Forced Walking Prepartum for Dairy Cows of Different Ages

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ABSTRACT

Fifty-three 2-yr-old Holstein heifers and 63 cows from 3 to 7 yr old were exercised 5 days/wk for 8 wk before calving. Three treatments were: 1) control (no forced exercise); 2) walk 1.6 km/day; and 3) walk 8.0 km/day. Exercise was at 4.0 km/h in a circular lane with a motor-driven gate. Daily feed intake and weekly body weights were recorded during the prepartum period and 50 days postpartum. Daily milk production and semimonthly milk composition were recorded for the complete lactation.

Exercise did not affect feed intake during the prepartum period. Weight gain was reduced during the dry period, more for older than for young cows, and particularly less gain for the longer distance. There was no benefit to production or feed efficiency from exercise for any age of cows. Production of protein and solids not fat was higher for combined ages of cows on the shorter than the longer distance. Protein percentage in milk for the lactation was higher for exercised than for control cows; solids-not-fat percentage in milk was higher for exercise for shorter than for longer distance; and fat percentage in milk was not affected by exercise. Number of services per conception and number of days open were less for exercised cows.

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INTRODUCTION

Exercise affected 2-yr-old heifers differently from older cows (2, 3). Two-year-old Holstein heifers in confinement benefited from prepartum exercise (3). Exercise improved ease of calving, hastened release of the placenta and involution of the uterus, increased production of milk, and increased efficiency of converting feed to milk. Older cows (2) showed no benefit from prepartum exercise but were exercised for different distances from younger cows (3.2 to 9.6 km/day vs. 1.6 km/day). The objective of this study was to determine whether differences between young and older cows were from distance of walking or age of cow.

MATERIALS AND METHODS

Fifty-three 2-yr-old Holstein heifers and 63 cows from 3 to 7 yr old were exercised 5 days/wk for 8 wk before their expected calving dates. Heifers were blocked in three's according to sire, production index of dam, and expected calving date. Older cows were blocked in three's according to previous production, age, and expected calving date. One member of each block was assigned at random to one of the following treatments: 1) control (no forced exercise); 2) walk 1.6 km/day; and 3) walk 8.0 km/day. Exercise was at 4.0 km/h in a circular lane with a motor-driven gate (1).

Heifers were pastured during summers but were confined to corrals with free-stall housing during winters and for at least 3 mo before expected calving. Cows had been confined to corrals since first calving.

Cows and heifers were housed together and fed and managed the same throughout the prepartum exercise trial. Lactating cows and heifers were also together but were separated from those not lactating. Animals were tied individually for feeding three times/day for 2 h each

time during the 8 wk prepartum exercise period. Alfalfa hay was fed ad libitum. Corn silage was fed at 13.6 kg/day to cows and 11.3 kg/day to heifers. Cows and heifers were fed .9 kg of grain per day for 5 wk; the amount of grain then was increased .9 kg twice per week until heifers reached 3.6 kg/day and cows reached 4.5 kg/day. These intakes were maintained until freshening. The grain ration consisted of 79% steam rolled barley, 14% molasses dried beet pulp, 5% sugar beet molasses, 1% dicalcium phosphate, and 1% salt.

Feed intake was recorded for 50 days postpartum. Animals had access to feed during four 2-h periods per day. Alfalfa hay was fed ad libitum. Corn silage was fed at the same rate as prepartum unless restricted to force heifers to eat a minimum of 5.4 kg of hay per day and cows to eat at least 6.8 kg/day. Grain was fed as follows: heifers were started at 4.5 kg/day, raised .9 kg every other day up to 8.2 kg/day, then fed .5 kg of grain for each kg of milk over 6.8 kg/day; cows were started at 5.4 kg/day, raised .9 kg every other day up to 10.9 kg/day, then fed .5 kg of grain for each kg of milk over 9.1 kg/day.

Reproduction performance was studied during the lactation following exercise. Heat detection was by observation for estrous behavior. Breeding was artificial insemination. Days to first service equaled number of days from calving to first breeding. Number of services amounted to number of breedings to achieve pregnancy. Number of days open equaled number of days from calving to date of service on which the animal became pregnant. Milk yield was recorded daily throughout the 305-day lactation. Milk composition (fat, protein, and solids-not-fat (SNF)) was measured twice monthly. Body weights were taken on 3 consecutive days at the start of the exercise trial and after calving. Single weights were taken at weekly intervals throughout the prepartum exercise and 50-day postpartum periods. Efficiency of feed utilization for the first 50 days of lactation was calculated as (.75 × kg of 4% fat-corrected-milk (FCM))/ Mcal of digestible energy (DE).

Data were analyzed by:

$$y_{ijkn} = \mu + t_i + a_j + (ta)_{ij} + m_k + \sum_{l=1}^{2} b_l x_{ijkln} + e_{ijkn}$$

TABLE 1. Least square means and standard errors for reproductive variables of heifers and cows on three exercise regimens.

Variables	Heifers						Cows					
	Control		1.6 km/day		8.0 km/day		Control		1.6 km/day		8.0 km/day	
	$\bar{X}$	SE	$\bar{X}$	SE	$\bar{X}$	SE	$\bar{X}$	SE	$\bar{X}$	SE	$\bar{X}$	SE
No. animals	16		20		14		20		20		20	
Days to first service	86.9	9.91	91.9	8.44	86.8	10.01	86.9	9.08	85.4	8.19	91.6	8.43
Number services	1.9	.43	2.2	.37	1.4	.44	2.8	.40	2.2	.36	2.1	.37
Days open	141.2	20.90	156.8	17.80	111.4	21.12	170.1	19.16	131.6	17.27	137.5	17.79