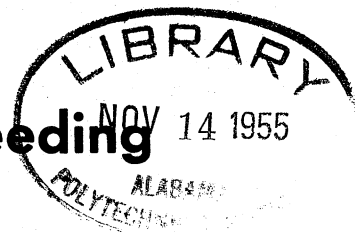


AGRICULTURAL EXPERIMENT STATION of The Alabama Polytechnic Institute, Auburn, Ala.

E. V. SMITH, Director

Report of Herd Improvement by Crossbreeding

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MOST ALABAMA milk cows produce too little milk to be profitable. The average annual production of all milk cows in the State is less than 3,500 pounds.

In many cases an improved feeding program could result in an increase of 30 to 50 per cent in production level. An example of this is the production performance of the A.P.I. College dairy herd. In 1947 it averaged 5,120 pounds of milk per cow. A year later average production of the herd rose to 6,640 pounds, while concentrate consumption dropped 1,000 pounds per cow. The difference was the better supply of good pasture and other roughage than in the previous year. Another example is the 1952 and 1953 performance of nine mature Jersey cows in an experimental herd at the A.P.I. Agricultural Experiment Station's Dairy Management unit (North Auburn area). In each case they calved about the first of the calendar year. In 1953, a relatively good roughage and pasture year on this unit, these cows averaged 9,070 pounds of milk, or 2,040 pounds more than the 1952 production average.

Even under the best feeding and management conditions, however, it is impossible to get profitable production from many of Alabama's milk cows. Studies at several Substations of the A.P.I. Agricultural Experiment Station System (1, 2, 3,) show that in some cases grade Jersey herds with better-than-average pasture and feeding conditions average no more than 6,000 to 7,000 pounds of milk.

PRODUCTION PERFORMANCE OF EXPERIMENTAL HERD

Late in 1949 a herd was assembled at the dairy management unit. Most of the animals were grade Jerseys and Guernseys, and were obtained from farmers in the Piedmont Area of Alabama. A few purebred Jersey cows from the College dairy herd were added to the experimental herd. Given in Table 1 are the production data, level of feed consumption, and estimated returns above feed cost of this herd from 1950, the first full year of operation, through 1954.

Most of the milk from this unit was sold as Grade A; the highest price received was \$6.65 per hundred-weight in 1951, and the lowest was \$5.42 per hundred-weight in 1954. The variation reflects an increased amount of surplus milk in the past 2 or 3 years. This so-called surplus was sold to an evaporated milk plant at a price of approximately \$3 per hundredweight. In addition to actual returns, presented in Table 1 are the calculated returns above feed cost with milk valued at \$4 per hundred pounds.

Variations in weather conditions experienced during the period were as follows: 1950 was a reasonably good feed year until a severe November freeze eliminated all winter pastures; 1952 was a relatively poor feed year in comparison with 1953. The severe drought of 1954, probably the worst in the history of this section, practically eliminated all summer pastures. As a result, there was little supplemental forage grown or harvested on the unit. Consequently, an abnormally large amount of concentrate was fed the milking herd.

TABLE 1. PERFORMANCE OF EXPERIMENTAL HERD, 1950-1954¹

Years	No. cows	Av. milk prod.	Av. fat test	Av. hay equiv. consumption	Av. concentrate consumption	Total feed cost	Return above feed cost	
							Actual ²	Milk at \$4
		Lb.	Pct.	Lb.	Lb.	Dol.	Dol.	Dol.
1950	29	4,540	5.0	1,900	1,600	109	165	73
1951	30	4,390	4.9	1,150	1,150	87	190	89
1952	42	5,870	4.6	1,850	1,610	115	274	120
1953	47	7,090	4.5	2,690	1,570	124	273	160
1954	59	6,740	4.5	1,970	2,300	131	234	139

¹Data from DHIA records.

²Based on price of milk varying from \$5.42 per cwt. in 1954 to \$6.65 in 1951.

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PROGRESS THROUGH IMPROVED BREEDING

In Table 2 are compared the dairy herd operations for 1950-51 and 1953-54. The considerable increase in milk production and in returns above feed cost reflect primarily an improvement in productive capacity of the cows in the herd. Use of proved Holstein bulls on Jersey cows and Jersey bulls on Holstein cows at the Agricultural Research Center of U.S.D.A., Beltsville, Maryland (4) and results from similar programs at state experiment stations have shown some of the possibilities of crossbreeding. At this Station several cows in the dairy herd were bred to Holstein bulls.

A few crossbred heifers came into milk in 1952; the herd of 47 cows included about 15 crossbred heifers that completed full lactation periods in 1953. It is pointed out that from 1950 to 1954 the number of cows in the herd was doubled. This was necessary in developing a herd for feeding experiments and precluded a normal culling program. Even so, by 1954 there remained only a few animals from the original grade herd purchased for the management unit. At the present time, the milking herd consists of about 1/3 Holstein-Jersey crossbred animals, about 1/3 purebred Jerseys, and the remainder, grade Jerseys and Guernseys.

TABLE 2. COMPARATIVE PERFORMANCE OF HERD IN 1950-51 AND 1953-54¹

Years	Av. Milk Prod.	Value of product (\$4 per cwt.)	Total feed cost per cow	Returns above feed cost per cow	Ratio of concentrates consumed to milk produced
	Lb.	Dol.	Dol.	Dol.	
1950-51	4,460	179	98	81	1:3.2
1953-54	6,920	277	127	150	1:3.6
Difference	+ 2,460	+ 98	+ 29	+ 69	-----

¹Data from DHIA records.

PROOF OF GOOD BULLS

Production records on the 12 Holstein-Jersey crossbreds that have completed records and that have dams with completed records for comparison are given in Table 3. Given are the highest actual milk record for

each crossbred animal and also the same record converted to a mature equivalent basis. The records for the dams are the highest made while they were in production and are computed to a mature equivalent basis. In most cases these records were made on DHIA tests and in a few instances on Register of Merit tests.

TABLE 3. COMPARISON OF THE BEST RECORDS OF 12 HOLSTEIN-JERSEY CROSSBREDS WITH THEIR DAMS

Dau.	Sire	Daughters' best records ¹					Dams' best records ¹		
		Actual			Mature equivalent		Mature equivalent		
		Milk	Fat	Age	Milk	Fat	No.	Milk	Fat
		Lb.	Lb.	Years	Lb.	Lb.		Lb.	Lb.
H-3	Inka	12,800	521	(5)	12,900	529	529	8,440	389
H-7	"	11,510	485	(4)	11,860	500	214	6,910	311
H-8	"	12,000	485	(4)	12,640	511	564	7,580	328
H-9	"	9,070	344	(3)	9,910	376	201	8,950	428
H-10	"	12,240	549	(4)	12,890	578	574	8,190	363
H-11	"	11,830	467	(3)	13,490	532	217	8,390	365
H-14	"	11,390	478	(3)	12,980	545	464	5,750	325
H-44	"	16,030	570	(3)	18,270	650	242	6,250	285
H-2	"	5,000	234	(2)	5,950	278	563	6,310	309
H-70	Aide	7,660	343	(2)	9,730	436	464	5,750	325
H-75	"	8,110	340	(2)	9,410	394	33	2,310	137
H-90	"	9,820	407	(2)	12,470	517	1	5,920	233
	Mean =	10,620	435	=	11,880	487			
	Mean of 12 Dams M.E.			=	6,730	317			
	Difference			=	+ 5,150	+ 170			

¹Each record here was made in 305 days, and on twice-daily milking.

In the 12 comparisons, the daughters produced an average of 5,150 pounds more milk and 170 pounds more fat than did their dams. It is also pointed out that the average actual production of 10,620 pounds of milk and 435 pounds of fat is based on performance by immature cows. Only one crossbred in this group was as old as 5 years when these records were started.

Since no Holstein females were in the herd when this breeding study was started, Holstein bulls were used on Jersey cows in all cases. Also, it must be noted that the daughters of only two bulls were involved in this comparison. The Station had two bulls of excellent transmitting ability, Penstate Marksman

Inka 963021, and B.D.I. Dugline Aide 1042560. Inka is from the Holstein herd at Pennsylvania State University. Aide is from the herd of the Dairy Branch, A.R.S., Beltsville, Maryland.

The average performance of 16 crossbred females as compared with that of the remaining 43 animals in milk during 1954 is given in Table 4. From the data in this table, it is obvious that the daughters of good Holstein bulls produced at a much more profitable level than did the other animals in the herd. Based on milk selling at \$4 per hundredweight, returns per cow above feed costs were \$122 greater for crossbreds than for the others.

TABLE 4. COMPARISON OF AVERAGE PERFORMANCE OF 43 COWS (NOT CROSSBRED) AND 16 CROSSBRED HEIFERS IN 1954¹

Group	Milk prod.	Fat	Concentrates fed	Total feed cost	Returns above feed cost (milk @ \$4/cwt.)
	Lb.	Lb.	Lb.	Dol.	Dol.
16 crossbred animals ²	9,480	410	2,450	152	227
43 other animals in herd (chiefly Jersey and grade Jersey)	5,720	262	2,239	124	105
Difference	+ 3,760	+ 148	+ 211	+ 28	+ 122

¹Actual DHIA records during calendar year of 1954.

²Of these 16 cows, 8 were first-calf heifers in 1954. All are Holstein-Jersey crossbreds.

DISCUSSION OF RESULTS

This is a report of an informal test, involving the use of good bulls on mediocre cows. It appears that hybrid vigor contributed to the superior performance of the crossbred cows. Evidence of this was found, not only in the amount of milk and fat produced, but in the greater persistency of milk flow.

When comparing the average level of milk production during the first 3 months in milk (45 pounds daily) with that of the last 3 months (27 pounds daily), it was found that the crossbreds were producing almost 60 per cent as much milk the last 3 months as the first 3. The comparable figure for the dams was 30 per cent, (32 pounds daily to 10 pounds daily).

While interpreting these results, it should be pointed out that the crossbred daughters averaged 100 to 150 pounds heavier in body weight than their Jersey-bred dams.

A question is often raised about difficulties of a Jersey dam dropping a Holstein-sired calf. This has not been a problem in the course of this study, because small, immature cows and Jersey heifers were not bred to Holstein bulls.

During much of the time between 1950 and 1954, several cows in the herd were on feeding tests that had a bearing on milk production level. This is one reason the study reported here is considered a test rather than a controlled breeding experiment. However, from time to time most of the animals in the herd were subjected to feeding experiments involving poor quality forages; hence, this handicap was no greater for one group (in these comparisons) than for

another. Tables 1 and 4 give the level of concentrates fed and Table 1 gives the estimated hay consumption by the herd.

APPLICATION OF RESULTS

Where a farmer has a low-producing herd of cows, whether grade or purebred, his greatest need from the standpoint of herd improvement is to get the service of a good proved bull. Often this can be done through an artificial breeding association. When using a well-bred bull, the most rapid progress probably can be made by crossbreeding.

If the milk produced by a dairyman's herd tests more than the market demands and if high test milk does not command a good premium for extra fat, he may wish to develop cows producing at a fat level in line with market demands. Crossing cows of Jersey or Guernsey breeding with a well-bred Holstein male should result in offspring that produce a greater volume of milk testing around 4 per cent butterfat. The 12 daughters referred to in Table 3 produced milk averaging 4.1 per cent.

Regardless of the system of herd improvement used, a complete record of milk production and feed consumption is very important if a dairyman is to accurately measure his progress. The DHIA testing program enables him to keep such records.

REFERENCES

1. Baker, K. G. A System for Process Milk Production in the Black Belt. API Agricultural Experi-

ment Station, Progress Report Series No. 45, Aug., 1946.

2. Brown, Otto. Summaries of Some Experiments at the Gulf Coast Substation. API Agricultural Experiment Station, Mimeographed Sheet, Feb., 1948.

3. Stewart, Fred and Boseck, John. Feed and Forage Cropping System for Process Milk Production

in the Alabama Tennessee Valley. API Agricultural Experiment Station, Progress Report Series No. 9, Apr., 1947.

4. Fohrman, M. H., et al. A Crossbreeding Experiment with Dairy Cattle. USDA Tech. Bul. No. 1074, Feb., 1954.