

Brown Swiss sired, 530 and 481 lb.; and Jersey sired, 476 and 481 lb. The same relationship held for average age at the start of the study, but for both measurements the differences were not significant. The Jersey sired heifers had the highest percentage to have reached sexual maturity at the start of the study, 87.5 percent, compared to 69.2 percent of the Hereford sired, 48.0 percent of the Simmental sired, 45.8 percent of the Brown Swiss sired and 45.4 percent of the Angus sired heifers. Thus, as their body weights suggest, the level of nutrition that had been provided to all groups except the Jersey sired group were apparently too low to permit a high percentage of the heifers to reach sexual maturity.

Factors Affecting the Calving Interval in Large Dairy Herds

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Story in Brief

Poor reproduction performance continues to cause major losses for many dairymen. Long calving intervals, loss of profitable cow time in the herd, fewer herd replacement animals and increased cost of the breeding program are among the major factors that take a tremendous cut out of a dairyman's potential profit.

Several factors can add significantly to the length of the period from one calving to the subsequent calving. Some of this time interval is dictated as being necessary for cow recovery postpartum. However, once the cows' reproductive system has recovered from the previous calving, man has his "management opportunity"—to get the cow back in calf as efficiently as his skill allows. This study, based on breeding, calving and production records of cows in the Oklahoma State University dairy herd for the years 1968 through 1974, was conducted to summarize the reproductive performance and determine the relative influence of several factors on the potential length of the calving interval.

The intervals from calving to first service and from first service to conception and the number of services per conception were significant

factors that determined calving interval. In Holsteins, there was an indication that cows with high peak milk levels would be somewhat more difficult to re-breed.

These factors indicate that the prime goals that a dairyman needs to strive for in achieving optimum calving intervals are (1) commence breeding when the cow has recovered from calving (50-60 days usually); a minimum number of services per conception and (3) if re-breeding is necessary, a minimum interval from first service to ultimate conception.

Introduction

As herd size increases, it becomes increasingly more difficult to manage well the reproductive performance of a herd. High labor costs as well as the unavailability of labor causes dairymen to try to stretch their resources in order to manage the several facets of dairy herd operations. With the increasing competition for time, the calving interval has been gradually increasing in Oklahoma.

In order for a cow to achieve a long, economically productive life, high milk production and reasonable reproductive efficiency are necessary. Many dairymen have been able to increase production capability of their cows to a significant degree by using genetically superior animals. However, low reproductive efficiency seems to be a continuing, complex problem. It has long been recognized that low conception rate and the resulting long calving interval significantly lower the net returns from a herd. A twelve month calving interval is considered the ideal reproductive performance in achieving the optimum production potential from a herd.

The purpose of this study was to determine what factors affect calving interval and to relate the findings to potential improvement in management of reproductive efficiency.

Materials and Methods

All cows in the OSU dairy herd that had completed a lactation and calved subsequently between January 1, 1968 and March 3, 1974, were considered in this study. A total of 696 calving intervals on 370 cows were used (240 calving intervals on 131 Ayrshire cows, 315 on 161 Holsteins, 84 on 47 Jerseys and 57 on 31 Guernseys). The same manager was in charge of the herd for almost all of the study period.

The herd is managed so that the majority of the cows calve from July to January, with very few calving outside this period. This coincides with the greatest student demand for milk on the campus. This does create a problem with some cows having to be held open for longer than necessary periods of time in order to get them to calve at the desired time.

Cows are checked for heat at least twice daily and artificially inseminated by dairy barn personnel. Cows in heat in the morning are inseminated in late afternoon while those in heat in the afternoon are inseminated the next morning.

The following factors were analyzed within each breed to evaluate their possible effect on length of the calving interval:

Year of calving	Interval from calving to first service
Month of calving	Interval from first service to conception
Month of first service	Services per conception
Month of conception	Peak milk level
Age at calving	

Results and Discussion

Table 1 presents the conception rate data for each breed in the study. Overall, Ayrshire and Guernseys had lower breeding efficiency than did Holsteins and Jerseys (respectively 2.27 and 2.26 versus 1.95 services per conception). Table 2 also reflects the same idea in that approximately 90 percent of the Holsteins and Jerseys had settled by 3 services while only about 80 percent of the Ayrshires and Guernseys had settled to 3 services. The analysis of conception rate within service shows that the efficiency of conception to the remaining 4 services was quite variable within Ayrshires and Guernseys. Conversely, in Holsteins and Jerseys, a conception rate of 65 percent or better was apparent within any one of the services beyond third service. It should be pointed out that the overall reproductive efficiency of these cows would be quite low in that they had already been bred 3 times and failed to conceive.

Table 3 shows that there was a significant difference in the fertility level of bulls used in the different breeds, undoubtedly this contributed

Table 1. Services Required Per Conception and Percent Services Resulting in Conception During the Period 1968-1974.

BREED	Number of bulls	Number of cows	Number of conceptions	Number of services	Services per conception	Percent Services resulting in conception
Ayrshire	13	131	240	545	2.27	44.0
Guernsey	9	31	57	129	2.26	44.1
Holstein	33	161	315	613	1.95	51.3
Jersey	11	47	84	165	1.96	50.9
Overall breed	66	370	696	1452	2.10	47.9

Table 2. Number and Percent of Cows Conceiving at Each of A. Series of Consecutive Services.

ITEM	Services required per conception						
	1	2	3	4	5	6	7
<i>AYRSHIRE</i>							
Total services	240	134	81	50	27	10	3
Total conceptions	106	53	31	23	17	7	3
% conception	44.1	39.5	38.2	46.0	62.9	70.0	100.0
% of total conceptions	44.1	22.0	12.9	9.5	7.0	2.9	1.2
<i>GUERNSEY</i>							
Total services	57	30	16	11	9	5	1
Total conceptions	27	14	5	2	4	4	1
% conception	47.3	46.6	31.2	18.1	44.4	80.0	100.0
% of total conceptions	47.3	24.5	8.7	3.51	7.0	7.0	1.7
<i>HOLSTEIN</i>							
Total services	315	164	88	31	11	4	
Total conceptions	151	76	57	20	7	4	
% conception	47.9	46.3	64.7	64.5	63.6	100	
% of total conceptions	47.9	24.1	18.1	6.3	2.2	1.2	
<i>JERSEY</i>							
Total services	84	42	23	9	3	3	1
Total conceptions	42	19	14	6	0	2	1
% conceptions	50.0	45.2	60.8	66.6	0.0	66.0	100.0
% of total conceptions	50.0	22.6	16.6	7.1	0.0	2.3	1.1
<i>OVERALL BREEDS</i>							
Total services	696	370	208	101	50	22	5
Total conceptions	326	162	107	51	28	17	5
% conception	46.8	43.7	51.4	50.5	56.0	77.2	100.0
% of total conceptions	46.8	23.2	15.3	7.3	4.0	2.4	0.7

to the lower conception rate in the case of Guernseys and Ayrshires. Variations in insemination technique and less than optimum timing of insemination in relation to first observation of heat undoubtedly also contributed to lowered conception rate. Table 4 presents the breed means for calving interval, the interval from calving to first service and from first service to conception, services per conception, gestation length, peak daily milk production and 2X, M.E. 305 day milk production. The calving interval ranged from 396 days for Holsteins to 414 days for Guernseys, or, a range of 13.0 to 13.5 months. These are not excessively long intervals, but some improvement can be made.

Breed analyses indicated that approximately 60 percent of the variation in calving interval was due to variation among cows within each breed. Further, the analysis indicated that in Guernseys and Ayrshires, the interval from calving to first service and services per conception were major factors affecting the length of the calving interval. In Holsteins and Jerseys, which required somewhat fewer services per conception, the

Table 3. Distribution of Bulls Used According to Their Conception Rate.

BREED	Percent conception rate								
	Greater than 60			50 to 60			Less than 50		
	No. bulls	No. of services	% of services in breed	No. bul's	No. of services	% of services in breed	No. bulls	No. of services	% of services in breed
AYRSHIRE	2	26	4.7	6	218	40.0	5	301	55.2
GUERNSEY	3	20	15.5	2	36	27.9	4	73	56.3
HOLSTEIN	14	135	22.0	7	256	41.7	12	222	36.1
JERSEY	4	23	13.9	4	50	30.3	3	92	55.7