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Evaluating DHI records with the dairy herd analyzer

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Abstract

A computer program was developed for analyzing DHI records to evaluate potential losses from 1) reproduction, 2) nutrition, 3) milk quality, and 4) genetics. Production-tested Kansas Holstein herds were grouped according to Rolling Herd Average (RHA), with the groups averaging 13,587, 15,988, 17,938 and 20,227 lb milk/cow/yr. Losses were directly related to RHA, amounting to $573, $426, $300, and $160/cow/yr, respectively. The Dairy Herd Improvement (DHI) program provides valuable information to dairy farmers for making feeding, breeding, and management decisions. Yet, the only economic information provided by the program is feed cost/cwt milk produced and income over feed cost. Hence, the Dairy Herd Analyzer (DHA) computer program was developed to evaluate economic losses in dairy herds, using information from the Herd Summary (DHIA-202) and Somatic Cell Count Report (DHIA-230). The program is intended to be used by dairy farmers, consultants, researchers, and Extension personnel.; Dairy Day, 1989, Kansas State University, Manhattan, KS, 1989; The 1989 Annual KSU Dairy Day is known as Dairy Day, 1989

Keywords

Dairy Day, 1989; Kansas Agricultural Experiment Station contribution; no. 90-140-S; Report of progress (Kansas Agricultural Experiment Station); 580; Dairy; DHI Records; Reproduction; Nutrition; Milk quality; Genetics

EVALUATING DHI RECORDS WITH THE DAIRY HERD ANALYZER

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Summary

A computer program was developed for analyzing DHI records to evaluate potential losses from 1) reproduction, 2) nutrition, 3) milk quality, and 4) genetics. Production-tested Kansas Holstein herds were grouped according to Rolling Herd Average (RHA), with the groups averaging 13,587, 15,988, 17,938 and 20,227 lb milk/cow/yr. Losses were directly related to RHA, amounting to $573, $426, $300, and $160/cow/yr, respectively.

Introduction

The Dairy Herd Improvement (DHI) program provides valuable information to dairy farmers for making feeding, breeding, and management decisions. Yet, the only economic information provided by the program is feed cost/cwt milk produced and income over feed cost. Hence, the Dairy Herd Analyzer (DHA) computer program was developed to evaluate economic losses in dairy herds, using information from the Herd Summary (DHIA-202) and Somatic Cell Count Report (DHIA-230). The program is intended to be used by dairy farmers, consultants, researchers, and Extension personnel.

Procedures

Economic loss from reproductive performance is calculated at the rate of $1/day for calving intervals from 366 to 395 days, and $3/day over 395 days. Loss from long or short dry periods is included in the reproductive loss at the rate of $3/day over 60 days or under 45 days dry. The effect of less than optimum conception rate is accounted for by adding $2/0.1 service/conception over 1.7. Reproductive loss also includes the effects of age of first calving by adding $30/mo over 24 mo of age at first freshening.

Reproductive performance is also evaluated by calculating conception rates after first and second services, using the number of pregnant cows conceiving from the first and second service, as shown on the DHIA-202. Heat detection efficiency is determined by comparing the number of repeat service cows bred between 18 and 24 days following the last service.

Nutritional loss is evaluated by assuming that a herd should be fed to produce 125% of breed average FCM, if mastitis and genetic losses are not limiting herd production. Nutritional loss is also adjusted for the additional feed required to produced 125% of breed avg FCM. The formula for calculating nutritional loss is: (1.25 × Breed Avg FCM – Herd Avg FCM) × (Milk Price/cwt – Feed Cost/cwt Milk) – (Milk Quality Loss) – (Genetic Loss).

Loss because of milk quality (somatic cell count) is determined by the following formula: (Milk Price) × (Milk Loss – 1) × 305. The amount of milk loss from somatic cell count is reduced 1

lb, because most herds will experience a 1 lb milk loss under the best of conditions. The milk quality loss also accounts for any quality premiums that may be available in certain markets.

Genetic loss is evaluated by comparing the PTA$ value of sires of the cows, as shown on DHIA-202, to the 80 percentile rank PTA$ value. The PTA$ value used for cows sired by unproven sires is zero. It is estimated that the PTA$ value of sires available when the cows were conceived was 70 percent of the current PTA$ value of sires. The genetic loss is also adjusted for the feed cost associated with producing additional milk, when high genetic value sires are used. This value is estimated to be 50 percent of the value of milk. The following formula is used to calculate genetic loss: [(80th Percentile PTA$ – Sire Avg PTA$) × (No. Cows with Proven Sires) + (80th Percentile PTA$ × No. Cows with Unproven Sires)] × .70 × .50.

Results and Discussion

The DHA program was used to compare economic losses in four production groups of Kansas Holstein herds. The results shown in Table 1 were calculated from the input information shown in Table 2.

Table 1. Comparison of Economic Losses in Four Production Groups of Kansas Holstein Herds

Item	Production average, lb/yr			
	13,587	15,988	17,938	20,227
Number of herds	98	146	175	79
Cows/herd	61	72	74	79
Reproductive loss, $	133	151	116	106
Nutritional loss, $	187	162	132	29
Milk quality loss, $	253	70	18	0
Genetic loss, $	50	43	34	25
Total loss/cow, $	573	426	300	160
Total loss/herd, $	34,990	30,724	22,160	12,638
Conception 1st service, %	55	50	45	46
Conception after 2nd, %	77	77	73	73
Heat detection efficiency, %	38	38	38	39
Days to 1st service	83	84	81	81

Economic loss in dairy herds is directly related to herd average. However, the results indicate that lower producing herds could make the most improvement by improving milk quality, whereas higher producing herd should emphasize improvement in reproduction. Improved nutrition programs would benefit the three lower production groups.

Reproductive loss is lower in higher producing herds, even though conception rates are lower, since higher producing herds freshen heifers at a younger age. Higher producing herds tend to breed cows earlier after freshening, which also helps shorten the calving interval.

The DHA is useful for evaluating economic losses on dairy farms. In most cases, profitability could be improved with very little additional investment.

Table 2. Dairy Herd Analyzer Input Form

Rolling herd average--milk	13,587	15,988	17,938	20,227
Rolling herd average--fat	487	581	654	736
Number producing cows	61	72	74	79
Freshening interval--days	401	409	407	406
Average days dry	71	67	63	61
Services per conception	1.8	2.0	2.1	2.1
Pregnant cows bred once	12	15	15	17
Pregnant cows bred twice	5	8	9	10
Number pregnant cows	22	30	33	37
Breeding intervals				
18 to 24 days	3	5	6	7
<18 days	1	1	1	1
>24 days	4	7	9	10
Number lactation 1 cows	17	25	27	28
Lactation 1 cows' age	30	29	27	27
Milk price per cwt, $	11.55	11.55	11.55	11.55
Feed cost per cwt milk, $	5.89	5.96	5.54	5.61
Loss per day due to S.C.C.	6.0	3.0	1.5	1.0
Quality milk premium available, $	0.15	0.15	0.15	0.15
Quality milk premium received, $	-0.05	0.15	0.15	0.15
No. cows sired by proven sires	19	39	53	67
Avg PTA of proven sires, $	39	48	62	73
No. cows sired by unproven sires	42	33	21	12
Breed (Enter Code for Breed)	4	4	4	4
1. Ayshire 2. Brown Swiss				
3. Guernsey 4. Holstein				
5. Jersey 6. Mixed				