

Pre-weaned calf rearing options for dairy producers

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HIGHLIGHTS

- Calves raised on cows had the highest average daily gain and weaning weight
- No difference in health scores of group-fed calves, individual calves or calves raised on cows
- Across the weeks of the study, calves raised on cows had greater increase in body weight after 8 weeks of age
- Future studies will evaluate the economic impacts, as well as production effects of these calves when they come into milk

The objective of this study was to determine growth and health of organic dairy calves raised on cows compared to calves fed in individual pens or calves raised on an automated calf feeder. The study was conducted at the University of Minnesota West Central Research and Outreach Center, Morris, MN, organic dairy. Forty-five Holstein and crossbred calves were assigned to treatment groups by birth order during one calving seasons from March to May 2020. Calves raised on cows ($n = 14$) were housed in a compost bedded pack barn and on pasture, individual calves ($n = 16$) were housed in single Calf-Tel hutch (Hampel Corp., Germantown, WI), and group calves ($n = 15$) were housed in an indoor-outdoor barn with a Holm & Laue HL100 Calf Feeder (Holm & Laue GmbH & Co KG, Westerronfeld, Germany). Calves raised on cows were allowed to bond with the dam for 3 days before grouped with other calves and cows. Individual and group calves were introduced to hutch and feeder on day 4 and were fed 8 L/d. All calves were weaned at 90 d and were weighed weekly and scored for health and behavioral measurements. Data were analyzed using PROC MIXED of SAS. Independent variables for analyses were the fixed effects of birthweight as a covariate, treatment group, along with calf within pen as a random effect. At weaning of 90 d, calves raised on cows had higher ($P < 0.05$) weaning weight (137.6 kg vs. 120.0 kg vs. 128.4 kg, respectively) and average daily gain (1.12 kg/d vs. 0.93 kg/d vs. 1.01 kg/d, respectively) compared with individual calves and automated feeder calves. The individual-fed calves and calves from the automated feeder were not different ($P > 0.05$) for average daily gain. Average daily gain at 120 d of age, was not different ($P > 0.05$) for all treatment groups. The automated feeder calves had higher ($P < 0.05$) fecal scores (0.18) compared with calves raised on cows (0.04) and individual calves (0.03). The calves raised on cows had higher ($P < 0.05$) hygiene scores which indicated calves had dirtier bellies and sides than other treatment groups. Figures show the graphical representation of calf body weight by week. All calves have superior growth during the study. However, at 6 weeks of age, the calves raised on cows increased in body weight much faster than the group-fed or individually fed calves. The results from this study indicate that there may be advantages to feeding organic dairy calves on cows during the pre-weaning period.

Number of dairy calves by breed group and feeding group

	Group fed	Individual	Raised on cows
Breed group	(n)	(n)	(n)
Holstein	5	9	2
HMS ¹	7	3	2
HJS ²	3	4	10
Total calves	15	16	14

¹HMS = Crossbreds of Holstein, Montbéliarde, and Viking Red

²HJS = Crossbreds of Holstein, Jersey, Normande, and Viking Red

Weights for treatment groups

Variable	Group fed	Individual	Raised on cows
Serum total protein	5.64	5.26	5.75
Birth weight (lb)	80.5	82.7	86.4
60-day weight (lb)	211.6 ^a	206.8 ^a	256.8 ^b
Hip height (cm)	96.3	96.5	98.3
Heart girth (cm)	104.9 ^a	104.4 ^a	115.3 ^b
Average daily gain – birth to 60 days (lb/d)	2.16 ^a	2.07 ^a	2.91 ^b

^{a,b}Means within a row without common superscripts are different at P < 0.05.

Weights for treatment groups

Variable	Group fed calves fed Ab Libitum	Group fed calves fed 8 Liters	Individual calves fed 8 Liters	Calves raised on cows
Serum total protein	6.5	4.9	5.26	5.6
Birth weight	80.5	83.9	82.7	86.4
60-day weight	232.1 ^b	187.4 ^a	206.8 ^a	256.8 ^b
Hip height (cm)	96.9	96.2	96.5	98.3
Heart girth (cm)	107.7 ^b	102.4 ^a	104.4 ^a	115.3 ^b
Average daily gain	2.49 ^b	1.74 ^a	2.07 ^a	2.91 ^b

Hygiene for feeding groups

Variable	Group fed	Individual	Raised on Cows
Fecal score	0.2 ^a	0.03 ^b	0.03 ^b
Belly cleanliness	1.0 ^a	1.0 ^a	1.3 ^b
Side cleanliness	1.04 ^a	1.01 ^a	1.12 ^b
Rear cleanliness	1.0 ^{a,c}	1.02 ^{b,c}	1.07 ^a
Scours score	1.15 ^a	1.02 ^b	1.01 ^b
Respiratory score	1.0	1.0	1.0
General appearance	1.01	1.0	1.0

^{a,b}Means within a row without common superscripts are different at $P < 0.05$.



