PROGENY TESTING BULLS

Trials with five popular Hereford lines, using commercial cow herds, indicate that significant increases in size, cuttability and yield of boneless, closely trimmed retail cuts from round, loin, rib and chuck can be obtained through breeding selection—without impairing carcass quality grade.

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Beef carcass below was given a quality grade of 20, choice, on a scale (as used in the table) with 18, high good, and 19, low choice.

THESE TRIALS, along with two other experiments to be reported in subsequent issues, resulted from efforts initiated by the California Cattlemen's Association in 1958 to obtain industry support for an expanded University of California research program in beef quality and economy of production. The objective was to discover how much variation in growth and carcass quality existed between the lines being tested.

In 1959, 1960 and 1961, the Kern County Land Company allocated 120 cows of its Hereford commercial herd to the project. These cows were assigned at random to four breeding herds each year. The plan called for three closely related bulls from each of the four lines to be mated to one of these herds in the three successive years. These bulls were supplied by cooperating breeders in the State. One exception in the program occurred when the owner of one of the lines was unable to supply a bull the second year and a bull from a fifth line was supplied in its place.

The breeding season lasted three months, from February through April. Calves were weaned at nine months of age. For the first and third calf crops, the steer calves entered the feedlot as long yearlings and were fed for 120 days. For the second calf crop, the steers entered the feedlot at weaning and were fed for 150 days. The lines tested were coded *A*, *B*, *C*, *D*, and *E* and are summarized in the table. Heifer weaning weights obtained for the first and third calf crops ranked the lines as follows: *B* (494 lbs), *A* (489 lbs), *C* (471 lbs), and *D* (454 lbs). None of the differences in pairs are statistically significant. Weaning grades were obtained for steer and heifer calves in the first calf crop and for steers only in the second. There were no line or sex differences, the range among sire progenies being 86 to 87 or high "2–" to low "2."

Results

The results presented in the table for traits 1, 2, and 3, leave little doubt that line *C* is a faster growing line than *D*. Line *A* is intermediate and closer to *C* than to *D*, but its pair comparisons with *C* or *D* are not statistically significant.

For the three lines that produced three calf crops each, the table shows their

CALIFORNIA AGRICULTURE

Progress Reports of Agricultural Research, published monthly by the University of California Division of Agricultural Sciences.

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Agricultural Publications

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ranking for slaughter weights and carcass measurements. Line *C* cattle weighed 87 lbs more than line *D* cattle at slaughter time. This much difference on today's market would be worth about $18 based on a price of $0.21 for good grade beef. The 57-lb difference in slaughter weight between line *A* and *D* was not statistically significant. Taken at face value it would be considered economically important by the seller, because it is equivalent to $12 per head. The quality grade averaged high-good for each line, and the differences between lines were very small.

If $0.34 is used as the price of good grade carcass beef, the same differences in value occur between line *C* and *D* carcasses and between line *A* and *D* carcasses as occurred among the live animals at $0.21. Differences in dressing per cent among the three lines were small and not statistically significant.

Line *D* carcasses tended to be more muscular and less wasty than carcasses of lines *C* and *A*. The thickness of fat was less in line *D* carcasses than in line *A* carcasses, and the area of rib eye per 100 lbs of carcass weight was greater in line *D* carcasses than in either line *C* or *A* carcasses. Hence, line *D* carcasses had a better yield grade (cuttability) than either line *A* or *C* carcasses. They also had a higher percentage of carcass weight in the form of boneless, closely trimmed meat in the round, loin, rib and chuck.

In the final analysis, all carcasses were adjusted to low choice quality grade. Line *C* carcasses yielded an average of 23 lbs more beef of low choice quality in the form of boneless, closely trimmed meat in the round, loin, rib and chuck than line *D* carcasses. At $0.70 per lb this difference is worth $16. Line *A* carcasses were worth about $5 more than line *D* carcasses. Before adjusting for grade and cuttability, the difference in value between lines *A* and *D* carcasses was $12.

In summary, the results showed line *D* produced carcasses that ranked lowest in value, but best in cuttability; line *A* carcasses ranked intermediate in value, but poorest in cuttability; while line *C* ranked highest in value and intermediate in cuttability.

The three lines *A*, *C* and *D* showed large and statistically significant differences in slaughter weight, cutability, and percentage of boneless, closely trimmed retail cuts from round, loin, rib and chuck. Differences in carcass quality grade were negligible. Thus, it appears that size, cuttability and yield of boneless, closely trimmed retail cuts from round, loin, rib and chuck can be improved through selection without impairing carcass quality grade.

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RANKING OF THREE LINES ON BASIS OF AVERAGE PERFORMANCE OVER THREE CALF CROPS*

Trait	First	Second	Third	Statistical significance of pair comparisons
(1) Weaning weight (lb)	C (541)**	A (517)	D (510)	None
(2) Slaughter weight (lb)	C (1092)	A (1062)	D (1005)	C > D†
(3) Warm carcass weight (lb)	C (678)	A (656)	D (624)	C > D
(4) Dressing percentage	D (62.5)	C (62.2)	A (61.9)	None
(5) Kidney and internal fat (per cent of carcass weight)	D (2.7)	C (2.8)	A (2.9)	None
(6) Fat thickness (in.)	D (0.41)	C (0.46)	A (0.51)	D > A
(7) Rib eye area (sq. in.)	D (12.1)	C (12.0)	A (11.7)	None
(8) Rib eye per cwt. of carcass (sq. in.)	D (1.96)	A (1.80)	C (1.75)	D > A D > C
(9) Marbling score	C (8.3)	D (7.9)	A (7.5)	None
(10) Quality grade	C (18.2)	D (18.0)	A (17.9)	None
(11) Yield grade (cuttability)	D (2.94)	C (3.32)	A (3.43)	D > C D > A
(12) Per cent of boneless closely trimmed retail cuts from round, loin, rib and chuck	D (51.0)	C (50.1)	A (49.8)	D > A
(13) Per cent of boneless closely trimmed retail cuts from round, loin, rib, and chuck, equivalent to low choice quality (carcass index)	D (50.2)	C (49.5)	A (49.0)	D > A
(14) Pounds of boneless closely trimmed retail cuts from round, loin, rib and chuck, equivalent in quality to low choice	C (335.3)	A (319.9)	D (312.2)	C > D

* Lines B and E are excluded since they were not involved in all three calf crops.
** Line average over three calf crops.
† ">"implies a statistically significant superiority.

SALT

Safflower is highly salt tolerant, according to results of field plot experiments in 1962 and 1963. However, safflower appears to be only about half as salt tolerant during germination as during later stages of growth. Salinity decreases the oil percentage of the seed, but oil quality is unaffected.

DURING THE LAST few years the culture of safflower in California has expanded rapidly. Some of the areas in which this oil crop is grown are affected by salt, and this has prompted salt-tolerance investigations at the United States Salinity Laboratory and the University of California at Riverside in 1962 and 1963. The effects of soil salinity on germination, vegetative growth, seed yield, and oil production and quality were determined.

1962 experiments

Four varieties, N-10, US-10, Gila, and a variety designated as 41191197 which was developed by a commercial company, were planted in late March, 1962, according to Latin square design in four 14-foot square plots. Double-row sloping seedbeds on 42-inch centers were used with 36-inch subplots for each variety. Superphosphate at the rate of 66 lbs of P per acre was worked into the soil prior to bed formation. Calicum and potassium nitrates were added in each irrigation for a total application of 240 lbs of N and 315 lbs of K per acre.

Differential salination was initiated approximately three weeks after planting when the plants were in the four-leaf stage. Salt levels were increased stepwise during the next two weeks until the series of plots were receiving 0, 3,000, 6,000, and 9,000 ppm of added salt (equal parts of NaCl and $CaCl_2$) in the irrigation water. The initial salinity of the irrigation water was about 350 ppm. The average soil salinities in the root zone of the four plots, expressed as the electrical conductivity of the saturation extract (EC_e), were 0.9, 4.7, 7.9, and 11.2 millimhos per centimeter.

Within a month after initial salination,