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Stage of lactation profile reflects nutrition and management

Abstract

The Stage of Lactation Profile (SOLP) is a good estimate of the shape of the lactation curve for dairy herds. The SOLPs for herds with various milk production levels are somewhat similar. The rates of decline of all SOLPs are about the same. Therefore, the differences in production levels are about the same in late stages of lactation and in early lactation, regardless of production Rolling Herd Average (RHA). In addition, higherproducing herds have their highest level of production in the second stage of lactation (51 to 100 days in milk), whereas this occurs in the first stage of lactation (<50 days in>milk) in lower-producing herds. Nutrition and management programs have a large impact on the early stages of lactation that affects the total lactation milk yield.; Dairy Day, 1994, Kansas State University, Manhattan, KS, 1994;

Keywords

Dairy Day, 1994; Kansas Agricultural Experiment Station contribution; no. 95-141-S; Report of progress (Kansas Agricultural Experiment Station); 716; Stage of lactation; Profile; Summit milk yield; Rolling herd average

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STAGE OF LACTATION PROFILE REFLECTS NUTRITION AND MANAGEMENT

J. R. Dunham

Summary

The Stage of Lactation Profile (SOLP) is a good estimate of the shape of the lactation curve for dairy herds. The SOLPs for herds with various milk production levels are somewhat similar. The rates of decline of all SOLPs are about the same. Therefore, the differences in production levels are about the same in late stages of lactation and in early lactation, regardless of production Rolling Herd Average (RHA). In addition, higher-producing herds have their highest level of production in the second stage of lactation (51 to 100 days in milk), whereas this occurs in the first stage of lactation (<50 days in milk) in lower-producing herds. Nutrition and management programs have a large impact on the early stages of lactation that affects the total lactation milk yield.

(Key Words: Stage of Lactation Profile, Summit Milk Yield, Rolling Herd Average.)

Introduction

Nutrition and management programs account for 75 to 80% of the difference in RHA among dairy herds. These programs are extremely important at the beginning of lactation, because the peak of the lactation curve is affected at this time. After the peak of the lactation curve is established, milk production level declines at a rather constant rate, and the curve cannot be changed to any great extent.

Dairy Herd Improvement (DHI) records show a SOLP, which is a good estimate of the lactation curve for dairy herds. The Summit Milk Yield (SMY), which is a good estimate of the peak of the lactation curve, also is reported in DHI records. A compari-

son of SMY and SOLP for herds with various RHAs indicates a vast difference in nutrition and management in Kansas dairy herds.

Procedures

Data were collected from 391 Kansas Holstein herds with DHI records. Herds were divided into four groups (quartiles) based on RHAs for milk production to evaluate SMYs and SOLPs.

Results and Discussion

Figure 1 depicts SOLPs of Kansas Holstein herds grouped according to RHA. SMYs, SOLPs, and Predicted Transmitting Ability (PTA) of sires of cows are shown in Table 1.

The RHA for the first through fourth quartiles were 20,648, 18,276, 16,269, and 13,142 lb milk, respectively. The shapes of the SOLPs are somewhat similar. The production differences were of similar magnitudes through all stages of lactation among all production groups. Hence, cows must start the lactation at a high level in order to be milking at a higher level late in lactation.

The first and second quartiles had the highest production levels in the second stage (50 to 100 days in milk) of lactation, whereas production was highest in the first stage for the third and fourth quartiles. This illustrates the important role nutrition plays during early lactation.

Dairy cows have two sources of nutrients, those that are provided by the ration and energy stored in the form of body fat. Both sources have a positive effect on production

during early stages of lactation. Assuming adequate genetic ability, milk production will be determined by nutrient intake and removal of energy from stored body fat. Therefore, the first two quartiles were not as limited by nutrient intake as the lower two quartiles. Because production was declining by the second stage of lactation in the two lower quartiles, body weight loss appears to have occurred earlier in lactation. An average of 16% more concentrate was fed during the two higher quartiles than the two lower quartiles.

The SMYs shown in Table 1 are the best estimates of the peak of the lactation curves. The fact that SMY was higher for each higher milk-producing group illustrates the role of nutrition and management. Comparing the highest to lowest production groups,

these data show that RHA is increased by 289 lb milk for each 1 lb increase in SMY.

The following nutrition and management programs affect early lactation production levels and SOLP:

1. Feed nutrient levels to obtain body condition scores between 3.5 and 4.0 during the dry period.
2. Lead feed dry cows 2 to 3 wk prior to calving with rations similar to those fed to early lactation cows.
3. Feed highest quality forages to early lactation cows.
4. Challenge early lactation cows nutritionally with energy and protein.

Table 1. Comparisons of Summit Milk Yield (SMY), State of Lactation Profiles and Predicted Transmitting Ability for Milk (PTAM) of Sires of Kansas Holstein Herds Ranked by Quartile

Quartile	Stage of Lactation Profile (SOLP)							
	Average RHA ¹	Average SMY	Days in milk					PTAM
			<50	50-100	101-200	201-300	>300	
1st	20648	79.7	77.3	77.3	67.7	56.2	44.7	1455
2nd	18276	71.3	68.9	69.1	58.8	50.4	40	1446
3rd	16269	66.6	66.2	64.1	54.7	46.2	34.7	1423
4th	13142	53.8	54.7	53.4	43.5	37.5	29.3	1221

¹Average rolling herd average.

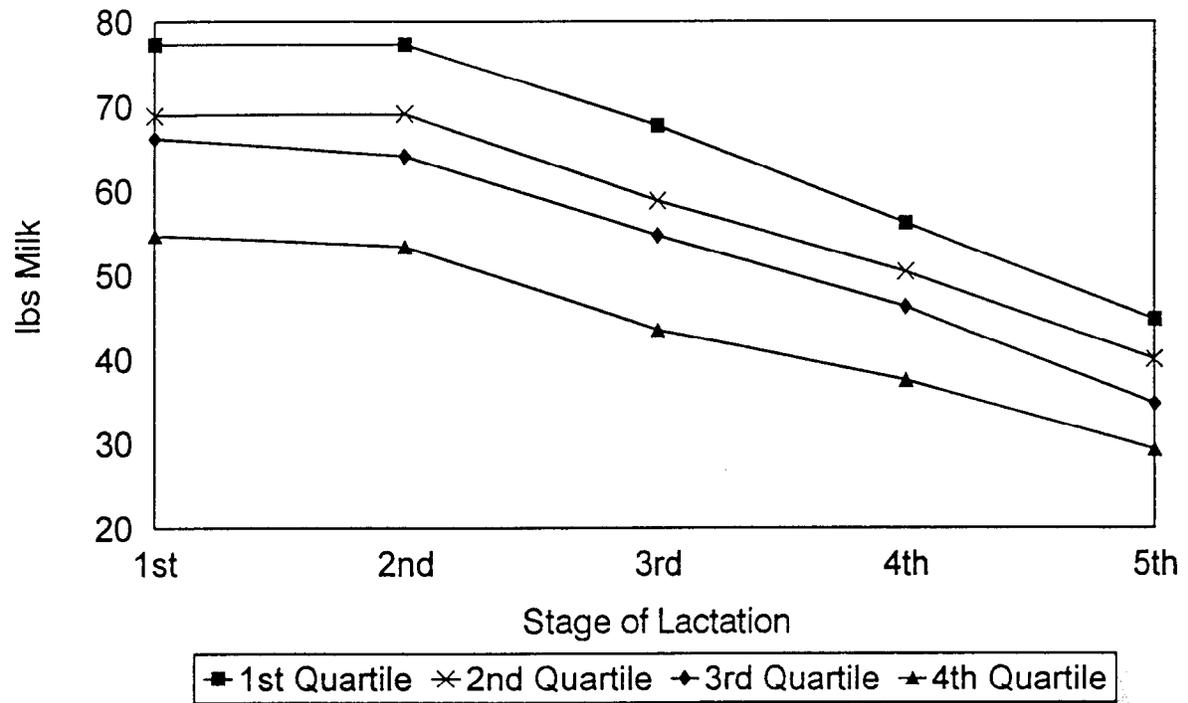


Figure 1. State of Lactation Profiles of Kansas Holstein Herds Ranked by Quartiles