING GROWTH, PUBERTY AND CONCEPTION OF HEIFERS OUT OF 2-YEAR-OLD COWS BY BREED OF DAM
CYCLE I, PHASE 3 HEIFERS BORN IN 1972-73-74

Breed of Heifer's Dam ^a		No. Heifers	200-Day Postwn. ADG, lb.	Adj. 400-Day Wt., lb. ^b	Adj. 550-Day Wt., lb. ^c	Reaching Puberty, % ^d	Adjusted ^e		Percent Pregnant ^f
Sire	Dam						Puberty Age, Days	Puberty Wt., lb.	
Angus Hereford	Hereford	18	1.19	630	777	87.0	404	680	88.9
	Angus	23	1.20	581	726	93.0	398	596	91.3
	Average	41	1.20	605	751	90.0	401	638	90.1
Jersey	Hereford	24	1.06	606	759	89.5	374	622	100.0
	Angus	21	1.08	615	770	95.0	361	604	100.0
	Average	45	1.07	611	765	92.2	368	613	100.0
South Devon	Hereford	21	1.22	631	796	83.8	389	633	90.5
	Angus	19	1.20	638	791	91.6	375	606	94.7
	Average	40	1.21	634	794	87.7	382	619	92.6
Limousin	Hereford	17	1.19	623	791	88.2	415	678	82.4
	Angus	30	1.23	656	810	96.4	390	651	83.3
	Average	47	1.21	639	800	92.3	402	664	82.8
Simmental	Hereford	32	1.22	651	815	89.4	382	657	93.8
	Angus	17	1.28	652	804	100.0	368	614	100.0
	Average	49	1.25	651	810	95.0	375	636	96.9
Charolais	Hereford	30	1.22	644	806	96.0	401	669	96.7
	Angus	15	1.25	623	799	96.7	397	627	93.3
	Average	45	1.23	633	803	96.4	399	648	95.0
Average	Hereford	142	1.18	631	791	89.0	394	656	92.1
All Sire	Angus	125	1.21	627	783	95.6	382	616	93.8
Breeds	Average	267	1.20	629	787	92.3	388	636	93.0

^a Calves from these cows were sired by Hereford, Angus, Devon, Holstein and Brahman bulls (appendix table 3).

^b Adjusted 400-day wt. = 200-day wt. + (200-day postweaning ADG x 200 days).

^c Adjusted 550-day wt. = 200-day wt. + (350-day postweaning ADG x 350 days).

^d Estrus was determined from weaning to an average of approximately 16 months of age.

^e Adjusted to comparable values if puberty had been detected in 100% of the heifers in all breed groups.

^f The breeding period was about 56 days natural service by Red Poll bulls.

TABLE 9. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
POSTWEANING GROWTH, PUBERTY AND CONCEPTION OF HEIFERS OUT OF 2-YEAR-OLD COWS BY BREED OF SIRE
CYCLE I, PHASE 3 HEIFERS BORN IN 1972-73-74

Breed of Heifer		No. Heifers	200-Day Postwn. ADG., lb.	Adj. 400-Day Wt., lb. ^b	Adj. 550-Day Wt., lb. ^c	Reaching Puberty, % ^d	Adjusted ^e		Percent Pregnant ^f
Sire	Dam ^a						Puberty Age, Days	Puberty Wt., lb.	
Angus Hereford	Hereford-Crosses	49	1.18	634	778	92.0	379	626	93.9
	Angus-Crosses	53	1.21	621	770	91.8	389	623	90.6
	Average	102	1.20	627	774	91.9	384	624	92.3
Brahman	Hereford-Crosses	31	1.16	658	826	69.8	427	774	83.9
	Angus-Crosses	17	1.17	631	787	90.4	396	638	100.0
	Average	48	1.17	645	806	80.1	412	706	92.0
Devon	Hereford-Crosses	34	1.12	595	745	95.3	393	616	94.1
	Angus-Crosses	33	1.18	615	772	99.6	377	601	90.9
	Average	67	1.15	605	758	97.5	385	609	92.5
Holstein	Hereford-Crosses	28	1.27	637	815	98.6	376	607	100.0
	Angus-Crosses	22	1.27	642	805	100.0	362	601	95.5
	Average	50	1.27	640	810	99.3	369	604	97.8
Average All Sire Breeds	Hereford-Crosses	142	1.18	631	791	89.0	394	656	93.0
	Angus-Crosses	125	1.21	627	783	95.5	382	616	94.2
	Average	267	1.20	629	787	92.3	388	636	93.6

^a Two-way-cross cows mated as shown in appendix table 3.

^b Adjusted 400-day wt. = 200-day wt. + (200-day postweaning ADG x 200 days).

^c Adjusted 550-day wt. = 200-day wt. + (350-day postweaning ADG x 350 days).

^d Estrus was determined from weaning to an average of approximately 16 months of age.

^e Adjusted to comparable values if puberty had been detected in 100% of the heifers in all breed groups.

^f The breeding period was about 56 days natural service by Red Poll bulls.

TABLE 10. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
CALVING DIFFICULTY OF CALVES FROM 3-YEAR-OLD COWS
CYCLE I, PHASE 3 - 1973-74-75 CALF CROPS

Breed of Calf		No. Calves Born	Type of Parturition, %			
Sire	Dam ^a		No Calving Difficulty ^b	Calf- Puller	C-Section	Abnormal Presentation
Angus	Hereford-Crosses	146	92.5	2.2	0.4	4.9
Hereford	Angus-Crosses	109	88.1	9.9	0.2	1.8
	Average	255	90.3	6.1	0.3	3.3
Gelbvieh	Hereford-Crosses	69	76.1	17.8	0.0	6.4
	Angus-Crosses	68	75.3	14.5	3.5	6.7
	Average	137	75.7	16.2	1.7	6.5
Maine Anjou	Hereford-Crosses	81	63.7	24.9	5.6	5.7
	Angus-Crosses	63	59.3	24.5	1.2	14.9
	Average	144	61.5	24.7	3.4	10.3
Chianina	Hereford-Crosses	65	61.9	28.9	4.9	4.2
	Angus-Crosses	63	66.2	28.1	3.9	1.7
	Average	128	64.1	28.5	4.4	3.0
Average	Hereford-Crosses	361	73.6	18.5	2.7	5.3
All Sire	Angus-Crosses	303	72.2	19.3	2.2	6.3
Breeds	Average	664	72.9	18.9	2.4	5.8

^a Two-way-cross cows mated as shown in appendix table 3. Angus and Hereford sired calves include both AI and clean up matings.

^b No assistance or minor hand assistance.

TABLE 11. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
BIRTH DATE, CALF MORTALITY, BIRTH WEIGHT AND PREWEANING GROWTH OF CALVES FROM 3-YEAR-OLD COWS
CYCLE I, PHASE 3 - 1973-74-75 CALF CROPS

Breed of Calf		No. Calves Weaned ^b	Birth Date	Calf Mortality ^c		Calf Wt., lb. ^d		Prewn. ADG, lb. ^d	200-Day Wt. Ratio ^e
Sire	Dam ^a			Early	Late	Birth	200- Day		
Angus Hereford	Hereford-Crosses	134	April 17	4.0	2.8	77.8	420	1.70	100.5
	Angus-Crosses	102	April 19	3.4	1.9	80.2	415	1.67	99.3
	Average	236	April 18	3.7	2.3	79.0	418	1.69	100.0
Gelbvieh	Hereford-Crosses	64	April 4	2.5	3.9	85.6	449	1.82	107.4
	Angus-Crosses	64	March 30	6.9	0.0	85.7	447	1.80	106.9
	Average	128	April 1	4.7	1.9	85.7	448	1.81	107.2
Maine Anjou	Hereford-Crosses	72	April 4	4.5	4.4	91.4	441	1.75	105.5
	Angus-Crosses	53	March 30	5.8	6.4	87.1	433	1.73	103.6
	Average	125	April 1	5.2	5.4	89.3	437	1.74	104.5
Chianina	Hereford-Crosses	53	April 3	6.1	11.2	92.2	456	1.81	109.1
	Angus-Crosses	57	April 2	2.6	6.2	89.4	452	1.80	108.1
	Average	110	April 2	4.3	8.7	90.8	454	1.81	108.6
Average All Sire Breeds	Hereford-Crosses	323	April 7	4.3	5.6	86.8	442	1.77	105.7
	Angus-Crosses	276	April 5	4.7	3.4	85.6	437	1.75	104.5
	Average	599	April 6	4.5	4.5	86.2	439	1.76	105.0

^a Two-way-cross cows mated as shown in appendix table 3. Angus and Hereford sired calves include both AI and clean up matings.

^b Birth traits calculated from all calves born. Weaning traits calculated from all calves weaned and raised by their own dam.

^c Early mortality is within 72 hr of birth; late is from 72 hr after birth until weaning.

^d Adjusted to a steer basis. Least-squares adjustment factors for heifers were 6.7 lb. for birth weight, 18 lb. for 200-day weight and .05 lb./day for ADG.

^e Ratio computed relative to 418 lb. average for Hereford and Angus sired calves.

TABLE 12. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
STEER POSTWEANING FEEDLOT RATIONS
CYCLE II, PHASE 2 - 1974 CALF CROP

Period	Ingredients				Ration Analyses, 100% D.M. Basis ^a			
	Corn Silage, %	Alfalfa Haylage, %	Corn, %	Supplement, % ^b	C.P., %	D.P., %	TDN, %	Mcal. M.E./lb.
Oct. 24 - Nov. 12	65.0	20.0	12.0	3.0	12.7	8.6	71.6	1.17
Nov. 13 - Dec. 5 ^c	60.0	20.0	18.0	2.0	11.9	8.0	73.6	1.21
Dec. 6 - Dec. 11 ^c	62.0	20.0	18.0	0.0	10.4	6.7	73.3	1.20
Dec. 12 - Dec. 15 ^c	57.0	20.0	23.0	0.0	10.5	6.8	74.9	1.23
Dec. 16 - Jan. 8	55.0	20.0	23.0	2.0	11.9	8.1	75.2	1.23
Jan. 9 - Feb. 6	50.0	20.0	28.0	2.0	11.9	8.2	76.7	1.26
Feb. 7 - Slaughter	45.0	20.0	33.0	2.0	11.9	8.2	78.0	1.28

^a Estimated composition based on proximate analysis.

^b Crude protein level (100% D.M. basis) in the supplement was 51.0%.

^c In addition, medicated stress feed was fed at the rate of $\frac{1}{2}$ lb. per head per day from Dec. 5-15. The stress feed was 80% soybean meal, 15.3% corn, and 4.7% vitamin ADE and chlortetracycline. Crude protein level was 42.7%, digestible protein level was 36.2%, TDN was 78.7% and ME Mcal/lb was 1.28.

TABLE 13. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
FEED EFFICIENCY (FEED/GAIN)
CYCLE II, PHASE 2 - 197 CALF CROP

Breed of Steer		No. Steers ^a						Feed Efficiency (TDN and Mcal ME) ^b					
Sire	Dam	254	282	318	352	387	Total	254	282	318	352	387	Avg. ^c
Hereford Angus	Hereford	9	10	10	..	..	29						
	Angus	12	13	13	..	..	38						
	Average	21	23	23	..	..	67	6.42 (10.53)	6.58 (10.79)	6.70 (10.99)	....	....	6.57 (10.77)
Angus Hereford	Hereford	11	11	12	..	..	34						
	Angus	13	12	14	..	..	39						
	Average	24	23	26	..	..	73	6.76 (11.09)	6.94 (11.38)	7.48 (12.27)	....	....	7.06 (11.58)
Red Poll Red Poll Hereford Angus	Hereford	6	6	6	..	..	18						
	Angus	13	13	14	..	..	40						
	Red Poll	3	3	3	..	..	9						
	Red Poll	5	5	5	..	..	15						
	Average	27	27	28	..	..	82	7.47 (12.25)	7.59 (12.45)	7.93 (13.00)	....	....	7.66 (12.56)
Brown Swiss Brown Swiss Hereford Angus	Hereford	6	7	6	6	7	32						
	Angus	8	11	11	7	7	44						
	Brown Swiss	2	2	2	..	..	6						
	Brown Swiss	2	2	3	..	..	7						
	Average	18	22	22	13	14	89	6.87 (11.27)	7.05 (11.56)	7.26 (11.91)	7.21 (11.82)	7.21 (11.82)	7.06 (11.58)
Gelbvieh	Hereford	..	6	6	5	5	22						
	Angus	..	10	11	8	7	36						
	Average	..	16	17	13	12	58	6.74 (11.05)	7.03 (11.53)	7.30 (11.97)	7.27 (11.92)	7.32 (12.00)	7.02 (11.51)
Maine Anjou	Hereford	..	8	10	7	7	32						
	Angus	..	10	14	7	7	38						
	Average	..	18	24	14	14	70	6.57 (10.77)	7.03 (11.53)	7.20 (11.81)	7.11 (11.66)	7.27 (11.92)	6.93 (11.37)
Chianina	Hereford	..	10	11	7	7	35						
	Angus	..	11	15	7	6	39						
	Average	..	21	26	14	13	74	6.62 (10.86)	6.90 (11.32)	7.10 (11.64)	7.25 (11.89)	7.08 (11.61)	6.87 (11.27)
Overall Average		90	150	166	54	53	513	6.78 (11.12)	7.02 (11.51)	7.28 (11.94)	7.21 (11.82)	7.22 (11.84)	7.02 (11.51)

^a Number of steers slaughtered after 254, 282, 318, 352 and 387 days on feed.

^b Metabolizable Energy (ME) values shown in parentheses. TDN Efficiency = lb. TDN consumed per lb. gain.

Mcal ME = lb. TDN x 1.64. TDN and ME on a 100% dry matter basis.

^c Average calculated only for dates common to all breed groups (254, 282 and 318 days).

TABLE 14. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
POSTWEANING AVERAGE DAILY GAINS AND ADJUSTED FINAL WEIGHTS OF STEERS
CYCLE II, PHASE 2 - 1974 CALF CROP

Breed of Steer		No. Steers ^a						Postweaning Average Daily Gain ^b						Adjusted Final Weight ^c					
Sire	Dam	254	282	318	352	387	Total	254	282	318	352	387	Avg. ^d	254	282	318	352	387	Avg. ^d Ratio ^e
Hereford Angus	Hereford	9	10	10	..	..	29	2.12	2.06	2.05	....	....	2.06	928	972	1051	....	....	1012 96.7
	Angus	12	13	13	..	..	38	1.99	1.97	1.94	....	....	1.96	929	980	1059	....	....	1020 97.4
	Average	21	23	23	..	..	67	2.06	2.02	2.00	....	....	2.01	928	976	1055	....	....	1016 97.0
Angus Hereford	Hereford	11	11	12	..	..	34	2.22	2.21	2.08	....	....	2.14	997	1033	1078	....	....	1056 100.9
	Angus	13	12	14	..	..	39	2.10	2.10	1.92	....	....	2.01	981	1030	1045	....	....	1038 99.1
	Average	24	23	26	..	..	73	2.16	2.16	2.00	....	....	2.08	989	1032	1062	....	....	1047 100.0
Red Poll	Hereford	6	6	6	..	..	18	2.04	2.07	1.98	....	....	2.02	931	1001	1054	....	....	1028 98.2
	Angus	13	13	14	..	..	40	1.94	1.92	1.90	....	....	1.91	916	965	1031	....	....	998 95.3
	Average	19	19	20	..	..	58	1.99	2.00	1.94	....	....	1.97	924	983	1042	....	....	1013 96.8
Brown Swiss	Hereford	6	7	6	6	7	32	2.22	2.13	2.24	2.24	2.22	2.18	1011	1060	1152	1221	1297	1106 105.6
	Angus	8	11	11	7	7	44	2.08	2.12	2.03	2.09	2.11	2.08	1026	1065	1095	1188	1270	1080 103.2
	Average	14	18	17	13	14	76	2.15	2.13	2.13	2.16	2.17	2.13	1019	1063	1123	1205	1284	1093 104.4
Gelbvieh	Hereford	..	6	6	5	5	22	....	2.31	2.34	2.38	2.28	2.32	....	1081	1189	1248	1277	1135 108.4
	Angus	..	10	11	8	7	36	....	2.27	2.20	2.17	2.28	2.24	....	1127	1184	1270	1362	1156 110.4
	Average	..	16	17	13	12	58	....	2.29	2.27	2.27	2.28	2.28	....	1104	1186	1259	1320	1145 109.4
Maine Anjou	Hereford	..	8	10	7	7	32	....	2.42	2.29	2.42	2.34	2.36	....	1107	1164	1239	1365	1136 108.5
	Angus	..	10	14	7	7	38	....	2.21	2.22	2.33	2.26	2.22	....	1107	1188	1307	1363	1148 109.6
	Average	..	18	24	14	14	70	....	2.31	2.26	2.37	2.30	2.29	....	1107	1176	1273	1364	1142 109.1
Chianina	Hereford	..	10	11	7	7	35	....	2.26	2.15	2.24	2.25	2.20	....	1057	1123	1208	1320	1090 104.1
	Angus	..	11	15	7	6	39	....	2.25	2.22	2.09	2.21	2.24	....	1103	1162	1227	1332	1132 108.1
	Average	..	21	26	14	13	74	....	2.25	2.18	2.17	2.23	2.22	....	1080	1143	1217	1326	1111 106.1
Average All Sire Breeds	Hereford	32	58	61	25	26	202	2.15	2.21	2.16	2.32	2.27	2.18	967	1044	1116	1229	1315	1080 103.2
	Angus	46	80	92	29	27	274	2.02	2.12	2.06	2.17	2.21	2.09	963	1054	1109	1248	1332	1082 103.3
	Average	78	138	153	54	53	476	2.09	2.16	2.11	2.24	2.24	2.14	965	1049	1113	1239	1323	1081 103.2

^a Number of steers slaughtered after 254, 282, 318, 352 and 387 days postweaning.

^b ADG = (actual final wt. - actual weaning wt.) ÷ days on feed.

^c Adj. final wt. = 200-day wt. + (postwn. ADG x days on feed postwn.).

^d Average calculated only for dates common to all breed groups (282 and 318 days).

^e Ratio relative to 1047 lb. average of Hereford-Angus crossbreds.

TABLE 15. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
HOT CARCASS WEIGHT, DRESSING PERCENTAGE AND U.S.D.A. QUALITY GRADE
CYCLE II, PHASE 2 - 1974 CALF CROP

Breed of Steer		Hot Carcass Wt., lb.						Dressing Percent ^a						U.S.D.A. Quality Grade ^b					
Sire	Dam	254	282	318	352	387	Avg. ^c	254	282	318	352	387	Avg. ^c	254	282	318	352	387	Avg. ^c
Hereford Angus	Hereford	503	523	577	...	...	550	57.6	57.2	58.9	....	....	58.0	9.5	10.1	9.9	....	....	10.0
	Angus	522	567	605	...	...	586	59.0	61.1	60.8	....	....	61.0	11.7	11.8	12.5	....	....	12.1
	Average	512	545	591	...	...	568	58.3	59.2	59.8	....	....	59.5	10.6	11.0	11.2	....	....	11.1
Angus Hereford	Hereford	537	583	613	...	...	598	57.7	59.3	60.1	....	....	59.7	10.5	10.9	11.4	....	....	11.1
	Angus	535	578	598	...	...	588	58.4	59.5	60.3	....	....	59.9	10.9	11.5	11.3	....	....	11.4
	Average	536	580	606	...	...	593	58.0	59.4	60.2	....	....	59.8	10.7	11.2	11.4	....	....	11.3
Red Poll	Hereford	509	557	581	...	...	569	58.1	59.1	59.0	....	....	59.0	10.4	10.4	10.8	....	....	10.6
	Angus	507	550	594	...	...	572	58.9	60.5	60.5	....	....	60.5	11.1	11.1	11.3	....	....	11.2
	Average	508	554	588	...	...	571	58.5	59.8	59.8	....	....	59.8	10.8	10.7	11.0	....	....	10.9
Brown Swiss	Hereford	531	566	636	678	720	601	56.8	57.6	59.4	60.2	62.0	58.5	8.2	10.1	10.2	10.9	10.8	10.2
	Angus	557	587	615	658	717	601	58.2	59.1	59.7	59.9	59.4	59.4	10.6	9.9	11.6	11.2	12.2	10.8
	Average	544	577	626	668	719	601	57.5	58.3	59.6	60.1	60.7	59.0	9.4	10.0	10.9	11.0	11.5	10.5
Gelbvieh	Hereford	...	602	666	690	739	634	....	58.6	59.1	60.4	60.1	58.8	....	9.6	8.6	11.1	9.5	9.1
	Angus	...	629	668	732	779	648	....	59.5	59.7	61.8	60.5	59.6	....	10.8	10.8	12.4	11.8	10.8
	Average	...	615	667	711	759	641	....	59.1	59.4	61.1	60.3	59.2	....	10.2	9.7	11.7	10.6	10.0
Maine Anjou	Hereford	...	620	645	692	779	632	....	59.4	58.8	60.1	60.5	59.1	....	9.1	9.9	9.8	10.0	9.5
	Angus	...	636	686	730	794	661	....	60.7	60.6	60.6	61.5	60.6	....	10.2	11.1	11.5	11.6	10.6
	Average	...	628	666	711	786	647	....	60.0	59.7	60.3	61.0	59.8	....	9.6	10.5	10.6	10.8	10.0
Chianina	Hereford	...	591	615	670	747	603	....	60.3	58.7	60.4	59.9	59.5	....	8.3	8.5	8.6	9.6	8.4
	Angus	...	624	651	704	742	638	....	60.4	59.6	62.3	59.5	60.0	....	9.5	8.6	10.9	10.7	9.0
	Average	...	608	633	687	744	620	....	60.3	59.1	61.3	59.7	59.7	....	8.9	8.6	9.8	10.1	8.7
Average All Sire Breeds	Hereford	520	578	619	682	746	598	57.6	58.8	59.2	60.3	60.6	59.0	9.7	9.8	9.9	10.1	10.0	9.8
	Angus	530	596	631	706	758	614	58.6	60.1	60.2	61.2	60.2	60.2	11.1	10.7	11.0	11.5	11.6	10.8
	Average	525	587	625	694	752	606	58.1	59.5	59.7	60.7	60.4	59.6	10.4	10.2	10.5	10.8	10.8	10.3

^a Dressing percent equals hot carcass weight divided by final weight on feed and water (without shrink).

^b U.S.D.A. Quality Grade as revised in 1976. 10 = average good, 11 = high good, 12 = low choice, 13 = average choice, etc.

^c Average calculated only for dates common to all breed groups (282 and 318 days).

TABLE 16. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
MARBLING SCORE, U.S.D.A. YIELD GRADE AND RIBEYE AREA
CYCLE II, PHASE 2 - 1974 CALF CROP

Breed of Steer		Marbling Score ^a							U.S.D.A. Yield Grade							Ribeye Area, sq. in.						
Sire	Dam	254	282	318	352	387	Avg. ^b		254	282	318	352	387	Avg. ^b		254	282	318	352	387	Avg. ^b	
Hereford Angus	Hereford	7.5	8.4	8.3	....	....	8.4		2.9	3.2	3.2	...	...	3.2		9.3	9.5	9.5	....	....	9.5	
	Angus	11.0	11.5	13.0	....	....	12.2		3.2	3.4	3.6	...	...	3.5		10.0	9.9	10.7	....	....	10.3	
	Average	9.2	10.0	10.6	....	....	10.3		3.0	3.3	3.4	...	...	3.4		9.6	9.7	10.1	....	....	9.9	
Angus Hereford	Hereford	8.6	9.8	11.1	....	....	10.4		3.1	3.2	3.8	...	...	3.5		9.8	10.6	9.5	....	....	10.0	
	Angus	9.5	10.2	10.1	....	....	10.2		3.2	3.3	3.6	...	...	3.4		9.9	10.1	9.7	....	....	9.9	
	Average	9.0	10.0	10.6	....	....	10.3		3.2	3.2	3.7	...	...	3.4		9.8	10.3	9.6	....	....	10.0	
Red Poll	Hereford	9.1	9.4	10.0	....	....	9.7		2.9	3.6	3.3	...	...	3.4		9.8	9.1	10.3	....	....	9.7	
	Angus	9.9	9.7	10.3	....	....	10.0		3.1	3.0	3.6	...	...	3.3		9.8	10.5	10.0	....	....	10.2	
	Average	9.5	9.5	10.1	....	....	9.8		3.0	3.3	3.5	...	...	3.4		9.8	9.8	10.1	....	....	10.0	
Brown Swiss	Hereford	5.8	7.9	8.0	9.6	10.0	8.0		2.2	2.6	2.8	3.0	3.5	2.7		10.5	10.5	10.4	10.8	11.0	10.4	
	Angus	8.5	8.5	11.4	10.5	12.3	10.0		2.8	2.9	3.0	3.1	3.6	3.0		10.8	10.7	11.0	10.9	11.7	10.8	
	Average	7.1	8.2	9.7	10.0	11.2	9.0		2.5	2.8	2.9	3.1	3.5	2.8		10.6	10.6	10.7	10.9	11.4	10.6	
Gelbvieh	Hereford	....	7.8	6.5	10.7	8.7	7.2		...	2.8	2.5	3.1	3.3	2.6		....	10.7	11.7	11.2	11.9	11.2	
	Angus	....	9.5	10.1	12.1	12.7	9.8		...	3.0	2.7	3.8	4.0	2.8		....	11.5	11.9	11.2	12.1	11.7	
	Average	....	8.6	8.3	11.4	10.7	8.5		...	2.9	2.6	3.4	3.6	2.7		....	11.1	11.8	11.2	12.0	11.4	
Maine Anjou	Hereford	....	7.2	7.7	8.2	8.9	7.4		...	2.7	2.5	2.7	3.2	2.6		....	11.3	11.6	11.5	12.6	11.4	
	Angus	....	8.9	10.4	11.1	10.2	9.6		...	3.0	3.1	3.5	3.5	3.0		....	11.6	11.5	11.4	12.4	11.6	
	Average	....	8.0	9.1	9.6	9.6	8.5		...	2.8	2.8	3.1	3.3	2.8		....	11.4	11.5	11.4	12.5	11.5	
Chianina	Hereford	....	6.4	6.2	6.5	8.0	6.3		...	2.3	2.2	2.5	3.2	2.2		....	11.3	11.2	11.0	11.8	11.2	
	Angus	....	7.5	6.7	9.8	9.6	7.1		...	2.7	2.4	2.8	3.1	2.6		....	11.4	12.0	12.1	12.6	11.7	
	Average	....	6.9	6.4	8.1	8.8	6.7		...	2.5	2.3	2.7	3.2	2.4		....	11.3	11.6	11.5	12.2	11.4	
Average All Sire Breeds	Hereford	7.8	8.1	8.2	8.7	8.9	8.2		2.8	2.9	2.9	2.8	3.3	2.9		9.9	10.4	10.6	11.1	11.8	10.5	
	Angus	9.7	9.4	10.3	10.8	11.2	9.0		3.1	3.0	3.1	3.3	3.6	3.0		10.1	10.8	11.0	11.4	12.2	10.9	
	Average	8.8	8.7	9.3	9.8	10.0	9.0		2.9	3.0	3.0	3.1	3.4	3.0		10.0	10.6	10.8	11.3	12.0	10.7	

^a Marbling Score: 9 = slight+, 10 = small-, 21 = slightly abundant+.

^b Average calculated only for dates common to all breed groups (282 and 318 days).

TABLE 17. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
FAT THICKNESS AND PERCENTAGE KIDNEY, PELVIC AND HEART FAT
CYCLE II, PHASE 2 - 1974 CALF CROP

Sire	Dam	Fat Thickness, in.						Estimated Percent Kidney, Pelvic and Heart Fat					
		254	282	318	352	387	Avg. ^a	254	282	318	352	387	Avg. ^a
Hereford Angus	Hereford	.35	.43	.44	...	...	.44	2.9	2.8	2.5	...	...	2.6
	Angus	.43	.49	.53	...	...	.51	3.9	3.6	3.8	...	...	3.7
	Average	.39	.46	.48	...	...	.47	3.4	3.2	3.2	...	...	3.2
Angus Hereford	Hereford	.42	.44	.59	...	...	.52	3.5	3.4	3.2	...	...	3.3
	Angus	.43	.46	.56	...	...	.51	3.6	3.1	3.1	...	...	3.1
	Average	.42	.45	.58	...	...	.52	3.6	3.2	3.2	...	...	3.2
Red Poll	Hereford	.36	.43	.42	...	...	.42	3.6	4.3	4.1	...	...	4.2
	Angus	.38	.38	.46	...	...	.42	4.4	4.1	4.8	...	...	4.4
	Average	.37	.40	.44	...	...	.42	4.0	4.2	4.5	...	...	4.3
Brown Swiss	Hereford	.18	.27	.27	.32	.47	.27	3.4	2.9	2.9	3.4	3.5	2.9
	Angus	.31	.36	.37	.39	.49	.36	4.0	3.5	4.0	4.1	4.8	3.8
	Average	.24	.32	.32	.35	.48	.32	3.7	3.2	3.5	3.7	4.2	3.4
Gelbvieh	Hereford	...	.28	.27	.39	.43	.28	...	3.5	2.8	3.6	4.0	3.2
	Angus	...	.32	.36	.51	.61	.34	...	4.3	2.9	4.7	4.8	3.6
	Average	...	.30	.31	.45	.52	.31	...	3.9	2.9	4.2	4.4	3.4
Maine Anjou	Hereford	...	.27	.26	.30	.44	.26	...	3.4	2.7	3.4	3.7	3.0
	Angus	...	.34	.39	.50	.48	.36	...	4.0	3.7	3.8	4.1	3.8
	Average	...	.31	.32	.40	.46	.31	...	3.7	3.2	3.6	3.9	3.4
Chianina	Hereford	...	.21	.20	.23	.39	.20	...	2.6	2.4	2.6	3.6	2.5
	Angus	...	.31	.29	.34	.43	.30	...	3.1	2.7	3.9	4.1	2.9
	Average	...	.26	.25	.28	.41	.25	...	2.9	2.6	3.3	3.8	2.7
Average All Sire Breeds	Hereford	.33	.33	.35	.31	.43	.33	3.3	3.3	3.0	3.3	3.7	3.2
	Angus	.39	.38	.42	.43	.50	.42	4.0	3.7	3.6	4.1	4.5	3.6
	Average	.36	.36	.39	.37	.47	.38	3.7	3.5	3.3	3.7	4.1	3.4

^a Average calculated only for dates common to all breed groups (282 and 318 days).

TABLE 18. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
PERCENTAGE BONE, PERCENTAGE FAT TRIM AND PERCENTAGE RETAIL PRODUCT
CYCLE II, PHASE 2 - 1974 CALF CROP

Breed of Steer		Bone, %						Fat Trim, %						Retail Product, % ^a					
Sire	Dam	254	282	318	352	387	Avg. ^b	254	282	318	352	387	Avg. ^b	254	282	318	352	387	Avg. ^b
Hereford Angus	Hereford	13.6	13.4	13.3	....	....	13.4	13.3	15.2	15.6	....	....	15.4	73.1	71.4	71.0	....	....	71.2
	Angus	12.4	12.2	11.9	....	....	12.0	15.3	17.7	18.0	....	....	17.8	72.3	70.2	70.1	....	....	70.2
	Average	13.0	12.8	12.6	....	....	12.7	14.3	16.4	16.8	....	....	16.6	72.7	70.8	70.6	....	....	70.7
Angus Hereford	Hereford	12.9	12.8	12.3	....	....	12.6	15.4	15.6	18.2	....	....	16.9	71.7	71.5	69.4	....	....	70.4
	Angus	12.7	12.6	12.2	....	....	12.4	15.3	15.8	17.8	....	....	16.8	72.0	71.7	70.0	....	....	70.8
	Average	12.8	12.7	12.2	....	....	12.5	15.4	15.7	18.0	....	....	16.8	71.8	71.6	69.7	....	....	70.6
Red Poll	Hereford	13.5	13.5	13.0	....	....	13.2	14.1	16.4	16.9	....	....	16.6	72.4	70.1	70.1	....	....	70.1
	Angus	13.3	12.9	12.5	....	....	12.7	15.0	15.5	18.0	....	....	16.8	71.7	71.6	69.5	....	....	70.6
	Average	13.4	13.2	12.8	....	....	13.0	14.6	15.9	17.4	....	....	16.7	72.0	70.9	69.8	....	....	70.4
Brown Swiss	Hereford	14.7	14.9	14.6	13.7	13.5	14.8	10.8	12.0	12.5	16.0	16.4	12.2	74.5	73.2	72.9	70.3	70.1	73.0
	Angus	14.1	13.7	13.4	13.0	12.8	13.6	12.6	14.1	15.1	16.7	17.1	14.6	73.2	72.3	71.6	70.2	70.0	72.0
	Average	14.4	14.3	14.0	13.3	13.2	14.2	11.7	13.0	13.8	16.4	16.8	13.4	73.9	72.7	72.2	70.3	70.1	72.5
Gelbvieh	Hereford	....	14.0	14.2	13.7	13.1	14.1	....	12.6	13.0	15.6	16.4	12.8	....	73.4	72.8	70.7	70.5	73.1
	Angus	....	13.0	13.3	12.0	12.0	13.2	....	14.9	13.9	19.7	19.0	14.4	....	72.0	72.7	68.4	69.0	72.4
	Average	....	13.5	13.8	12.8	12.6	13.6	....	13.8	13.5	17.6	17.7	13.6	....	72.7	72.8	69.5	69.8	72.8
Maine Anjou	Hereford	....	14.5	14.4	14.0	13.2	14.4	....	13.1	13.2	14.2	15.9	13.2	....	72.5	72.5	71.7	70.9	72.5
	Angus	....	13.5	13.3	12.9	12.9	13.4	....	15.0	16.0	18.0	16.7	15.5	....	71.5	70.6	69.1	70.3	71.0
	Average	....	14.0	13.9	13.5	13.1	14.0	....	14.0	14.6	16.1	16.3	14.3	....	72.0	71.6	70.4	70.6	71.8
Chianina	Hereford	....	15.0	15.5	15.2	14.3	15.2	....	10.4	9.7	11.2	13.6	10.0	....	74.6	74.8	73.6	72.1	74.7
	Angus	....	14.3	14.4	13.7	13.5	14.4	....	12.5	11.1	14.3	14.8	11.8	....	73.2	74.5	72.0	71.7	73.8
	Average	....	14.7	15.0	14.4	13.9	14.8	....	11.5	10.4	12.8	14.2	11.0	....	73.9	74.6	72.8	71.9	74.2
Average All Sire Breeds	Hereford	13.7	14.0	13.9	14.1	13.5	14.0	13.4	13.6	14.2	14.3	15.6	13.9	72.9	72.4	71.9	71.6	70.9	72.2
	Angus	13.1	13.2	13.0	12.9	12.8	13.1	14.6	15.1	15.7	17.2	16.9	15.4	72.3	71.8	71.3	69.9	70.3	71.6
	Average	13.4	13.6	13.5	13.5	13.2	13.6	14.0	14.3	14.9	15.7	16.2	14.6	72.6	72.1	71.6	70.8	70.6	71.9

^a Retail Product, % = Actual yield of boneless, closely trimmed beef from the carcass.

^b Average calculated only for dates common to all breed groups (282 and 318 days).

TABLE 19. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
ACTUAL PERCENTAGE CUTABILITY, WARNER-BRATZLER SHEAR AND TASTE PANEL ACCEPTABILITY
CYCLE II, PHASE 2 - 1974 CALF CROP

Breed of Steer		Actual Cutability, % ^a						Warner-Bratzler Shear, lb. ^b						Taste Panel Acceptability ^c					
Sire	Dam	254	282	318	352	387	Avg. ^d	254	282	318	352	387	Avg. ^d	254	282	318	352	387	Avg. ^d
Hereford Angus	Hereford	58.3	57.1	56.6	....	....	56.8	7.2	9.0	8.7	...	...	8.8	6.7	6.3	6.4	...	...	6.4
	Angus	57.4	55.5	55.1	....	....	55.3	6.4	7.6	7.2	...	...	7.4	7.3	7.4	6.9	...	...	7.1
	Average	57.8	56.3	55.8	....	....	56.0	6.8	8.3	8.0	...	...	8.1	7.0	6.8	6.6	...	...	6.7
Angus Hereford	Hereford	57.3	57.1	54.7	....	....	55.9	7.0	7.8	7.7	...	...	7.8	6.9	6.5	7.1	...	...	6.8
	Angus	57.8	57.6	55.2	....	....	56.4	7.6	8.1	8.3	...	...	8.2	7.2	7.0	6.8	...	...	6.9
	Average	57.6	57.4	55.0	....	....	56.2	7.3	8.0	8.0	...	...	8.0	7.1	6.8	7.0	...	...	6.9
Red Poll	Hereford	58.0	56.1	56.0	....	....	56.0	10.1	7.2	7.8	...	...	7.5	6.8	7.5	6.8	...	...	7.2
	Angus	57.1	57.4	55.2	....	....	56.3	7.0	8.2	8.3	...	...	8.2	7.4	7.3	6.7	...	...	7.0
	Average	57.6	56.8	55.6	....	....	56.2	8.6	7.7	8.1	...	...	7.9	7.1	7.4	6.8	...	...	7.1
Brown Swiss	Hereford	60.1	59.2	58.7	56.8	56.2	58.9	9.7	8.9	7.8	8.6	7.3	8.4	6.8	6.8	6.7	6.6	7.3	6.8
	Angus	58.9	58.3	57.2	56.7	56.2	57.8	7.6	9.5	8.3	9.3	7.9	8.9	6.2	6.7	7.4	6.4	7.4	7.0
	Average	59.5	58.7	57.9	56.8	56.2	58.3	8.6	9.2	8.0	9.0	7.6	8.6	6.5	6.8	7.0	6.5	7.3	6.9
Gelbvieh	Hereford	....	59.2	58.8	57.2	57.0	59.0	...	9.3	8.8	8.2	6.3	9.0	...	7.2	6.6	6.8	7.0	6.9
	Angus	....	57.8	58.4	54.2	54.4	58.1	...	8.8	8.9	7.7	8.0	8.8	...	6.7	6.6	7.2	6.8	6.6
	Average	....	58.5	58.6	55.7	55.7	58.6	...	9.0	8.8	7.9	7.2	8.9	...	7.0	6.6	7.0	6.9	6.8
Maine Anjou	Hereford	....	58.7	58.1	58.2	57.3	58.4	...	8.4	8.4	8.7	7.4	8.4	...	6.8	7.1	6.4	7.1	7.0
	Angus	....	57.5	55.4	55.1	56.2	56.4	...	8.5	8.8	8.6	7.0	8.6	...	6.5	6.5	6.7	7.4	6.5
	Average	....	58.1	56.8	56.6	56.7	57.4	...	8.5	8.6	8.6	7.2	8.5	...	6.7	6.8	6.5	7.2	6.8
Chianina	Hereford	....	61.3	61.0	60.2	58.3	61.2	...	7.7	9.3	8.8	7.8	8.5	...	7.3	7.3	5.8	7.5	7.3
	Angus	....	59.7	60.3	58.0	57.9	60.0	...	9.0	8.9	8.4	7.9	9.0	...	6.3	6.7	6.9	6.8	6.5
	Average	....	60.5	60.6	59.1	58.1	60.6	...	8.4	9.1	8.6	7.9	8.8	...	6.8	7.0	6.3	7.1	6.9
Average All Sire Breeds	Hereford	58.4	58.4	57.7	58.1	57.2	58.0	8.5	8.3	8.3	8.6	7.2	8.3	6.8	6.9	6.9	6.4	7.2	6.9
	Angus	57.8	57.7	56.7	56.0	56.2	57.2	7.1	8.5	8.4	8.5	7.7	8.4	7.0	6.8	6.8	6.8	7.1	6.8
	Average	58.1	58.0	57.2	57.0	56.7	57.6	7.8	8.4	8.4	8.5	7.5	8.4	6.9	6.9	6.8	6.6	7.1	6.8

^a Actual Cutability, % = Actual yield of boneless, closely trimmed beef from the round, loin, rib and chuck.

^b A measure of the pounds of force required to shear one-half inch cores of steaks cooked at 350°F to 150°F internal temperature and cooled for 30 minutes at room temperature. Warner-Bratzler shear was obtained from all 476 steers.

^c Taste panel scores are based on a 9-point hedonic scale, with higher scores indicating greater acceptability.

Taste panel traits were measured on steaks from 4 steers per sire-dam breed group per slaughter date.

^d Average calculated only for dates common to all breed groups (282 and 318 days).

TABLE 20. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
TASTE PANEL EVALUATION OF COOKED STEAKS^a
CYCLE II, PHASE 2 - 1974 CALF CROP

Breed of Steer		Taste Panel Tenderness						Taste Panel Flavor						Taste Panel Juiciness					
Sire	Dam	254	282	318	352	387	Avg. ^b	254	282	318	352	387	Avg. ^b	254	282	318	352	387	Avg. ^b
Hereford Angus	Hereford	6.7	6.4	6.1	...	...	6.2	7.3	7.5	7.0	...	...	7.2	6.8	7.3	6.9	...	...	7.1
	Angus	7.9	7.5	7.0	...	...	7.2	6.9	7.3	7.1	...	...	7.2	7.3	7.3	7.1	...	...	7.2
	Average	7.3	7.0	6.6	...	...	6.7	7.1	7.4	7.0	...	...	7.2	7.0	7.3	7.0	...	...	7.2
Angus Hereford	Hereford	6.6	6.6	7.3	...	...	7.0	7.2	7.1	7.1	...	...	7.1	7.2	6.8	7.1	...	...	7.0
	Angus	7.2	7.3	6.7	...	...	7.0	7.4	7.2	7.0	...	...	7.1	7.2	7.2	7.3	...	...	7.2
	Average	6.9	7.0	7.0	...	...	7.0	7.3	7.2	7.0	...	...	7.1	7.2	7.0	7.2	...	...	7.1
Red Poll	Hereford	6.5	7.4	7.5	...	...	7.4	7.1	7.6	6.4	...	...	7.0	6.9	7.4	6.9	...	...	7.2
	Angus	7.4	7.2	6.8	...	...	7.0	7.4	7.3	7.2	...	...	7.2	7.3	7.1	6.7	...	...	6.9
	Average	6.9	7.3	7.2	...	...	7.2	7.2	7.4	6.8	...	...	7.1	7.1	7.3	6.8	...	...	7.0
Brown Swiss	Hereford	6.9	6.6	6.8	6.4	7.3	6.7	7.0	7.2	7.1	7.3	7.6	7.2	7.3	7.2	7.0	6.7	7.2	7.1
	Angus	6.1	6.8	7.7	6.5	7.5	7.2	6.9	7.3	7.2	7.1	7.7	7.2	6.6	7.0	7.3	6.8	7.4	7.2
	Average	6.5	6.7	7.2	6.5	7.4	7.0	6.9	7.2	7.2	7.2	7.6	7.2	7.0	7.1	7.1	6.8	7.3	7.1
Gelbvieh	Hereford	...	6.7	6.2	6.8	7.0	6.4	...	7.3	7.2	7.2	7.4	7.2	...	7.4	7.3	6.6	7.0	7.4
	Angus	...	6.3	6.4	7.4	6.8	6.4	...	7.1	6.9	7.2	7.0	7.0	...	7.4	6.9	7.4	7.0	7.2
	Average	...	6.5	6.3	7.1	6.9	6.4	...	7.2	7.1	7.2	7.2	7.1	...	7.4	7.1	7.0	7.0	7.3
Maine Anjou	Hereford	...	6.8	6.9	6.2	6.8	6.8	...	6.9	7.4	7.0	7.3	7.2	...	7.0	7.3	6.8	7.3	7.2
	Angus	...	6.3	6.5	6.5	7.4	6.4	...	7.2	6.8	7.0	7.4	7.0	...	7.1	6.5	6.8	7.5	6.8
	Average	...	6.5	6.7	6.4	7.1	6.6	...	7.1	7.1	7.0	7.3	7.1	...	7.0	6.9	6.8	7.4	7.0
Chianina	Hereford	...	7.3	7.4	5.5	7.7	7.4	...	7.3	7.4	6.5	7.4	7.4	...	7.4	7.6	6.3	7.4	7.5
	Angus	...	6.0	6.5	6.9	6.6	6.2	...	7.0	7.3	7.4	7.1	7.2	...	7.0	7.0	7.2	7.1	7.0
	Average	...	6.7	6.9	6.2	7.1	6.8	...	7.2	7.4	6.9	7.3	7.3	...	7.2	7.3	6.8	7.2	7.2
Average All Sire Breeds	Hereford	6.7	6.8	6.9	6.2	7.2	6.8	7.2	7.3	7.1	7.0	7.4	7.2	7.1	7.2	7.2	6.6	7.2	7.2
	Angus	7.1	6.8	6.8	6.8	7.1	6.8	7.1	7.2	7.1	7.2	7.3	7.2	7.1	7.2	7.0	7.1	7.2	7.1
	Average	6.9	6.8	6.8	6.5	7.1	6.8	7.1	7.2	7.1	7.1	7.3	7.2	7.1	7.2	7.1	6.8	7.2	7.2

^a Taste panel scores are based on a 9-point hedonic scale, with higher scores indicating greater acceptability.

^b Taste panel traits were measured on steaks from 4 steers per sire-dam breed group per slaughter date.
Average calculated only for dates common to all breed groups (282 and 318 days).

TABLE 21. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
POSTWEANING AVERAGE DAILY GAINS AND ADJUSTED FINAL WEIGHTS
CYCLE II, PHASE 2 - 1974 CALF CROP

Breed of Steer ^a		No. Steers ^b				Postweaning Average Daily Gain ^c				Adjusted Final Weight ^d				
Sire	Dam	254	282	318	Total	254	282	318	Avg.	254	282	318	Avg.	Ratio ^e
Hereford	Hereford	9	10	10	29	2.12	2.06	2.05	2.08	928	972	1051	984	92.3
	Angus	13	12	14	39	2.10	2.10	1.92	2.04	981	1030	1045	1019	95.6
	Red Poll	3	3	3	9	1.85	2.02	2.07	1.98	974	1076	1135	1062	99.6
	Brown Swiss	2	2	2	6	1.87	2.24	2.03	2.05	1007	1158	1193	1119	105.0
	Average	27	27	29	83	1.98	2.10	2.02	2.04	972	1059	1106	1046	98.1
Angus	Hereford	11	11	12	34	2.22	2.21	2.08	2.17	997	1033	1078	1036	97.2
	Angus	12	13	13	38	1.99	1.97	1.94	1.97	929	980	1059	989	92.8
	Red Poll	5	5	5	15	2.03	1.98	1.87	1.96	1016	1085	1104	1068	100.2
	Brown Swiss	2	2	3	7	2.30	2.27	1.97	2.18	1151	1250	1206	1202	112.8
	Average	30	31	33	94	2.14	2.11	1.96	2.07	1023	1087	1112	1074	100.8
Red Poll	Hereford	6	6	6	18	2.04	2.07	1.98	2.03	931	1001	1054	995	93.3
	Angus	13	13	14	40	1.94	1.92	1.90	1.92	916	965	1031	971	91.1
	Red Poll	2	2	2	6	2.03	1.76	2.03	1.94	982	909	1106	999	93.7
	Brown Swiss	2	2	3	7	2.29	2.19	2.04	2.17	1117	1189	1208	1171	109.8
	Average	23	23	25	71	2.08	1.98	1.99	2.02	986	1016	1100	1034	97.0
Brown Swiss	Hereford	6	7	6	19	2.22	2.13	2.24	2.20	1011	1060	1152	1074	100.8
	Angus	8	11	11	30	2.08	2.12	2.03	2.08	1026	1065	1095	1062	99.6
	Red Poll	2	2	3	7	2.21	2.21	1.96	2.13	1104	1184	1167	1152	108.1
	Brown Swiss	2	1	2	5	2.33	2.21	2.04	2.19	1087	1154	1208	1150	107.9
	Average	18	21	22	61	2.21	2.17	2.07	2.15	1057	1116	1156	1110	104.1
Average All Sire Breeds	Hereford	32	34	34	100	2.15	2.12	2.09	2.12	967	1016	1084	1022	95.9
	Angus	46	49	52	147	2.03	2.03	1.95	2.00	963	1010	1058	1010	94.7
	Red Poll	12	12	13	37	2.03	1.99	1.98	2.00	1019	1064	1128	1070	100.4
	Brown Swiss	8	7	10	25	2.20	2.23	2.02	2.15	1090	1187	1203	1160	108.8
	Average	98	102	109	309	2.10	2.09	2.01	2.07	1010	1069	1118	1066	100.0

^a Steers from Hereford and Angus dams also included in table 14.

^b Number of steers slaughtered after 254, 282 and 318 days postweaning.

^c ADG = (actual final wt. - actual weaning wt.) ÷ days on feed.

^d Adj. final wt. = 200-day wt. + (postwn, ADG x days on feed postwn.).

^e Ratio computed relative to the overall average of 1066 lb.

TABLE 22. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
HOT CARCASS WEIGHT, DRESSING PERCENTAGE, U.S.D.A. QUALITY GRADE AND MARBLING SCORE
CYCLE II, PHASE 2 - 1974 CALF CROP

Breed of Steer ^a		Hot Carcass Wt., lb.				Dressing Percent ^b				U.S.D.A. Quality Grade ^c				Marbling Score ^d			
Sire	Dam	254	282	318	Avg.	254	282	318	Avg.	254	282	318	Avg.	254	282	318	Avg.
Hereford	Hereford	503	523	577	534	57.6	57.2	58.9	57.9	9.5	10.1	9.9	9.8	7.5	8.4	8.3	8.1
	Angus	535	578	598	570	58.4	59.5	60.3	59.4	10.9	11.5	11.3	11.2	9.5	10.2	10.1	9.9
	Red Poll	528	608	640	592	57.7	60.2	60.3	59.4	10.6	11.3	12.3	11.4	9.0	9.3	11.3	9.9
	Brown Swiss	549	606	640	598	57.7	58.1	57.8	57.9	9.9	8.9	7.9	8.9	7.9	6.4	4.9	6.4
	Average	529	579	614	574	57.8	58.8	59.3	58.6	10.2	10.4	10.4	10.3	8.5	8.6	8.6	8.6
Angus	Hereford	537	583	613	578	57.7	59.3	60.1	59.0	10.5	10.9	11.4	10.9	8.6	9.8	11.1	9.8
	Angus	522	567	605	565	59.0	61.1	60.8	60.3	11.7	11.8	12.5	12.0	11.0	11.5	13.0	11.8
	Red Poll	573	610	627	603	60.3	60.5	60.3	60.4	13.3	11.1	11.3	11.9	15.3	9.5	9.9	11.6
	Brown Swiss	604	686	655	648	57.8	58.8	58.7	58.4	10.4	10.5	9.6	10.2	8.9	8.5	8.3	8.6
	Average	559	612	625	598	58.7	59.9	60.0	60.0	11.5	11.1	11.2	11.2	11.0	9.8	10.6	10.4
Red Poll	Hereford	509	557	581	549	58.1	59.1	59.0	58.7	10.4	10.4	10.8	10.5	9.1	9.4	10.0	9.5
	Angus	507	550	594	550	58.9	60.5	60.5	60.0	11.1	11.1	11.3	11.2	9.9	9.7	10.3	10.0
	Red Poll	523	494	626	548	58.2	59.2	60.5	59.3	11.9	8.1	10.4	10.1	11.9	7.1	9.9	9.6
	Brown Swiss	581	666	668	638	58.5	60.8	59.8	59.7	11.5	9.4	9.9	10.3	10.5	7.4	8.5	8.8
	Average	530	567	618	571	58.4	59.9	60.0	59.4	11.2	9.8	10.6	10.5	10.4	8.4	9.7	9.5
Brown Swiss	Hereford	531	566	636	578	56.8	57.6	59.4	57.9	8.2	10.1	10.2	9.5	5.8	7.9	8.0	7.2
	Angus	557	587	615	586	58.2	59.1	59.7	59.0	10.6	9.9	11.6	10.7	8.5	8.5	11.4	9.5
	Red Poll	577	644	687	636	58.1	59.0	62.2	59.8	8.5	10.5	12.2	10.4	6.0	9.5	11.9	9.1
	Brown Swiss	570	652	680	634	56.7	59.7	60.0	58.8	10.5	11.9	11.0	11.1	8.5	9.9	9.5	9.3
	Average	559	612	654	608	57.4	58.8	60.3	58.9	9.4	10.6	11.2	10.4	7.2	9.0	10.2	8.8
Average All Sire Breeds	Hereford	520	557	602	560	57.6	58.3	59.4	58.4	9.6	10.4	10.6	10.2	7.8	8.9	9.4	8.6
	Angus	530	570	603	568	58.6	60.0	60.3	59.7	11.1	11.1	11.7	11.3	9.7	10.0	11.2	10.3
	Red Poll	550	589	645	595	58.6	59.7	60.8	59.7	11.1	10.2	11.6	11.0	10.5	8.8	10.7	10.0
	Brown Swiss	576	653	661	630	57.7	59.3	59.1	58.7	10.6	10.2	9.6	10.1	8.9	8.0	7.8	8.3
	Average	544	592	628	588	58.1	59.3	59.9	59.1	10.6	10.5	10.9	10.6	9.2	8.9	9.8	9.3

^a Steers from Hereford and Angus dams also included in tables 15 and 16.

^b Dressing percent equals hot carcass weight divided by final weight on feed and water (without shrink).

^c U.S.D.A. Quality Grade as revised in 1976. 10 = average good, 11 = high good, 12 = low choice, 13 = average choice, etc.

^d Marbling Score: 9 = slight+, 10 = small-, 21 = slightly abundant+.

TABLE 23. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
U.S.D.A. YIELD GRADE, RIBEYE AREA, FAT THICKNESS AND PERCENTAGE KIDNEY, PELVIC AND HEART FAT
CYCLE II, PHASE 2 - 1974 CALF CROP

Breed of Steer ^a		U.S.D.A. Yield Grade				Ribeye Area, sq. in.				Fat Thickness, in.				Est. Percent Kidney Pelvic and Heart Fat			
Sire	Dam	254	282	318	Avg.	254	282	318	Avg.	254	282	318	Avg.	254	282	318	Avg.
Hereford	Hereford	2.9	3.2	3.2	3.1	9.3	9.5	9.5	9.4	.35	.43	.44	.41	2.9	2.8	2.5	2.7
	Angus	3.2	3.3	3.6	3.4	9.9	10.1	9.7	9.9	.43	.46	.56	.48	3.6	3.1	3.1	3.3
	Red Poll	3.1	4.0	3.7	3.6	10.2	9.0	9.8	9.7	.38	.46	.53	.46	4.5	5.0	3.7	4.4
	Brown Swiss	2.8	3.0	1.9	2.6	10.4	10.3	12.1	10.9	.34	.31	.19	.28	3.5	2.7	3.0	3.1
	Average	3.0	3.4	3.1	3.2	10.0	9.7	10.3	10.0	.38	.42	.43	.41	3.6	3.4	3.1	3.4
Angus	Hereford	3.1	3.2	3.8	3.4	9.8	10.6	9.5	10.0	.42	.44	.59	.48	3.5	3.4	3.2	3.4
	Angus	3.2	3.4	3.6	3.4	10.0	9.9	10.7	10.2	.43	.49	.53	.48	3.9	3.6	3.8	3.8
	Red Poll	3.7	3.5	3.2	3.5	10.0	10.2	10.2	10.1	.50	.45	.41	.45	4.9	3.8	3.2	4.0
	Brown Swiss	3.3	3.3	2.9	3.3	10.9	11.4	11.0	11.1	.39	.42	.31	.37	4.7	3.8	3.5	4.0
	Average	3.3	3.4	3.4	3.4	10.2	10.5	10.4	10.4	.44	.45	.46	.45	4.2	3.6	3.4	3.8
Red Poll	Hereford	2.9	3.6	3.3	3.3	9.8	9.1	10.3	9.7	.36	.43	.42	.40	3.6	4.3	4.1	4.0
	Angus	3.1	3.0	3.6	3.2	9.8	10.5	10.0	10.1	.38	.38	.46	.41	4.4	4.1	4.8	4.4
	Red Poll	3.1	3.4	3.4	3.3	9.8	8.7	10.7	9.7	.26	.24	.39	.30	5.2	6.0	4.7	5.3
	Brown Swiss	3.0	3.1	3.6	3.2	10.6	11.8	10.2	10.9	.30	.31	.37	.33	4.8	4.5	5.0	4.8
	Average	3.0	3.3	3.5	3.2	10.0	10.0	10.3	10.1	.32	.34	.41	.36	4.5	4.7	4.6	4.6
Brown Swiss	Hereford	2.2	2.6	2.8	2.5	10.5	10.5	10.4	10.5	.18	.27	.27	.24	3.4	2.9	2.9	3.1
	Angus	2.8	2.9	3.0	2.9	10.8	10.7	11.0	10.8	.31	.36	.37	.35	4.0	3.5	4.0	3.8
	Red Poll	2.6	3.4	3.2	3.1	10.4	10.6	10.6	10.5	.28	.25	.27	.27	4.0	5.5	4.3	4.6
	Brown Swiss	2.0	2.5	3.0	2.5	11.9	13.6	10.9	12.1	.18	.24	.32	.25	3.2	5.5	4.0	4.2
	Average	2.4	2.8	3.0	2.8	10.9	11.4	10.7	11.0	.24	.28	.31	.28	3.6	4.4	3.8	3.9
Average All Sire Breeds	Hereford	2.8	3.2	3.3	3.1	9.8	9.9	9.9	9.9	.33	.39	.43	.38	3.4	3.4	3.2	3.3
	Angus	3.1	3.2	3.4	3.2	10.1	10.3	10.4	10.2	.39	.42	.48	.43	4.0	3.6	3.9	3.8
	Red Poll	3.1	3.5	3.3	3.3	10.1	9.6	10.3	10.0	.36	.35	.40	.37	4.7	5.1	4.0	4.6
	Brown Swiss	2.8	2.9	2.8	2.8	11.0	11.8	11.1	11.3	.30	.32	.30	.31	4.1	4.1	3.9	4.0
	Average	3.0	3.2	3.2	3.1	10.2	10.4	10.4	10.3	.34	.37	.40	.37	4.0	4.0	3.8	3.9

^a Steers from Hereford and Angus dams also included in tables 16 and 17.

TABLE 24. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
POSTWEANING GROWTH, PUBERTY AND CONCEPTION OF HEIFERS
CYCLE II, PHASE 2 - BORN IN 1973-74

Breed of Heifer		No. Heifers	200-Day Postwn. ADG, lb.	Adj. 400-Day Wt., lb. ^a	Adj. 550-Day Wt., lb. ^b	550-Day Ht., in. ^c	Reaching Puberty, % ^d	Adjusted ^e		Percent Pregnant ^f
Sire	Dam							Puberty Age, days	Puberty Wt., lb.	
Hereford Angus	Hereford	37	1.20	587	732	45.7	94.8	390	580	89.0
	Angus	56	1.17	612	764	45.4	96.7	366	594	85.7
	Average	93	1.19	600	748	45.6	95.8	378	587	87.4
Angus Hereford	Hereford	41	1.30	618	790	46.3	95.4	381	630	90.5
	Angus	52	1.24	641	803	45.8	100.0	360	618	77.6
	Average	93	1.27	630	797	46.1	97.7	371	624	84.0
Red Poll	Hereford	43	1.22	601	758	46.9	95.6	367	583	86.0
	Angus	53	1.16	611	756	46.4	95.6	352	579	82.4
	Average	96	1.19	606	757	46.7	95.6	360	581	84.2
Brown Swiss	Hereford	67	1.29	635	805	48.4	98.0	361	605	95.7
	Angus	63	1.31	672	845	48.2	98.5	334	617	91.5
	Average	130	1.30	653	825	48.3	98.2	347	611	93.6
Gelbvieh	Hereford	39	1.34	655	835	48.5	97.6	363	639	95.0
	Angus	43	1.31	678	858	48.2	100.0	319	605	90.9
	Average	82	1.32	666	847	48.4	98.8	341	622	93.0
Maine Anjou	Hereford	39	1.42	664	845	48.9	100.0	386	662	94.8
	Angus	50	1.45	704	886	48.4	98.2	356	669	94.1
	Average	89	1.43	684	865	48.7	99.1	371	665	94.4
Chianina	Hereford	46	1.37	656	844	51.1	77.4	422	714	79.4
	Angus	49	1.37	695	870	51.2	92.2	374	690	88.9
	Average	95	1.37	675	857	51.1	84.8	398	702	84.2
Average All Sire Breeds	Hereford	312	1.31	631	801	48.0	94.2	381	630	90.1
	Angus	366	1.29	659	826	47.7	97.4	352	625	87.3
	Average	678	1.30	645	814	47.8	95.8	366	628	88.7

^a Adjusted 400-day wt. = 200-day wt. + (200-day postweaning ADG x 200 days).

^b Adjusted 550-day wt. = 200-day wt. + (350-day postweaning ADG x 350 days).

^c Height at hips.

^d Estrus was determined from weaning to an average of approximately 16 months of age (end of AI plus clean up).

^e Adjusted to comparable values if puberty had been detected in 100% of the heifers in all breed groups.

^f The breeding period was 42 days by AI and 22 days by natural service.

TABLE 25. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
POSTWEANING GROWTH, PUBERTY AND CONCEPTION OF HEIFERS
CYCLE II, PHASE 2 - 1973-74 CALF CROPS

Breed of Heifer ^a		No. Heifers	200-Day Postwn. ADG, lb.	Adj. 400-Day Wt., lb. ^b	Adj. 550-Day Wt., lb. ^c	550-Day Ht., in. ^d	Reaching Puberty, % ^e	Adjusted ^f		Percent Pregnant ^g
Sire	Dam							Puberty Age, days	Puberty Wt., lb.	
Hereford	Hereford	37	1.20	587	732	45.7	94.8	390	580	89.0
	Angus	52	1.24	641	803	45.8	100.0	360	618	77.6
	Red Poll	21	1.25	661	817	48.2	100.0	365	634	84.6
	Brown Swiss	13	1.23	715	857	49.5	100.0	334	648	92.9
	Average	123	1.23	651	802	47.3	98.7	362	620	86.0
Angus	Hereford	41	1.30	618	790	46.3	95.4	381	630	90.5
	Angus	56	1.17	612	764	45.4	96.7	366	594	85.7
	Red Poll	21	1.17	657	817	47.3	96.3	365	636	83.7
	Brown Swiss	14	1.27	746	899	49.6	100.0	309	658	82.5
	Average	132	1.23	658	818	47.2	97.1	355	630	85.6
Red Poll	Hereford	43	1.22	601	758	46.9	95.6	367	584	86.0
	Angus	53	1.16	611	756	46.4	95.6	352	579	82.4
	Red Poll	22	1.13	632	775	48.5	100.0	342	589	78.6
	Brown Swiss	8	1.09	685	829	49.9	100.0	321	630	66.7
	Average	126	1.15	632	780	47.9	97.8	346	595	78.4
Brown Swiss	Hereford	67	1.29	635	805	48.4	98.0	361	605	95.7
	Angus	63	1.31	672	845	48.2	98.5	334	616	91.5
	Red Poll	18	1.22	668	834	49.4	100.0	337	624	83.8
	Brown Swiss	18	1.11	716	874	51.8	100.0	324	667	92.3
	Average	166	1.23	673	840	49.5	99.1	339	628	90.8
Average	Hereford	188	1.25	610	771	46.8	96.0	375	600	90.3
All Sire	Angus	224	1.22	634	792	46.5	97.7	353	602	84.3
Breeds	Red Poll	82	1.19	654	811	48.3	99.1	352	621	85.2
	Brown Swiss	53	1.17	715	865	50.2	100.0	322	651	83.6
	Average	547	1.21	653	810	48.0	98.2	350	618	85.8

^a Heifers from Hereford and Angus dams also included in table 24.

^b Adjusted 400-day wt. = 200-day wt. + (200-day postweaning ADG x 200 days).

^c Adjusted 550-day wt. = 200-day wt. + (350-day postweaning ADG x 350 days).

^d Height at hips.

^e Estrus was determined from weaning to an average of approximately 16 months of age (end of AI plus cleanup).

^f Adjusted to comparable values if puberty had been detected in 100% of the heifers in all breed groups.

^g The breeding period was 42 days by AI and 22 days by natural service.

TABLE 26. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
CALVING DIFFICULTY, CALF CROP PERCENTAGE, CALF MORTALITY, BIRTH WEIGHT AND WEANING WEIGHT OF CALVES FROM 2-YEAR-OLD COWS^a
CYCLE II, PHASE 2 - COWS BORN IN 1973

Breed of Cow		No. Calves Born	Type of parturition, % ^b				Calf Crop, % ^c		Calf Mortality, % ^d		Calf Wt., lb. ^e	
Sire	Dam		No Diff.	Calf- Puller	C- Section	Abn. Pre- sentation	Born	Weaned	Early	Late	Birth	200- Day
Angus	Hereford	19	47.4	47.4	0.0	5.2	86.4	82.0	8.8	0.0	73.4	415
Hereford	Angus	17	35.3	64.7	0.0	0.0	81.0	74.7	3.5	4.3	76.6	398
	Average	36	41.4	56.0	0.0	2.6	83.7	78.3	6.2	2.1	75.0	407
Red Poll	Hereford	12	16.7	58.3	16.7	8.3	85.7	73.9	12.6	1.3	84.9	429
	Angus	16	37.5	50.0	6.2	6.2	80.0	68.3	8.0	6.6	79.5	412
	Average	28	27.1	54.2	11.4	7.2	82.8	71.0	10.3	4.0	82.2	420
Brown Swiss	Hereford	26	53.9	42.3	0.0	3.8	96.3	84.6	9.4	2.6	81.2	474
	Angus	23	43.5	47.8	8.7	0.0	95.8	80.9	20.6	0.0	76.9	461
	Average	49	48.7	45.0	4.4	1.9	96.0	82.8	15.0	1.3	79.0	467
Gelbvieh	Hereford	18	38.9	55.5	5.5	0.0	90.0	84.1	8.0	0.0	80.8	499
	Angus	18	44.4	44.4	11.1	0.0	81.8	66.6	8.2	10.4	83.8	470
	Average	36	41.6	50.0	8.3	0.0	85.9	75.1	8.1	5.2	82.3	485
Maine Anjou	Hereford	19	42.1	52.6	0.0	5.3	90.5	84.1	1.0	6.1	88.1	457
	Angus	18	33.3	55.5	11.1	0.0	94.7	81.4	15.4	0.0	84.3	428
	Average	37	37.7	54.0	5.6	2.6	92.6	82.9	8.2	3.0	86.2	443
Chianina	Hereford	11	45.5	45.5	0.0	9.1	68.8	56.2	0.4	17.9	86.4	451
	Angus	16	56.3	31.2	12.5	0.0	88.9	80.7	4.4	4.8	85.1	455
	Average	27	50.9	38.4	6.2	4.6	78.9	68.1	2.4	11.4	85.8	453
Average	Hereford	105	40.8	50.3	3.7	5.3	86.3	77.4	6.7	4.6	82.5	454
All Sire	Angus	108	41.7	48.9	8.3	1.0	87.0	75.4	10.0	4.3	81.0	437
Breeds	Average	213	41.2	49.6	6.0	3.2	86.6	76.4	8.4	4.4	81.7	446

^a Calves from these cows were sired by Hereford, Angus, Brangus and Santa Gertrudis bulls (appendix table 4).

^b No difficulty includes no assistance or minor hand assistance. Results are based on breed of cow subclass means (not least squares).

^c Of cows alive at calving; heifers removed from experiment only for serious injury or by death and not for being open.

^d Early mortality is within 72 hr of birth; late is from 72 hr after birth until weaning.

^e Adjusted to a steer basis. Least-squares adjustment factors for heifers were 9.4 lb. for birth weight and 32 lb. for 200-day weight.

TABLE 27. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
CALVING DATE, REBREEDING PERFORMANCE AND SIZE OF COWS CALVING AS 2-YEAR-OLDS
CYCLE II, PHASE 2 - COWS BORN IN 1973

Breed of Cow		No. Calving as 2-Year-Olds	Avg. Calving Date	Postpartum Interval, Days ^a	Percent Pregnant ^b	Cow Wt. at 2½ Yrs. of Age, lb.	Hip Ht. at 2½ Yrs. of Age, in.
Sire	Dam						
Angus	Hereford	19	March 27	74.4	88.2	942	47.2
Hereford	Angus	17	March 25	57.0	93.8	943	47.0
	Average	36	March 26	65.7	91.0	942	47.1
Red Poll	Hereford	12	March 23	70.6	90.0	889	47.4
	Angus	16	March 25	65.1	81.3	865	46.6
	Average	28	March 24	67.9	85.6	877	47.0
Brown Swiss	Hereford	26	March 29	69.8	92.3	963	49.5
	Angus	23	March 26	77.1	100.0	955	49.1
	Average	49	March 27	73.4	96.2	959	49.3
Gelbvieh	Hereford	18	March 27	68.7	100.0	1011	49.6
	Angus	18	March 29	60.9	100.0	993	48.4
	Average	36	March 28	64.8	100.0	1002	49.0
Maine Anjou	Hereford	19	March 26	69.8	89.5	1060	50.5
	Angus	18	March 25	68.6	88.2	1021	49.2
	Average	37	March 25	69.2	88.8	1040	49.9
Chianina	Hereford	11	April 6	60.0	72.7	1074	53.5
	Angus	16	March 22	78.9	93.3	1045	52.7
	Average	27	March 30	69.4	83.0	1059	53.1
Average	Hereford	105	March 28	68.9	88.8	990	49.6
All Sire	Angus	108	March 25	67.9	92.8	970	48.8
Breeds	Average	213	March 27	68.4	90.8	980	49.2

^a Interval from calving to first estrus.

^b Breeding period was 64 days by natural service to Simmental bulls. Percent pregnant = no. palpated as pregnant ÷ no. palpated, and only include cows that calved prior to breeding.

TABLE 28. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
CALVING DIFFICULTY OF CALVES FROM 2-YEAR-OLD COWS
CYCLE II, PHASE 3 - 1975 CALF CROP

Breed of Calf		No. Calves Born	Type of Parturition, %			
Sire	Dam ^a		No Calving ^b Difficulty	Calf- Puller	C-Section	Abnormal Presentation
Angus	Hereford-Crosses	21	50.8	41.2	2.3	5.6
Hereford	Angus-Crosses	28	48.9	40.9	3.7	6.5
AI Sires	Average	49	49.9	41.1	3.0	6.0
Brangus	Hereford-Crosses	30	52.9	41.5	2.3	3.3
	Angus-Crosses	30	45.6	49.2	5.5	0.0
	Average	60	49.3	45.3	3.9	1.6
Santa Gertrudis	Hereford-Crosses	29	30.9	64.8	0.9	3.4
	Angus-Crosses	32	34.4	48.5	16.4	0.7
	Average	61	32.7	56.6	8.7	2.1
Angus	Hereford-Crosses	22	31.9	48.2	9.4	10.5
Hereford	Angus-Crosses	14	67.8	40.4	0.0	0.0
Clean Up Sires	Average	36	49.9	44.3	4.7	5.2
Average	Hereford-Crosses	102	41.6	48.9	3.7	5.7
All Sire	Angus-Crosses	104	49.2	44.7	6.4	1.8
Breeds	Average	206	45.4	46.8	5.0	3.7

^a Two-way-cross cows mated as shown in appendix table 4, and does not include backcross calves out of Hereford-Angus cross cows by clean up Angus and Hereford sires.

^b No assistance or minor hand assistance.

TABLE 29. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
BIRTH DATE, CALF MORTALITY, BIRTH WEIGHT AND PREWEANING GROWTH OF CALVES FROM 2-YEAR-OLD COWS
CYCLE II, PHASE 3 - 1975 CALF CROP

Breed of Calf		No. Calves Weaned ^b	Birth Date	Calf Mortality, ^c %		Calf Wt., lb. ^d			
Sire	Dam ^a			Early	Late	Birth	200- Day	Prewn. ADG, lb. ^d	200-Day Wt. Ratio ^e
Angus	Hereford-Crosses	20	March 16	2.1	0.0	74.8	451	1.89	101.6
Hereford	Angus-Crosses	24	March 13	5.4	3.7	79.1	436	1.79	98.2
AI Sires	Average	44	March 15	3.8	1.8	77.0	444	1.84	100.0
Brangus	Hereford-Crosses	27	March 22	2.9	0.0	83.2	456	1.86	102.7
	Angus-Crosses	20	March 20	15.0	12.6	78.7	440	1.80	99.1
	Average	47	March 21	8.9	6.3	81.0	448	1.83	100.9
Santa Gertrudis	Hereford-Crosses	23	March 21	4.0	13.1	89.6	458	1.85	103.2
	Angus-Crosses	28	March 18	12.6	0.0	86.4	442	1.79	99.5
	Average	51	March 19	8.3	6.5	88.0	450	1.82	101.4
Angus	Hereford-Crosses	18	April 22	17.9	2.4	82.2	452	1.84	101.8
Hereford	Angus-Crosses	13	April 20	7.1	0.0	79.9	432	1.77	97.3
Clean Up Sires	Average	31	April 21	12.5	1.2	81.1	442	1.80	99.5
Average	Hereford-Crosses	88	March 28	6.7	3.8	82.5	454	1.86	102.3
All Sire	Angus-Crosses	85	March 25	10.0	4.0	81.0	437	1.79	98.4
Breeds	Average	173	March 27	8.4	3.9	81.7	446	1.82	100.4

^a Two-way-cross cows mated as shown in appendix table 4.

^b Birth traits calculated from all calves born.

^c Early mortality is within 72 hr of birth; late is from 72 hr after birth until weaning.

^d Adjusted to a steer basis. Least-squares adjustment factors for heifers were 9.4 lb. for birth weight, 32 lb. for 200-day weight and .10 lb./day for ADG.

^e Ratio computed relative to 444 lb. average for Hereford and Angus AI sired calves.

TABLE 30. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
CALVING DIFFICULTY AND CALF MORTALITY OF CALVES FROM 4-5-6-7-8-9-10-YEAR-OLD COWS
CYCLE III, PHASE 2 - 1975 CALF-CROP

Breed of Calf		No. Calves Born	Type of Parturition, %				Calf Mortality, % ^b	
Sire	Dam		No Calving Difficulty ^a	Calf- Puller	C-Section	Abnormal Presentation	Early	Late
Angus Hereford	Hereford	96	94.3	5.1	0.0	0.9	2.5	0.5
	Angus	134	89.9	5.2	0.0	5.2	5.0	0.5
	Average	230	92.1	5.1	0.0	3.0	3.8	0.5
Brahman	Hereford	94	81.4	14.7	0.8	3.1	6.9	2.8
	Angus	132	83.1	13.3	0.0	3.9	4.2	2.0
	Average	226	82.3	14.0	0.4	3.5	5.5	2.4
Sahiwal	Hereford	66	79.9	13.8	1.1	5.1	4.9	1.8
	Angus	88	87.1	9.1	2.0	1.9	3.7	1.5
	Average	154	83.5	11.5	1.6	3.5	4.3	1.6
Pinzgauer	Hereford	99	83.9	9.4	0.7	6.0	4.5	0.6
	Angus	151	85.5	8.7	0.4	5.4	5.2	1.9
	Average	250	84.7	9.0	0.5	5.7	4.8	1.3
Tarentaise	Hereford	29	83.7	15.9	0.0	0.6	7.5	0.7
	Angus	53	91.8	5.3	0.0	3.2	0.0	0.0
	Average	82	87.7	10.6	0.0	1.9	3.8	0.4
Average All Sire Breeds	Hereford	384	84.7	11.8	0.4	3.1	5.2	1.3
	Angus	558	87.5	8.3	0.3	3.9	3.6	1.2
	Average	942	86.1	10.0	0.4	3.5	4.4	1.3

^a No assistance or minor hand assistance.

^b Early mortality is within 72 hr. of birth; late is from 72 hr. after birth until weaning.

TABLE 31. U.S. MEAT ANIMAL RESEARCH CENTER GERM PLASM EVALUATION PROGRAM
BIRTH DATE, BIRTH WEIGHT AND PREWEANING GROWTH^a
CYCLE III, PHASE 2 - 1975 CALF CROP

Breed of Calf		No. Calves Weaned ^b	Birth Date ^c	Birth Wt. ^d lb.	Prewn. ADG ^d lb.	Adj. 200-Day Wt. ^d lb.	200-Day Wt. Ratio ^e
Sire	Dam						
Angus Hereford	Hereford	93	April 4	82.4	1.85	452	97.4
	Angus	127	April 2	81.4	1.98	476	102.6
	Average	220	April 3	81.9	1.91	464	100.0
Brahman	Hereford	85	April 15	98.1	1.85	467	100.6
	Angus	123	April 7	92.8	2.08	509	109.7
	Average	208	April 11	95.5	1.97	488	105.2
Sahiwal	Hereford	63	April 19	94.6	1.74	443	95.5
	Angus	84	April 15	87.8	1.94	475	102.4
	Average	147	April 17	91.2	1.84	459	98.9
Pinzgauer	Hereford	94	April 7	93.9	1.81	454	97.8
	Angus	139	April 2	88.2	2.04	496	106.9
	Average	233	April 4	91.1	1.93	475	102.4
Tarentaise	Hereford	27	April 9	91.0	1.85	462	99.6
	Angus	53	April 8	85.8	2.01	486	104.7
	Average	80	April 8	88.4	1.93	474	102.2
Average All Sire Breeds	Hereford	362	April 11	92.0	1.82	456	98.3
	Angus	526	April 7	87.2	2.01	488	105.2
	Average	888	April 9	89.6	1.91	472	101.7

^a All calves from cows 4 years of age or older.

^b Birth traits calculated from all calves born, weaning traits calculated on all calves weaned and raised by their own dam.

^c The AI breeding season to produce these calves was initiated on June 3, 1974 except for Sahiwal sires for which semen was not available until June 12.

^d Adjusted to a steer basis. Least-squares adjustment factors for heifers were 9.30 lb. for birth weight, 36 lb. for 200-day weight, and .13 lb/day for ADG.

^e Ratio computed relative to average 464 lb. for Angus-Hereford and Hereford-Angus crossbred controls.

APPENDIX

TABLE 1. MATING PLANS TO PRODUCE CYCLE I, PHASE 2 CALVES

1969, 1970, 1971 Breeding Seasons

Dam Breeds ^a	Sire Breeds						
	Hereford	Angus	Jersey	South Devon	Limousin	Simmental	Charolais
Hereford	X	X	X	X	X	X	X
Angus	X	X	X	X	X	X	X

^a The cows were 1, 2, 3 and 4-year-olds in 1969; 1, 2, 3, 4 and 5-year-olds in 1970; and 2, 3, 4, 5 and 6-year-olds in 1971.

APPENDIX

TABLE 2. MATING PLANS TO PRODUCE CYCLE II, PHASE 2 CALVES

1972 and 1973 Breeding Seasons

Dam Breeds ^a	Sire Breeds						
	Hereford ^b	Angus ^b	Red Poll	Brown Swiss	Gelbvieh	Maine Anjou	Chianina
Hereford ^c	X	X	X	X	X	X	X
Angus ^c	X	X	X	X	X	X	X
Red Poll	X	X	X	X			
Brown Swiss	X	X	X	X			

^a The cows were 3, 4, 5, 6 and 7-year-olds in 1972; and 3, 4, 5, 6, 7 and 8-year-olds in 1973.

^b Sample of same Hereford and Angus sires used in Cycle I, 1969, 1970 and 1971 breeding seasons.

^c Cows used for GPE Cycle I, 1969, 1970 and 1971 breeding seasons.

APPENDIX

TABLE 3. MATING PLANS TO PRODUCE CYCLE I, PHASE 3 CALVES

Breed Group ^a	Sire Breeds										3rd and 4th Calf Crops ^d
	First Calf Crop ^b					Second Calf Crop ^c					
	Here-ford ^e	Angus ^e	Brah-man	Devon	Hol-stein	Here-ford ^e	Angus ^e	Gelb-vieh	Maine Anjou	Chia-nina	
H x H		X					X				X
A x A	X					X					X
A x H			X	X	X			X	X	X	X
H x A			X	X	X			X	X	X	X
J x H		X	X	X	X		X	X	X	X	X
J x A	X		X	X	X	X		X	X	X	X
SD x H		X	X	X	X		X	X	X	X	X
SD x A	X		X	X	X	X		X	X	X	X
L x H		X	X	X	X		X	X	X	X	X
L x A	X		X	X	X	X		X	X	X	X
S x H		X	X	X	X		X	X	X	X	X
S x A	X		X	X	X	X		X	X	X	X
C x H		X	X	X	X		X	X	X	X	X
C x A	X		X	X	X	X		X	X	X	X

- ^a Females of each breed group distributed equally among cells marked "X" for each calf crop.
^b Each group of heifers bred as yearlings to produce one calf crop as 2-year-olds by these breeds.
^c Each group of cows bred as 2-year-olds to produce one calf crop as 3-year-olds by these breeds.
^d Each group of cows bred to produce at least two calf crops by this breed.
^e Sample of same sires used in Cycle I, 1969-70-71 breeding seasons.

APPENDIX

TABLE 4. MATING PLANS TO PRODUCE CYCLE II, PHASE 3 CALVES

Female Breeding Groups ^a	Sire Breeds				2nd, 3rd and 4th Calf Crops ^c
	First Calf Crop ^b				
	Hereford ^d	Angus ^d	Brangus	Santa Gertrudis	Simmental
Hereford		X	X	X	X
Angus	X		X	X	X
Red Poll	X	X			X
Brown Swiss	X	X			X
H x A & Recip.			X	X	X
H x R.P. & Recip.		X	X	X	X
H x B.S. & Recip.		X	X	X	X
A x R.P. & Recip.	X		X	X	X
A x B.S. & Recip.	X		X	X	X
R.P. x B.S. & Recip.	X	X			X
Gelbvieh x Hereford		X	X	X	X
Gelbvieh x Angus	X		X	X	X
Maine Anjou x Hereford		X	X	X	X
Maine Anjou x Angus	X		X	X	X
Chianina x Hereford		X	X	X	X
Chianina x Angus	X		X	X	X

^a Females of each breed group distributed equally among the cells marked "X" for each calf crop.

^b Each group of heifers bred as yearlings to produce one calf crop as 2-year-olds by these breeds.

^c Each group of cows mated to produce at least three calf crops by 3/4 or 7/8 Simmental bulls.

^d Sample of same Hereford and Angus sires used in Cycle I, Phase 1, 1969, 1970 and 1971 breeding seasons.

APPENDIX

TABLE 5. MATING PLANS TO PRODUCE CYCLE III, PHASE 2 CALVES^a

1974 and 1975 Breeding Seasons

Female Breeds ^b	Male Breeds					
	Hereford ^c	Angus ^c	Brahman	Sahiwal	Pinzgauer	Tarentaise
Hereford		X	X	X	X	X
Angus	X		X	X	X	X

^a Approximately 1600 calves will be produced from these matings with 256 heifers (32 of each breed group, except Tarentaise) located at Brooksville, Florida, and the remainder located at the U.S. Meat Animal Research Center. These F₁ heifers will be bred naturally to Red Poll bulls for their first calf-crop and to Simmental bulls for their three subsequent calf-crops.

^b Cows used for GPE Cycle I, Phase 1.

^c Sample of same Hereford and Angus sires used in Cycle I, Phase 1 1969, 1970 and 1971 breeding seasons.