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2000 Statistics and Analysis Oklahoma Dairy Herd Improvement Association Records

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Accurate records are key to the success of any enterprise, and dairy farming is no exception. Dairy Herd Improvement (DHI) records are indispensable when evaluating and analyzing production management practices. Over the years, the DHI program has grown from strictly a production-testing program into a complete dairy herd management system. By keeping and using DHI records, participating producers are in the best position to cull the least profitable cows, feed for the most efficient production, breed genetically superior cows, increase milk production per cow, lower costs of production, and ultimately increase net profits.

Oklahoma is part of the Heart of America Dairy Herd Improvement Association (DHIA) that offers a variety of testing plans with enough options and flexibility to meet a wide range in producer needs. Also, adoption of the latest computer technology has made the service of DHIA fast and efficient. All data is transmitted via computer and phone modem from the lab, making total turn around time from test day to data processing an average of 3.5 days. Most local supervisors have portable computers so some management data can be provided on test day. Additionally, many producers have on-farm computers making DHIA data available for daily use and updates.

Producers may select from several testing plans such as: DHI or DHIRætechnician weighs two consecutive milkings: DHI-APætechnician weighs and samples one milking, alternating monthly from morning to evening milkings; DHI-APTæsame as AP with official timer to record milking intervals; DHI-APCSæsame as DHI with milk samples collected one milking; OSæherd owner collects weights and samples; SSæspecialized testing plans with no formal rules or requirements.

Table 1 lists the test plans selected by Oklahoma producers with production data for those herds. Over 90% of producers use AP plans to take advantage of the convenience and the 25 to 30% reduction in cost. The cost of maintaining DHIA records is approximately $12 to $24 per cow per year depending on the testing plan and options selected.

Table 2 indicates the trends that have been occurring in dairy herds on DHI and is reflective of the changes occurring in the dairy industry as a whole. In the period from 1985 to 1995, herd size, milk per cow, and income over feed cost increased by 20%. Meanwhile, the 3% lower milk price and 11% increase in total feed costs over that same period forced many producers out of business.

Table 1. Participation in Various Oklahoma DHIA Testing Plans, 2000.

Type of Testing Plan	*No. Herds*	*Cows/ Herd*	*Lbs. Milk*	*Lbs. Fat*	*Lbs. Protein*
01 DHI-AP-T	7	70	16,261	557	521
02 DHI-APCS	5	138	17,390	584	539
31 DHI-AP	55	105	18,059	612	564
20 DHIR	4	170	16,798	609	572
23 DHIR-AP	12	91	18,729	670	603
21 DHIR-AP-T	14	105	19,600	671	630
22 DHIR-APCS	2	100	17,982	615	580
40 OS	3	69	15,961	592	531
41 OS-AP	16	202	16,878	579	533
71 SS-AP	11	300	16,322	583	518
Other plans	2	97	16,515	570	525

High feed prices and an early, severe summer took an especially heavy toll on Oklahoma dairy producers in 1996. Production per cow dropped 3% from the all-time high posted in 1995 and halted a string of four yearly gains in total output. Additionally, total feed cost per cow increased 21% from the previous year, while only a marginal increase (7%) in the value of milk sold was witnessed.

In 1998, Oklahoma once again suffered a severe and early summer. Heat stress took its toll and any chance to return to the 1995 all-time production high was eliminated. To further complicate matters the severe drought resulted in short hay supplies and numerous producers lost milk to aflatoxin-contaminated grains and silage. However, Oklahoma was not alone as many of the major milk producing regions in the country were also suffering the effects of weather extremes, dramatically bolstering milk prices much of the year. This combined with an abundant and cheap feed grain supply, improved income over feed costs by 20% over the previous year and helped many producers pay down debt and stay in business. Only a slight increase in cows per herd was observed in 1998.

In 1999, producers watched the basic formula price (BFP) drop $6in February to $10.27, back up again in September to $16.26 and then down again in December to $9.63. The average BFP for the year settled at $12.43. The only thing making this volatility in the milk market somewhat bearable was the consistent and relatively cheap grain prices throughout the year.

According to USDA, a strong gain in output per cow, plus a second consecutive year of high cow numbers, boosted total U.S. milk production 3% over 1999's record production of nearly 163 billion pounds. Unfortunately, back-to-back record years had an inevitable downside in 2000. Producer prices fell to a 22-year low. Monthly Class III prices average $9.74 per hundredweight, the lowest since averaging $9.57 in 1978. The bottom line for dairies was a frustrating one: Even though average herd size and production per cow were at record highs, the basic milk price average dropped 21.6%. Thankfully for producers, feed prices remained low.

Herd expansion continues in Oklahoma. Since 1995 the number of dairy farms in Oklahoma has decreased 38.3%, while the number of cows has decreased by only 6.2% over the same time period. Currently, Oklahoma has approximately 91,000 cows on 505 farms.

Table 3 lists by quartile several DHIA management factors for Oklahoma Holstein herds. Milk production, as measured by rolling herd average (RHA), is what most producers look at first. However, the level of production can be changed very little unless there is a major improvement in one factor, or a gradual change in several areas of herd management. When desiring timely herd improvement, concentrating on nutrition and reproduction will generally bring about the greatest production return. In addition, many herds would benefit tremendously, in the long run, in the use of improved genetics.

Production: Numerous studies have shown milking fewer, but better, cows can increase net income. A good goal is to produce at least 15% over the breed average if not already producing at that level. If production is 15% above breed average, a goal of increasing production by 250 to 300 pounds per year should be set. The current DHIA production average for the Holstein breed in Oklahoma is 18,130 pounds (Table 5). The production average in 2000 for all herds in Oklahoma, DHIA and non-DHIA, is 14,231 pounds while the U.S. production average for all herds is 18,204.

Summit milk is the average of the two highest of the first three-test days production and is directly related to lactation yield. Studies show that for each 1-pound increase in summit milk, a cow will produce 225 to 230 pounds more milk for the entire lactation. As a rule, cows should peak 8 to 10 weeks after the onset of lactation, and peak milk production of first-calf heifers should be within 25% of older cows. Low peak or summit milk production may indicate inadequate heifer nutrition, cows with excessive or inadequate body condition, poor lactating cow nutrition and/or lower genetic capability.

The percent of first lactation animals in a herd is usually equal to the current culling rate. Although culling rates do vary, if a herd is making genetic progress and maintaining cow numbers the percent first lactation animals is usually 25 to 30%.

Reproduction: Reproduction plays a major role in a herd's milk production level. A cow will not produce milk until she first reproduces. Likewise, a cow will not increase milk production until she reproduces again. The calving interval (CI) should be of concern at any production level. Calving interval is very critical as it affects stage of lactation, percent days in milk, and dry days. Calving interval also has a significant effect on the number of replacement heifers available. Most estimates show that $1.50 to $5 per cow per day is lost for each day the CI exceeds 365 days. Producers with a wide CI should consider improving heat detection programs or adding heat synchronization and treatment programs that will promote the results needed for a satisfactory CI. These programs would also aid in the use of artificial insemination, which is often needed in the lower production groups.

Table 2. Change in Selected DHI Factors.

DHI Factor	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*5 year Change*
Miscellaneous:							
Herd size	96	89	118	121	129	132	38%
Avg. age of cows, mo.	48	50	52	52	52	52	æ
Production:							
Lbs. milk/cow	17,403	16,901	16,767	16,659	16,706	17,760	2%
Lbs. fat/cow	607	588	565	572	574	612	æ
% in milk	86	85	82	84	82	84	æ
Avg. days dry	69	72	74	75	74	79	æ
Cost and Returns:							
Total feed cost/cow	$944	$1,142	$886	$796	$717	$954	1%
Value of milk/cow	$2,162	$2,238	$2,137	$2,353	$2,402	$2,146	-1%
IOFC/cow	$1,218	$1,212	$929	$1,113	$1,098	$1,219	NC
Feed cost/cwt. milk	$5.60	$6.47	$5.22	$4.70	$4.19	$5.39	-4%
Value of milk/cwt.	$12.47	$13.36	$12.82	$14.24	$14.42	$12.45	NC
Reproduction							
Projected calving interval, mo.	13.8	14.1	15.2	15.7	15.5	14.5	5%
Avg. days open	138	146	180	197	192	190	38%
Avg. days to 1st breeding	84	91	93	95	89	83	NC

IOFC = Income over feed costs. NC = No change

Table 3. Management Data of Oklahoma Holstein Herds by Quartile.

Management Factor	*Quartiles 1st*	*2nd*	*3rd*	*4th*	*Goals*	*Your Herd*
Production						
RHA Milk, lbs.	21,043	18,765	17,066	13,926	>20,850	
Summit milk 1st lactation, lbs.	69	61	58	50	>75	
Summit milk 2nd lactation, lbs.	87	77	72	60	>85	
Summit milk 3rd lactation, lbs.	93	84	78	64	>95	
Standardized 150 day milk, lbs.	73	66	62	53	>70	
% 1st lactation cows	36	32	36	37	——	
Average days in milk	199	187	197	186	170±10	
Cull rate, %	35	31	32	39	——	
% cows in milk	87	85	84	80	86-88	
Reproduction						
Projected calving interval, mo.	15.2	15.4	16.0	15.7	——	
Services/Pregnancy, pregnant cows	2.1	1.8	2.4	1.4	<2.0	
Days To 1st service, total	96	88	89	64	<75	
% successful, 1st service	34	37	39	36	>55	
% successful, total	34	38	40	37	>50	
% Heats Observed	37	31	28	22	>70	
Days open	181	188	206	197	<120	
% open VWP to 100 days	ND	29	46	14	>70	
Average days dry	67	75	76	82	60	
% dry 40 To 70 days	75	49	52	37	>90	
Average age of 1st lactation cows, mo.	28	27	28	28	<25	
Milk Quality						
SCC average (1,000)	416	414	509	598	<200	
RHA SCS less than 4.0	58	57	53	48	>60	
Average SCS	3.1	3.2	3.5	3.8	<3.0	
Genetics						
% bred to proven sires	80	34	41	20	>75	
% bred to Ai young sires	8	8	7	2	<25	
Avg. sire PTA$, 1st lactation	222	210	177	131	>140	
Avg. sire PTA$, 2nd lactation	194	130	147	103	>120	
Avg. sire PTA$, 3rd+ lactation	120	51	99	24	>100	
Net Merit rank of proven sires	66	37	40	14	>80	
% Identified by sire	84	70	42	16	100	

SCS = Somatic cell score, PTA$ = Predicted transmitting ability, NM$ = Net merit, ND = No data.

Other reproductive management areas that have been studied and associated with monetary losses include; services per conception, average days dry and average days open. Depending on the price of semen, each 0.1 increase in services per conception above 1.5 results in a loss of $1 to $1.50 per cow. More importantly, the calving interval is extended and that loss is more costly.

Average days dry is another area which management should pay close attention, since the length of the dry period has a tremendous influence on milk production in the subsequent lactation. Accurate breeding dates are key to managing days dry successfully. Dairy producers lose an average $2per day for dry periods under 30 days and $3 per day for dry periods over 60 days. Management should strive for greater than 90% of the cows having a dry period of 40 to 70 days.

Days open is an important indicator of present reproductive efficiency. The number of days open is the result of 1) time when cows are first bred, 2) accuracy of heat detection, 3) herd conception rate, 4) embryonic death and abortion, and 5) reproductive culling rate. A reasonable voluntary waiting period (VWP) before first breeding is 45 to 50 days for second or later lactation animals. A slightly longer VWP (60 to 70 days) may be desirable for first lactation animals. This allows sufficient time for complete uterine involution and allows breeding to occur early enough to maintain a calving interval less than 13 months. It is estimated that producers lose $2 per cow per day for each day open beyond 90 days.

Increased age at first calving (AFC) increases herd costs in three ways: 1) increased days of rearing, 2) increased number of heifers on the farm, and 3) lost production potential. A DHIA study has shown that an extra day of AFC costs approximately twice as much as an extra day dry, and thirteen times as much as an extra day open. The goal for Holsteins should be to breed heifers at 750 to 900 pounds (13 to 15 months of age) so that they will calve between 22 to 24 months of age weighing between 1,200 to 1,250 pounds post-calving.

Milk Quality: Mastitis is the most costly disease on the dairy farm. Recent estimates put the economic loss to producers at $200 per infected cow per year. An elevated somatic cell count (SCC) is related to loss of milk production. Producers should strive for a total herd average SCC of less than 200,000 or a somatic cell score (SCS) of less than 3. However, even at this level producers are losing an estimated three pounds per day or 800 pounds per lactation. Cows with a SCC of 400,000 (SCS = 5) or greater produce 4.5 to 10.5 pounds less milk per day, which translates into 1,200 to 2,800 pounds less milk over an entire lactation.

Table 4. Breed Averages for all DHI Herds, 2000*.

Management Factor	*Ayrshire*	*Brown Swiss*	*Guernsey*	*Holstein (Okla.)*	*Holstein*	*Jersey*	*Milking Shorthorn*
Number of herds	144	221	133	89	12,046	767	36
Avg. herd size	39	42	39	134	125	78	36
% left herd	37	36	46	37	37	36	32
Production:							
Rolling herd avg. milk, lbs	15,198	17,048	14,120	18,130	19,721	14,251	14,232
Avg. % cows in milk	84	85	86	84	86	85	79
Avg. days in milk	173	195	194	195	189	179	162
Standardized 150-d milk, lbs	54	60	49	65	68	48	52
Summit milk - 1st lact., lbs	52	53	50	60	66	46	54
Summit milk - 2nd lact., lbs	65	69	59	73	79	57	65
Summit milk - 3rd + lact., lbs	68	76	63	81	88	62	71
% cows in 1st lact.	32	33	37	34	36	32	31
Reproduction:							
Calving interval, mo.	14.1	15.0	15.0	15.7	14.6	14.0	14.3
Services/conception	2.7	3.2	3.2	2.5	2.6	2.6	2.2
Avg. days to 1st breeding	87	92	88	85	95	89	74
Avg. days open	150	177	176	196	163	145	154
Avg. days dry	77	74	70	75	68	69	94
% dry 40-70 days	57	63	65	56	64	72	53
Age at 1st calving, mo.	27	28	27	28	27	26	28
Milk Quality:							
Avg. SCS, total herd	3.0	3.4	3.1	3.4	3.2	3.3	3.0
% cows SCS < 4	61	57	61	55	59	57	61
Genetics:							
% bred to proven sires	45	49	46	47	55	58	24
% bred to young sires	17	21	19	6	15	19	15
NM$ rank of proven sires	42	44	32	39	50	50	18
Avg. sire PTA$ - 1st lact.	141	193	128	192	215	186	94
Avg. sire PTA$ - 2nd lact.	133	157	103	159	175	157	70
Avg. sire PTA$ - 3rd+ lact.	74	64	69	66	101	84	34
% identified by sire	87	91	91	56	67	87	90

*Except Oklahoma Holsteins, averages are for herds from OK, AR, KS, NE, ND, and SD.

Genetics: Predicted Transmitting Ability Dollars (PTA$) estimates one-half of the genetic value in the herd. Cow PTA$ estimate the average breeding value of each lactation group. The PTA$ index places an economic value on milk and its components the cow is expected to produce during a lactation over genetically inferior animals in the herd. Cows in first lactation should have the highest PTA$ due to improvements in this younger generation. If not, genetic progress is not being made. Further, if overall average service sire PTA$ are lower than the PTA$ for cows and other sires, then genetic progress is not being made. Use of genetically superior sires on cows and heifers has a significant impact on herd production and long-term profitability of the dairy operation.

Table 5 lists the Oklahoma Holstein breed average and the breed averages for all herds of the nine-state area processing with the Midstates Dairy Records Processing Center. Breeds, other than Holstein, are grouped for the total area to have enough herds for meaningful data.

Interpretation of DHI records is more involved than taking a quick glance at the RHA. When evaluating records to find areas of needed improvement, management should focus attention on those areas where profit potential is greatest. Look to improve areas where quick returns can be made without ignoring the long-term profitability of the enterprise. Generally, the time frame for dollars to return to the business for the nutrition and udder health areas is measured in weeks, while reproduction and heifer areas is measured in months; and genetics in years.

An examination of current DHI data suggests that most Holstein cows have the genetic potential to produce at least 16,000 pounds of milk per lactation. Therefore, herds producing under this amount would probably benefit most by focusing on nutrition and udder health. However, serious deficiencies exist in these herds in the areas of reproduction and heifer management that must also be addressed. Finally, in order to improve net profits, many herds in Oklahoma would benefit tremendously, long term, in the use of superior genetics and artificial insemination.

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