



Effect of Calving Environment on the Behavior, Metabolism, and Milk Yield of Holstein Heifers

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INTRODUCTION

- Goals for calving pen facilities and management include:
 - Promote comfort and a low stress environment
 - Minimize health risk for the cow and the calf
 - Offer convenience for employees working with cow and calf
 - Provide opportunity for seclusion by the cow
- Improper calving management causes stress, interrupts the calving process and may compromise well-being and performance of cows
- Modification of current close-up facilities with a shelter (aka calving blind) should allow for seclusion at calving and eliminate interruption of calving progress since cows would not be moved to a unfamiliar place

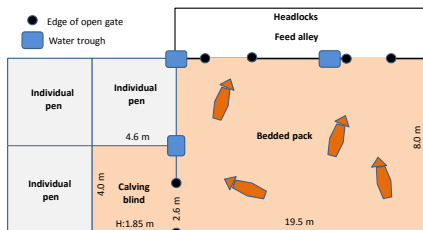
OBJECTIVE

- To determine the effect of calving environment of Holstein heifers on periparturient behavior and blood metabolites and milk yield during the first 21 DIM

MATERIALS AND METHODS

Completely Randomized Design

- 54 primigravid Holstein heifers
- Treatments were applied when calving was imminent
 - GRP:** Remained in bedded pack close-up pen enhanced with a calving blind (n = 30)
 - IND:** Moved to individual calving pen (n = 24)
- After calving, heifers were housed in a freestall pen, fed a TMR, and milked 3x/d



Data Collection

- Labor (abdominal contraction to calving) monitored with video camera and direct observation
- Standing recorded in 1-min intervals with HOBO Pendant® G data loggers
 - 4 to 12 h relative to calving
 - 1 to 21 DIM
- Rumination recorded in 2-h intervals with ai24 HR-Tag
 - 4 to 12 h relative to calving
 - 1 to 21 DIM
- Serum analyzed for BHBA and NEFA at 0, 7, 14 and 21 DIM
- Milk yield measured 1 to 21 DIM

Statistical Analysis

- Data were analyzed using the MIXED procedure of SAS with repeated measures as needed



RESULTS

Table 1. Calving behavior.

Variables	GRP	IND	SEM	P
Blind desired calving spot, #	12	6	-	0.25
Pen move to calving, min	-	89	10	-
Labor duration, min	98	124	11	0.11
Feet to calving, min	47	58	5	0.16
Calving difficulty (1-5)	1.5	1.8	0.2	0.31
Calf birth weight, kg	38.5	38.0	0.9	0.71
-2 h to calving (0 h)				
Standing, min	46	51	5	0.42
Standing, bouts	5	4	1	0.26
Standing, min/bout	19	22	5	0.68
Rumination, min	11	8	2	0.12

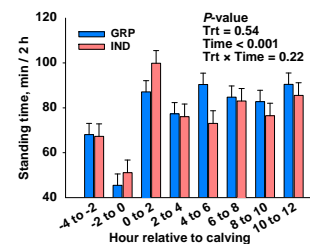


Figure 1. Standing -4 to 12 h relative to calving.

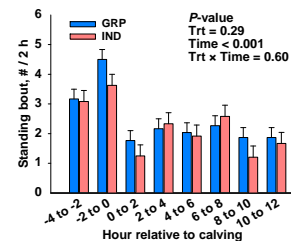


Figure 2. Standing bouts -4 to 12 h relative to calving.

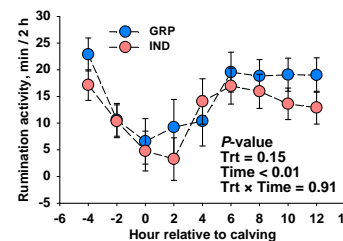


Figure 3. Rumination -4 to 12 h relative to calving.

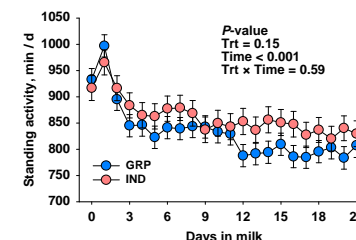


Figure 4. Standing 1 to 21 DIM.

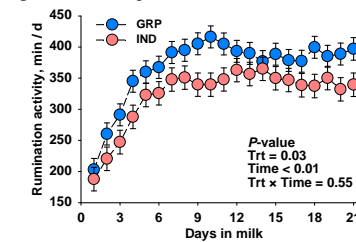


Figure 5. Rumination 1 to 21 DIM.

Table 2. Blood metabolites and milk yield postpartum.

Variables	GRP	IND	SEM	P-value	
				Trt	Time
NEFA, mEq/L	0.34	0.36	0.02	0.56	<0.001
BHBA, mg/dL	5.7	6.1	1.04	0.29	<0.001
Milk yield, kg/d	30.7	30.7	1.3	0.96	<0.001

CONCLUSIONS

- The calving blind was used by 40% of GRP heifers at calving and may indicate a desire for seclusion at calving.
- Management decisions around parturition should be considered to minimize disruptions that may delay normal calving progress and resumption of rumination after calving.