

Research Note

MILK PRODUCTION BY HOLSTEIN COWS FED ONLY ON GRASS DURING FIVE CONSECUTIVE LACTATIONS^{1, 2}

Previously published data showed that nine Holstein cows fed on all-grass rations from steep tropical grass pastures produced an average of 2,044, 3,695, and 3,896 l (4,497, 8,132, and 8,153 lb) of milk during their first, second, and third lactations, respectively.³ This paper presents results obtained during two additional lactations with the same cows receiving no concentrate feed.

The experiment was conducted near Orocovis at an elevation of about 600 m (2,000 ft). Average monthly temperature ranged from about 21° to 27° C (70° to 80° F) with highest daily temperatures rarely exceeding 32° C (90° F). Annual rainfall is about 165 cm (65 in) and is fairly well distributed throughout the year.

The nine experimental cows were fed exclusively on forage obtained by grazing steep tropical grass pastures fertilized with 2,240 kg/ha (1 ton/acre) of 15-5-10 yearly, applied in four equal applications. The pastures were grazed in rotation about every 3 weeks with one cow carried per acre year-round. The cows remained on the pastures at all times, grazing at will day and night except when being milked. Lactations were terminated 2 months before calving or when daily production dropped below 5 l of milk. The cows were bred approximately 2 months after calving.

During the fifth lactation the 9 experimental cows were incorporated into a 150-cow commercial dairy herd also fed exclusively on grass pastures and receiving no concentrate feed. The cows were treated like the others in the herd in all respects including mechanical milking, whereas they had previously been milked by hand.

Table 1 shows that with few exceptions the nine cows fed exclusively on all-grass rations from steep tropical grass pastures increased their production of milk during five successive lactations.

Average milk production per cow increased with each successive

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² This report covers work conducted cooperatively by the Agricultural Research Service, USDA, and the Agricultural Experiment Station, Mayagüez Campus, University of Puerto Rico, Río Piedras, P.R.

³ Caro-Costas, R., and Vicente-Chandler, J., Milk production of young Holstein cows fed only on grass from steep, intensively managed tropical grass pastures over three successive lactations, *J. Agr. Univ. P. R.* 58 (1): 18-25, 1974.

lactation, the largest increase occurring during the second lactation when the cows produced about 80% more milk than during the first lactation. The relatively low production during the first lactation is attributed to the small size of the cows which calved at an average weight of only 929 lb.

There was a marked increase in production during the fifth lactation, in which the cows yielded almost 20% more milk than during the previous lactation. Management was varied only in that the cows were incorporated into a larger herd and were milked mechanically instead of by hand as during their first four lactations.

TABLE 1.—*Milk production by nine Holstein cows over five lactations during which they were fed exclusively on all-grass rations from steep intensively managed tropical grass pastures*

Cow Number	Milk Production									
	First lactation		Second lactation		Third lactation		Fourth lactation		Fifth lactation	
	Liters	Pounds	Liters	Pounds	Liters	Pounds	Liters	Pounds	Liters	Pounds
64	2,181	4,799	3,014	6,630	4,239	9,326	4,224	9,292	4,232	9,311
155	2,180	4,769	3,991	8,780	4,129	9,084	3,921	8,627	6,644	14,616
648	1,630	3,587	4,138	9,103	4,005	8,810	4,945	10,879	5,005	11,011
166	1,925	4,234	3,319	7,302	3,976	8,745	3,930	8,646	4,799	10,557
687	1,917	4,217	3,166	6,966	3,532	7,771	3,673	8,081	5,312	11,687
188	2,087	4,591	4,075	8,966	3,258	7,167	3,437	7,562	3,567	7,716
153	2,093	4,605	3,570	7,853	3,615	7,953	3,696	8,131	4,299	9,457
194	1,817	3,998	(aborted)		4,288	9,434	4,550	10,011	5,430	11,947
163	2,580	5,675	4,299	9,457	4,031	8,868	4,142	9,112	4,128	9,081
Average	2,044	4,497	3,696	8,132	3,897	8,573	4,058	8,927	4,817	10,598
Average daily production (liters)	7.8		12.7		13.9		14.3		15.8	

During the fifth lactation all but one cow produced over 4,000 l or 9,000 lb of milk, and one cow produced 6,644 l (14,616 lb). Average production of these cows during the last four lactations far exceeds the average for Puerto Rico which is about 3,000 l (6,600 lb) of milk per lactation with cows receiving over 1 lb of concentrate feed per liter of milk produced.

It may be of interest to calculate the amount of forage that the cows must have ingested to produce an average of 4,817 kg (10,598 lb) of milk over the fifth lactation (300 days). According to accepted standards, the cows would have to consume about 2,909 kg (6,400 lb) of TDN for milk production and maintenance over this period or an average of 9.7 kg (21.3 lb) of TDN daily. Assuming that the forage has a digestibility of 60%

(which is 5% higher than previous estimates), the cows would have to consume about 16.4 kg (36 lb) of dry forage daily or about 66.3 kg (140 lb) of green forage daily. Holstein cows such as these, weighing about 1,200 lb, can consume this amount of forage daily since it was available to them at all times and was of good quality and high palatability.

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