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EFFECT OF YEARLY MILK PER COW ON VARIOUS REPRODUCTION TRAITS

E. P. Call

Summary

An analysis of 4,334 Holstein dairies confirms the negative genetic correlation that exists between milk production and reproduction. The most obvious traits affected are services per conception and conception rate. When subjected to analysis by the KSU Dairy Herd Analyzer (DHA) program, higher-producing herds have less economic loss because their managers do a better job of controlling factors not under genetic control, such as average days dry and age at calving of first-calf heifers (L-1). Higher-producing herds also have fewer cows that are open and should be bred.

Key Words: Milk Production, Genetics, Production, Reproductive Losses.)

Introduction

Although a negative genetic relationship exists between milk production and reproduction, it is difficult to determine the economics of reduced reproductive efficiency as production increases. The KSU Dairy Herd Analyzer (KSU-DHA) (1989 Dairy Day, KAES Rep. Prog. 580:46-48) provides a means to evaluate a herd's reproductive performance and assess the economic impact of less than optimal efficiency. Inputs into the evaluation include calving interval, days dry, services per conception, and age at calving of first-calf heifers (L-1).

Average days dry and age at calving for L-1 are dictated mostly by management decisions. Genetic antagonism between milk production and reproduction should be expressed by services per conception. Calving interval is affected by services per conception but may be masked by the voluntary waiting period

(VWP), as measured by average days to first service. The data for entry into the KSU-DHA are obtained from herd summary reports (DHIA 202 A-B) from herds enrolled in Dairy Herd Improvement Associations (DHIA).

Procedures

Holstein herds (n = 4,334) processed by Midstates Dairy Records Processing Center, Iowa State University, Ames, as of June, 1994, were categorized into 2,000 lb milk incremental production groups. Production was expressed by the rolling herd average (RHA) that represents the average cow's production during the last 365 days. Average data from each group of herds were subjected to the KSU-DHA program that compares actual performance with stated goals. The values generated can be related to improvement in cash flow if the goals are attained.

In addition, comparisons were made among the groups for days open and percentage of days open above 60 and 120 days. Conception rate to first service and cumulative rate to first plus second service also were evaluated.

Results and Discussion

Table 1 summarizes the effects of yearly milk production (rolling herd average - RHA) on the four increases associated with reproduction. Improvement in average days dry and age at calving of L-1 reflect positive responses to intensified management. Average services per conception suggest that higher-producing cows are more difficult to settle. Even though a negative trend occurs for services per conception, calving intervals are similar because the VWP (average days to first service) for higher-producing herds is shorter.

The economic effects of lowered reproductive efficiency are shown in Table 2. The dollar values obtained from the KSU-DHA reflect improvement in cash flow if the goals of the program are attained. The economic effect of more services per conception is relatively insignificant when compared to increasing cash flow by improving the factors that are mostly management oriented.

Table 3 illustrates the relationship of yearly milk per cow (RHA) on conception rate, percentage cows open, and days to first service

(VWP). The negative relationship between production and reproduction is evident by declining conception rates at first service with a similar effect after two services. The positive effect of a shorter interval to first service resulted in comparable calving intervals among groups (Table 1). The results of more intensive management in the reproduction program are seen in the lower percentage of cows not yet bred > 60 and 120 days. Managers of higher-producing herds (RHA) not only breed cows sooner after calving (shorter VWP) but have fewer cows that are not yet bred but should be.

Table 1. Effect of Rolling Herd Average on Various Reproductive Traits in 4,334 Holstein Herds

Rolling herd average	Calving interval	Days dry	Services/conception	Age at calving (L-1)
- milk, lb -	- days -	- days -	- no. -	- mo. -
13,152	420	73	1.7	28
15,071	414	68	1.8	28
17,012	412	66	1.9	27
18,960	412	64	2.0	27
20,846	413	63	2.0	26
22,840	411	61	2.0	26

Table 2. Economic Effect of Rolling Herd Average on Various Reproductive Traits as Measured by the KSU-DHA in 4,334 Holstein Herds

Rolling herd average	Calving interval	Days dry	Services/conception	Age at calving (L-1)	Total loss
- milk, lb -	- \$ -	- \$ -	- \$ -	- \$ -	- \$ -
13,152	105	39	0	39	183
15,071	87	24	2	39	152
17,012	81	18	4	33	136
18,960	81	12	6	33	132
20,846	84	9	6	24	123
22,840	78	3	6	24	111

Table 3. Effect of Rolling Herd Average on Days to First Service, Conception Rate, and Percentage Cows Not Yet Bred

Rolling herd average	Days to 1st service	Conception rate		% Cows not yet bred	
		1st service	1st +2nd	>60	>120
- milk, lb -	- days -	- % -	- % -	- % -	- % -
13,152	99	57	78	61	35
15,071	95	58	81	59	32
17,012	91	53	77	52	24
18,960	89	50	76	52	22
20,846	90	51	76	52	21
22,840	88	50	75	50	18