COMPARISON OF HIGH 20 AND LOW 20 HOLSTEIN HERDS ON DAIRY HERD IMPROVMENT ASSOCIATION TEST DURING 1989

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Story in Brief

Rolling herd averages for Holstein herds on Oklahoma's Dairy Herd Improvement records program range from 9,481 to 22,565 lb of milk. A study of the differences in various management factors between the High 20 and Low 20 herds provides information for dairy workshops, Animal Science courses, and producer discussions. Forty production data factors were taken from the monthly Dairy Herd Improvement Herd Summary of each herd or calculated for the comparisons. Those factors with a wide variation between groups which seemed to contribute most to the difference in production levels were: 1) quality of forage and quantity of grain fed; 2) management of dry periods and reproduction; and 3) genetic levels of the herd as controlled by use of artificial insemination. When Holstein herds were ranked on lb of milk, Rolling Herd Average, the Low 20 herds averaged 12,188 lb of milk valued at $1,554 compared to 20,741 lbs of milk valued at $2,553 for the High 20 Holstein herds. Average cost of feed was $356 more for the High 20 herds, however there was $606 more return above feed costs per cow. The High 20 farms had approximately $55,000 per farm additional income above feed costs as compensation for extra labor, management expertise, and genetic potential needed to reach their production levels.

(Key Words: Dairy Herd Improvement, Genetics, Dairy Management, Production Testing.)

Introduction

The January 1990 Dairy Herd Improvement Association Herd Summaries (DHIA-202) show that 20 Oklahoma dairy producers had Rolling Herd Average (RHA) production surpassing 20,000 lb of milk. This number represents approximately 7.5% of the total herds on DHI in Oklahoma and is more than triple the number of 1988. The production leader had 22,565 lb. Because the

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dramatic increase in high producing herds was accompanied by a 380 lb increase in the state average production, we evaluated management factors across all levels of production. Dividing the Oklahoma herds on DHI into four production levels at 2,000 lb increments, from less than 14,000 lb to over 18,000 lb indicate that the good herds improve and the low herds seemed to decrease during 1989.

Why were Oklahoma herds polarizing toward the extremes? The objectives of this study were to analyze the DHIA-202 Herd Summaries of the High 20 and Low 20 herds to determine management differences of the two groups.

Materials and Methods

Holstein herds on official DHIA programs were sorted in descending order of RHA milk production. The High 20 and the Low 20 were selected to study the criteria that contribute to the production difference of the two groups. All data on the Herd Summary (DHIA-202) of each herd were used in the analysis. The data was averaged or percentages calculated where appropriate with standard deviation calculated for each management factor. Production data was also compared to a similar study conducted 10 years ago.

Results and Discussion

There was 8,620 lb of milk difference between the High 20 Holstein herds averaging 20,741 lb and the Low 20 Holstein herds averaging 12,121 lb of milk on a RHA basis in 1989. Seven herds of the High 20 and five herds of the Low 20 were in the same group in 1980. Over the last 10 years, the top 20 herds increased an average of 1,423 lb or 7.4%. During the same 10 years, herds now ranking as the Low 20 have production 21.5% higher than the 10,028 lb for the Low 20 in 1980.

Table 1 lists the production, income, and feed cost data for the two groups. The value of milk produced was $1,545 for the Low 20 herds compared to $2,540 for the High 20 herds, a $995 difference. The income over feed cost of the High 20 herds was $585 per cow more even after paying for the $409 higher feed costs required to produce at those levels.

Table 2 lists the feeding program of the two groups. Not all herds of either group fed hay, silage, and pasture. Two of the High 20 herds were feeding a total mixed ration with cows in confinement. Some herds of each group were fed a combination of hay and pasture as the roughage, others used silage as the primary forage with hay and pasture as a supplement. The quality codes on the DHIA-202 are only listed for the current month with pounds fed and cost listed

Table 1. Production and income of High and Low 20 Holstein herds.

Factor, per cow	Low 20 average	SE	High 20 average	SE	Difference
Herd milk	12,121	1,025	20,741	645	8,620 lb
Herd fat	431	35	703	56	272 lb
Herd protein	395	31	655	30	260 lb
Milk value	$1545	$126	$2540	$208	$995
Feed cost	$770	$119	$1179	$153	$409
Income/over feed cost	$776	$169	$1361	$221	$585

Table 2. Feed data for High and Low 20 Holstein herds.

Factor, per cow	Low 20 average	SE	High 20 average	SE	Difference
Body weight	1133	101	1300	92	167 lb
Forage dm, cwt./ body weight, lb	1.90	.60	1.86	.69	.04 lb
Lb milk/lb grain	2.02	.32	2.43	.29	.41 lb
Hay fed	6011	2332	5825	3346	-187 lb
Silage, lb	10330	4695	10932	3137	601 lb
Pasture days	277	90	272	124	-5 days
Grain, lb	6107	1006	8647	1308	2540 lb

for the current month and the year. These codes indicate that the forage program of the High 20 herds contain a higher percentage of alfalfa and would have a higher protein and energy content than that of the Low 20 herds.

Also, average body weight was 167 lb heavier for the High 20 compared to the Low 20 herds. These weights indicate that the managers of the High 20 Holstein herds possibly make genetic selections for larger animals, and feed for heavier growth rates than the managers of the Low 20 herds. These improved management conditions of the High 20 herds result in larger cows at first freshening and they continue to feed for growth and milk production during later lactations.

Pounds of forage dry matter per cwt body weight was nearly equal for the two groups. More grain by 2,540 lb was fed to the High 20 herds. However, the High 20 herds produced 2.43 lb of milk produced per lb of grain compared to 2.02 lb for the Low 20 herds.

Table 3 refers to the days in milk and the dry period analysis for the two groups. Days in Milk is a very important figure to RHA as 1% of a year equates to 7 milkings on 2X milking or 11 extra on a 3X milking schedule. The High 20 cow group averaged 3.7% more days in milk or 26 milkings more per cow going into the bulk tank compared to the Low 20 herds.

Average Days Dry was 70 days for the Low 20 herds compared to 64 days for the High 20 herds. The extra 6 days dry is not as significant as the percent of cows in the 40 to 70 day range. Cows dry 10 days and 110 days would average 60 days dry. However, milk yield of each would be negatively affected in the subsequent lactation. The cow dry for only 10 days would not have enough rest to achieve maximum milk yield in the subsequent lactation, while the cow dry for 110 days would be susceptible to fatty udder, fat cow syndrome, etc. The High 20 group had 18% more cows in the desired 40 to 70 day range for dry periods than the Low 20 herds.

All factors of Table 4, reproductive data, favor the High 20 group of herds. Calving interval was 21 days shorter for the High 20 herds, at 418 compared to

Table 3. Dry period analysis for High and Low 20 Holstein herds.

Factor	Low 20 average	SE	High 20 average	SE	Difference
Days in milk, %	84.6	6.36	88.3	2.21	3.7%
Dry periods <40 days, %	17.6	13.40	13.0	16.30	-4.6%
Dry periods 40-70 days, %	45.5	18.30	63.5	8.95	18.0%
Dry periods >70 days, %	31.7	16.40	23.9	13.50	-7.8%
Dry days	70.0	27.90	64.0	8.95	6.0 days

Table 4. Reproductive data of High and Low 20 Holstein herds.

Factor	Low 20 average	SE	High 20 average	SE	Difference
Calving interval	439	40.2	418	21.6	-21 days
Days to 1st bred	99	23.1	88	15.0	-11 days
Open, days	159	40.6	140	23.0	-19 days
Services/conception	2.1	.55	2.0	.42	-.1 ser

439 for the Low 20 herds. Days open was 19 days less for High 20 herds compared to that of the Low 20. Services/conception was at or near the state average of 2.0 for each group. It should be noted however, that all of the High 20 were reporting breeding dates, whereas only 13 of the Low 20 herds reported breeding dates.

There are wide differences in genetic levels between the low and high groups (Table 5). Only 25.9% of the producing cows of the Low 20 herds are out of proven sires compared to 84.9% for the High 20. Also the level of proof favors the High 20 by $48.50. The High 20 herds are going to perpetuate their advantage as 73.1% of the current heifer inventory are out of proven bulls and 89.3% of the cows are bred back to sires with known genetic levels. The Low 20 herds have only 35.7% of the heifers out of proven sires and 35.3% of the cows bred to sires with known genetic levels. The genetic level of sires used is also significant. Low herds average $112.70 plus Predicted Difference Dollars (PD$) bulls to $160.00 PD$ sires of the High group. When natural service or young sires without PD are calculated into the average as zero PD$, the High 20 average $142 PD$ compared to $70 for the Low 20 herds.

Other factors (Table 5) that indicate a difference in management level between the High and Low 20 herds are heifer to cow ratio, age of herd, and percent first lactation. Culling rate is only calculated on the Herd Genetic Evaluation once per year in March. However, the calculation of percent cows in first lactation will usually be almost equal to the culling percentage. When

Table 5. Genetic evaluation of High and Low 20 Holstein herds.

Factor	Low 20 average	SE	High 20 average	SE	Difference
Herd size	82	43.4	99	79.0	17 cows
Cow:heifer ratio	1:.54	45.3	1:1.11	31.1	.57 hfrs
Heifers with PD, %	35.7	35.1	73.1	27.2	37.4 %
Cows with PD, %	25.9	22.6	84.9	17.2	59.0 %
PD$ of cows with PD	26.60	52.40	75.10	19.20	48.50 $
PD$ of service sires with PD	112.70	64.10	160.00	16.20	47.30 $
PD$ of all service sires	70.10	60.80	142.00	18.70	71.90 $
Cow bred to sires with PD, %	34.30	38.30	89.30	10.40	55.00 %
Age at first freshening	29.21	4.78	27.21	2.21	2.00 mo
Age of herd	54.40	9.87	46.30	2.93	8.10 mo
Herd as first lactation, %	25.0	7.40	36.0	2.30	11.0 %

making this calculation, the High 20 herds had 36% first Lactation animals compared to 25% for the Low 20. The High 20 also had a younger herd and a higher replacement heifer to cow ratio. The lower replacement heifer ratio can usually be attributed to use of beef bulls, higher heifer death loss, and longer calving interval of the low production herds.

Somatic Cell Counts (SCC) measure the amount of white blood cells and epithial cells discharged from milk secreting tissue of the udder. The higher the count the more stress or infection to that tissue. Healthy cows are considered to have counts below 100,0C0/ml. The age of cow will have some effect on somatic cell counts and healthy cows will increase with successive lactations. Milk quality standards suggest that bulk tank somatic cell counts should be below 300,000. Research with SCC indicate that as the linear score changes one score, up or down, the change in milk production due to change in udder stress is 1.5 lb per day in the same direction. The linear scale is devised as 1 to 9 with the raw SC count doubling for each score above 25,000. (1 = 25,000, 2 = 50,000, 3 = 100,000, etc.) The High 20 herds had 241,000 SC count compared to 481,000 for the Low 20 producing herds for the end of 1989 (Table 6). A factor that is probably more significant is that the High 20 herds had 10.9% of individual cows with counts above 400,000 compared to 32.8% for the Low 20 group.

Dairymen of both groups should analyze their DHIA and financial records to determine the areas of needed improvement. Applying the management resources in the areas of most impact on the immediate and future profits will be rewarding.

Table 6. Somatic cell counts of High and Low 20 Holstein herds.

Factor	Low 20 average	SE	High 20 average	SE	Difference
Raw somatic cell count	481,000	164,000	241,000	104,000	240,000
Linear score	4.65	.51	3.65	.35	1.0
Cows over 400,000, %	32.8	13.7	10.9	7.5	25.3