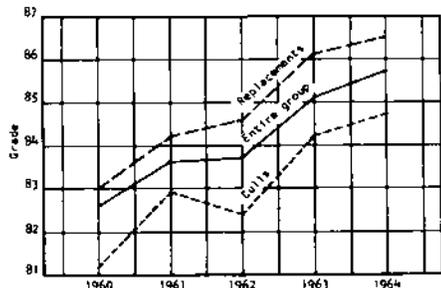


*Extra pounds,  
Extra quality beef . . .*

# U.C. HEIFER

R. HELPHENSTINE • K. ELLIS

GRAPH 1. CONFORMATION GRADES, MATT KEEGAN HERD, COLUSA COUNTY, UNDER HEIFER SELECTION PROGRAM, 1960-1964

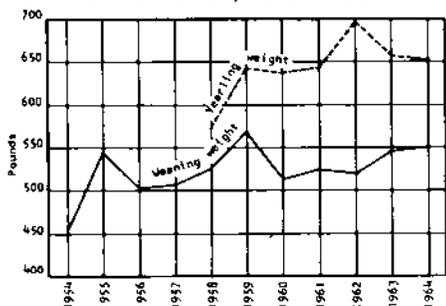


More pounds of beef, better quality, and improved conformation have been achieved in commercial cattle herds using the Heifer Selection Program of the University of California Agricultural Extension Service. The selection program is based mainly on the inherited traits of conformation grade and postweaning gaining ability.

tual selection of a cow herd that will transmit high conformation grades and postweaning gaining ability—both highly heritable characteristics. Conformation grade is considered about 30% heritable and postweaning gain, 45%.

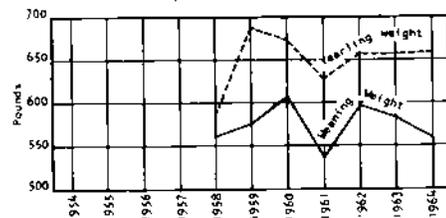
If a cow grading 2 minus is bred to a bull grading 2 plus, the offspring should have a conformation grade of 2, an improvement of  $\frac{1}{3}$  grade. An example of heritability of weaning weight might work out like this. A group of bulls on a feeding test show an average daily gain of 2 lbs. The fastest gaining bull of this group gained 3 lbs daily. How much more can the weaning weights of calves from the fast-gaining bull be above the calves produced from average bulls in the group? Subtracting 2 lbs from 3 lbs leaves a 1-lb increase in daily gain. Since postweaning

GRAPH 2. HEIFER WEANING AND YEARLING WEIGHT AVERAGES UNDER HEIFER SELECTION PROGRAM, 1954-1964, JOHN McNABB RESERVATION RANCH, TEHAMA COUNTY



**H**EREDITY, AS WELL AS ENVIRONMENT, is an important consideration in planning for profitable beef cattle production in commercial herds. Buying the best bulls possible (high-grading and tested for rate of gain) is a basic part of any improvement program; but another highly useful part of the program involves number-branding heifers for even-

GRAPH 3. HEIFER WEANING AND YEARLING WEIGHT AVERAGES UNDER HEIFER SELECTION PROGRAM, 1958-1964, LYMAN WILLARD RANCH, TEHAMA COUNTY



Scales tell the story—weighing heifers during selection program at John McNabb Reservation Ranch.



# SELECTION

## Program

gain is 45% heritable,  $45\% \times 1 \text{ lb} = 0.45 \text{ lb}$ . The offspring received one-half of their inheritance from the dam and one-half from the sire so this 0.45 lb increase must be divided by two, leaving .225 lb daily gain increase. This is the amount of gain that calves from the fast-gaining bull could be expected to exceed that of calves from the average-gaining bulls.

Under this program, the actual performance of each heifer is measured in terms of weaning weight, conformation and postweaning gain. Heifers are number-branded and carry this identification for life. Only the highest-grading and fastest-gaining heifers are kept as herd replacements. Those not measuring up in conformation, weaning weight and gain after weaning are sold. The small amount of ranch time invested in weighing, grading, branding and culling each year's heifers can result in heavier weaned calves, more uniform calf crops, and a possible outlet for tail-end heifers as replacements in other herds.

A study of three cooperating ranches in northern California (summarized in charts and tables) illustrates the value of the heifer selection program.

At the Matt Keegan ranch in Colusa County, the program was started in the fall of 1959, with the first selection made in June, 1960. The average number of grade points for the entire group of heifers was 82.6, or "grade 3" by the University of California grading system—with the selected group averaging 83; the culls averaged 81.2 (see graph 1). In June,

1964 (the fifth year of selection), all heifers averaged 85.7 points with the selected group averaging 86.5 and the culls 84.7. After five years, the culled group averaged higher (84.7 points) in conformation than the selected group (83) the first year—showing a striking increase of 3.5 grade points in the heifers from the first to fifth year.

During the first year of the program, Keegan's heifers gained 217 lbs per head; in the fourth year, 244; and the fifth, 228. Some fluctuation in gain was due to seasonal conditions. Daily gain the first year was .96 lb per day, the fourth year, 1.24; and the fifth year, 1.10 lbs. In the fourth year some heifers that entered the herd were produced from the first year's se-

Number brands on heifers in photo below allow individual identification in selection program. First number indicates year of birth.



TABLE 1. GRADING AND DISTRIBUTION SUMMARY OF HEIFER CALVES GRADED AT MCNABB RESERVATION RANCH, 1954-64

Year	Cattle Number	(2+)	(2)	(2-)	(3+)	Average wean wt. lbs
		89 and above	88-86	85-83	82 and below	
		PER CENT OF YEARLY TOTAL				
1954	63	0	1.6	47.6	50.8	456
1955	52	1.9	34.6	36.5	27.0	548
1956	70	0	17.2	35.7	47.1	501
1957	85	1.2	38.8	35.3	24.7	505
1958	79	6.3	44.3	29.1	20.3	524
1959	51	7.8	37.3	53.0	1.9	568
1960	50	16.0	56.0	22.0	6.0	512
1961	62	12.9	61.3	19.3	6.5	522
1962	69	4.4	60.8	34.8	0	519
1963	73	17.8	53.4	28.8	0	544
1964	97	11.3	73.2	15.5	0	550
Total	751					

TABLE 2. SUMMARY OF HEIFERS GRADED (YEARLING GRADE) AND DISTRIBUTION AT L. WILLARD RANCH

Year	Cattle Number	(2+)	(2)	(2-)	(3+)
		89 and above	88-86	85-83	82 and below
		PER CENT OF YEARLY TOTAL			
1958	25	8.0	48.0	36.0	8.0
1959	25	8.0	52.0	40.0	0
1960	25	12.0	80.0	8.0	0
1961	40	17.5	55.0	25.0	2.5
1962	40	0	90.0	10.1	0
1963	41	12.2	80.5	7.3	0
1964	33	18.2	78.8	3.0	0

lected heifers. Cull heifers from the selection process have improved to such an extent, that, for the past two years, another cattleman has purchased them for replacement heifers in his herd.

#### Ten years

An outstanding record has also resulted from ten years of heifer selection at the John McNabb Reservation Ranch, Tehama County. Starting in 1954, the average conformation grade of the McNabb heifers has risen from below 83 points (2 minus) to above 87 (nearly 2 plus) in 1964. Table 1 illustrates the percentage change and the steady improvement in the conformation grade. Note that in 1954 over 50% of the heifers graded 82 points or below. In 1964 over 73% placed in the grade 2 category (an increase in this category of 71.6%).

Weaning and yearling weights also showed a gradual increase on the McNabb ranch. As in all range cattle operations weights vary with weather conditions from year to year. Graph 2 shows the increase in weaning and yearling weights of the heifers. As with the Keegan herd, heifers not kept for replacements were usually purchased by other ranchers for herd replacements.

#### Increased grade

Progress with heifer selection at the Lyman Willard ranch, Tehama County, has shown a similar trend (see graph 3). Seven years of heifer selection have resulted in an increase in grade 2 heifers in each year's crop from 48% to around 80%. Grade 2-minus heifers have decreased from 36% to 7% of the total heifers graded each year. Yearling weights also showed a decided increase during the heifer selection program.

All three of the cooperating cattlemen agreed that selecting and buying the best bulls possible (rate-of-gain tested and high grading) are also important. But another highly useful part of any successful improvement program is number branding for heifer selection as an aid in herd management and culling. The University of California Agricultural Extension Service Heifer Selection Program is now being used in more than 84 herds, in 24 counties, with over 6,133 cattle involved. This program has proven itself to be a practical plan for obtaining heavier weaning weights, more uniformity, improved quality and higher grading cattle.

*R. Helphenshine is Farm Advisor, Colusa County, and K. Ellis is Farm Advisor, Tehama County.*

# Propagation of California Wax Myrtle

*... a valuable native  
shrub or tree for  
highway landscaping*

R. M. SACHS • J. DEBIE • R. W. ISLE

California Wax Myrtle, recently selected for testing along highways, is not propagated commercially; hence, performance trials with this species have lagged because of inadequate numbers of plants. Results of research reported here show that rooting of cuttings is greatly dependent upon the nature of the cutting material and time of year at which cuttings are taken. Up to 80% rooting has been achieved at U. C., Davis, using softwood cuttings taken in April, and applying mist-propagation techniques for two to three months. Rooting percentages are generally increased by treatment with indolebutyric acid (0.8% in a talc preparation).

**F**ROM SANTA MONICA TO PUGET SOUND, the Wax Myrtle (*Myrica californica*) is found in meadows, along streams, and on dunes usually close to the ocean. It is small evergreen tree or large shrub highly prized for its graceful branching habit, dark green foliage, and resistance to disease. As a result, the California Highway Division has considered expanded use of this native for roadside plantings in Mendocino County near the coast and in valleys. Successful experience in these trials may lead to more extensive plantings elsewhere along the Pacific Slope.

Unfortunately, transplanting of Wax Myrtle is difficult and inadequate for large scale landscaping. Early trials indicated less than 10% rooting from cuttings, and, since little information is available concerning propagation for this species, a research program was initiated at U.C., Davis.

Branches, from which cuttings were to be taken for propagation, were collected monthly and bimonthly from native stands near Fort Bragg and shipped to

Davis. Maximum time from collecting branches to sticking cuttings was four days. The branches were divided into three types of cuttings, each 6 inches long, with four to six leaves; terminal (softwood), subterminal (softwood), and one-year-old (hardwood—approximately  $\frac{3}{8}$ -inch caliper). A lightweight rooting medium (coarse vermiculite) was selected to permit easy removal of cuttings with a minimum of root breakage. Regardless of treatment, the new root initials on Wax Myrtle cuttings were extremely brittle at the point of protrusion from the parent stem, and great care was taken to prevent breakage.

One root-initiating substance, indolebutyric acid (IBA), was applied in a talc dip at two levels, 0.1% and 0.8%. After sticking, the cuttings were placed in a heavily shaded greenhouse on benches supplied with bottom heat to maintain a soil temperature of about 70°F. Periodic misting, adjusted to light intensity, was necessary to maintain the cuttings for the first four to six weeks; afterwards, some of the cuttings were transferred to high-