This is a final project report submitted to The Ceres Trust.

Project Title:

Effect of whole milk feeding duration with group fed calves on growth, health, and behavior of organic dairy calves.

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Project Summary

Heifer calves (n = 124) were used to evaluate the effect of early life feeding duration in an organic group management system on growth and economics of organic dairy calves. Calves were assigned to replicate feeding groups of 10 in super hutches by birth order, and were born at the University of Minnesota West Central Research and Outreach Center, Morris, during 2011 and 2012. Breed groups of calves were: Holsteins (n = 15) selected for high production (**HO**), Holsteins (n = 23) maintained at 1964 breed average level (**H64**), crossbreds (n = 54) including combinations HO, Montbéliarde, and Swedish Red selected for high production (**HMS**), and crossbreds (n = 32) including combinations of HO, Jersey, and Swedish Red selected for durability (**HJS**). Calves were weaned at 30 (**EW**), 60 (**MW**), or 90 (**LW**) days of age, and groups were fed 1.5% of birth weight of 13% total solids organic milk once daily and then weaned when the group consumption averaged 2 lb starter/calf/day. Calves were consuming about 11.5% of their birth weight in whole milk once per day. Body weight and hip height were recorded at birth, once per week, and at weaning. Weaning group performance was weaning age (days), EW (47.6), MW (64.5), LW (93.7); gain per day (lb), EW (1.11), MW (1.40), LW (1.66); weaning weight (lb), EW (136.2), MW (174.7), LW (238.2); and weaning hip height (in), EW (35.3), MW (36.1), LW (38.1). The HO (1.52; 192.6), H64 (1.28; 173.0), HMS (1.44; 187.7), and HJS (1.32; 178.8) calves were different for gain per day (lb) and weaning weight (lb.), respectively. Total costs (grain and organic milk) to weaning per calf were $109.30 for EW, $187.13 for MW, and $295.68 for LW groups; however, the cost per pound of gain was significantly higher for the EW ($2.51) group than the MW ($2.09) or LW ($1.88) groups. Organic dairy producers should regularly evaluate their costs for organic milk and grain fed to calves, along with growth rates, to determine the optimum time to weaning for their operation.

Problem addressed

The number of organic dairies has been steadily growing during the past decade in the United States and the Midwest. However, current research and extension programs do not adequately support the needs of the increasing number of organic dairies, and scientific research on methods used to raise organic dairy calves is lacking.

Dairy replacement feeding and management systems have undergone major evolution in the last 25 to 30 years. As herd sizes increased, individual hutches were introduced to protect calves from contaminated and overcrowded environments. Recently higher levels of milk feeding are recommended to promote early growth, and now some farmers are adopting extended suckling until calves are weaned. Group calf rearing offers opportunities to reduce labor and to aid in socializing calves, but performance of group-managed calves in enlarged hutches is not well documented. The maintenance of health and growth of organic dairy calves is very important in their first few months of life. As no organic milk replacers are available, whole milk from high somatic cell organic cows, as well as bulk tank milk, must be fed. The cost versus benefits of milk consumption and weaning age is very important and has not been researched with organic dairy calves.

A group of organic dairy stakeholders was involved in the development of this research project at a dairy producer focus group meeting in Rochester, MN in March 2011. Dairy producers were invited to participate in a focus group related to the West Central Research and Outreach Center's (**WCROC**) USDA Organic Research and Extension Initiative planning grant project. The goals of the focus groups were to develop an exceptional integrated research and extension program, which will meet the informational needs of the growing organic agriculture

sector through identification of key issues in organic dairy production. The focus groups included organic dairy producers, as well as organic dairy industry representatives.

Project Objective

Our objective was to evaluate whole milk and grain consumption, growth rates, health incidence of calves, and use the available data to conduct an economic analysis for weaning duration with organic dairy calves fed once per day. Results were disseminated to stakeholders through peer-reviewed research and extension publications, research center field days, and through online educational materials.

Methodology

Heifer calves born at WCROC during the 2011 and 2012 calving seasons were used to evaluate the effect of early life nutritional level in an organic group management system on growth, health, and profitability of organic dairy calves. Calves were assigned to groups of 10 by birth order, with paired group formation order randomly determined. Super hutches with an outdoor exercise area were the primary housing site. The average time for group formation ranged from 2 days to 1 week, depending on calving rates. Cows calved unattended on pasture from March to May, but calved in an open shed during extreme weather.

Breed groups of calves include pure Holsteins and various crossbreds of Jersey, Holstein, Montbéliarde, and Swedish Red. Breed groups of calves were: Holsteins (n = 15) selected for high production (**HO**), Holsteins (n = 23) maintained at 1964 breed average level (**H64**), crossbreds (n = 54) including combinations HO, Montbéliarde, and Swedish Red selected for high production (**HMS**), and crossbreds (n = 32) including combinations of HO, Jersey, and Swedish Red selected for durability (**HJS**). The distribution of cows by breed group and weaning group is in Table 1. The four breed groups were variable in number of calves per weaning group, but they provided meaningful comparisons.

Table 1. Distribution of organic dairy calves by breed group and weaning group.

	Early Wean	Mid-Wean	Late Wean
Breed group	(N)	(N)	(N)
1964 Holstein	4	11	8
Holstein	4	6	5
HMS[1]	14	23	17
HJS[2]	12	10	10
Total calves	34	50	40

[1]HMS = Crossbreds of Holstein, Montbéliarde, and Swedish Red
[2]HJS = Crossbreds of Holstein, New Zealand Friesian, Jersey, and Swedish Red

Calves were fed colostrum from its mother at the morning feeding after birth, and calves received 2 quarts of colostrum per 90 pounds of birth weight from a bottle fitted with a Peach Nipple for two days. On day 3, calves were fed organic milk by birth weight and moved to

group housing when the calf was an aggressive suckler. All calves were randomly assigned to three treatment groups; 30-day wean (**EW**), 60-day wean (**MW**), and 90-day wean (**LW**), by birth order. The EW groups were fed 1.5% of birth weight in organic dry matter milk (13% total solids milk) once daily until the youngest calf in the group was 30 days old, and weaned when the group of calves consumed 2 lb. of organic calf starter per head per day for 3 consecutive days. The MW and LW groups were fed in the same manner; however, the MW group was fed until 60 days and the LW group was fed until 90 days of age. Calves were consuming about 11.5% of their birth weight in whole milk once a day. All groups remained in their assigned super hutch housing until LW groups were weaned, when they were regrouped into pens by body weight and age. Post weaning organic calf starter consumption was ad libitum and was capped at 4 lb/calf/day. Weaned calves were fed alfalfa hay that was greater than 120 RFQ. All milk and grain intake was recorded through 90 days of age with refusals weighed 2 times per week, and water was provided free choice from day 3.

All calves were fed the same organic grain mix, which consisted of 48.82% organic corn, 23.09% organic expelled soybean meal, 22.47% organic wheat, and 5.62% certified organic heifer mineral. The mix contained 89.9% dry matter, 19.4% crude protein, 5.9% crude fat, 19.2% Neutral Detergent Fiber, 6.1% Acid Detergent Fiber, 50.2% Non-Fiber Carbohydrates, 1.52% Calcium, 0.74% Phosphorous, and Gross Energy for the starter (0.057 * Crude Protein % + 0.094 * Crude Fat + 0.0415 * Non-Fiber Carbohydrates; NRC, 2001) was 3.75 Mcal/kg.

Body Measurements

While in-group housing, calves were weighed before and after milk feeding once per week to evaluate milk intake. Furthermore, body weight, hip height, heart girth, and body condition score were recorded at weaning, 90 days, and 120 days of age. Health, treatment, and death loss records were recorded on an individual calf basis. Body measurements were birth weight, weaning weight, weaning hip height, weaning heart girth, total gain, average daily gain, 90-d weight, and 120-d weight. Calves were also evaluated to determine if calves had doubled their birth weight by 60 days of age, which is quickly becoming an industry standard. Body measurements were evaluated for the four different breed groups and were recorded on calves through the first 120 days of age.

Economics

Most importantly, an economic comparison evaluated the costs and benefits of various weaning ages for organic dairy calves. Total feed cost was estimated as a function of the total cost for milk and grain for weaning groups to weaning and to the first 90 days of age. The default milk price was $27.97/cwt., which was the mean organic mailbox milk price from 2011 to 2012 for the West Central Research and Outreach Center organic dairy. The average organic grain starter mix was $0.256/lb. Total feed cost was the sum of milk intake and grain intake for a group of dairy calves. Average cost per pound of gain was the total feed cost divided by the total sum of weight gain for a group of dairy calves. The economic analysis was calculated for the pre-weaning period and for the first 90 days of life.

Sensitivity analyses were performed to evaluate the effects of changes in organic milk price on total feed cost and the average cost per pound of gain for dairy calves. Alternative milk prices were used for sensitivity analysis. Three alternative milk price scenarios were higher milk price (25% higher at $34.96/cwt.), lower milk price (25% lower at $20.90/cwt.), and lowest milk price ($10/cwt.).

Statistical analysis

For statistical analysis of pre-weaning and post-weaning calf growth measurements, independent variables were fixed effects of year of birth, breed group, weaning group, and the interaction of breed group and weaning group. Additionally, birth weight was used as a covariate for calf growth measurements. For economic analysis, independent variables were fixed effects of year of birth and weaning group, and replicated super hutch was the experimental unit and was included in the model as a random effect. The MIXED procedure of SAS (SAS Institute, 2008) was used to obtain solutions and conduct the ANOVA. All treatment results are reported as least squares means and significance was declared at $P < 0.05$.

Results

Table 2 has results for pre-weaning and early post-weaning body measurements of organic dairy calves by weaning group. The weaning groups were significantly different from each other for duration on milk (47.6 d vs. 64.5 d vs. 93.7 d, for EW, MW, and LW, respectively). The EW group was weaned at 47.6 d, contrary to the original 30-d because the calves in the EW group were not eating the required 2 lb of calf starter per head per day at 30-d of age. Therefore, the early-weaned calves were weaned about 2 weeks later than originally planned, but they simply were not ready to be weaned. If they would have been weaned at 30 days, their growth could have been slowed because of the lower grain intake with no milk post-weaning. Birth weight of calves were not different for the three weaning groups. As expected, calves that were weaned earlier had significantly ($P < 0.05$) lower weaning weights, less hip height, smaller heart girth, and lower total gain to weaning. Consequently, average daily gain for the weaning groups was significantly ($P < 0.05$) lower for the EW (1.11 lb./d) group compared to the MW (1.40 lb/d) and LW (1.66 lb/d) group.

Doubling a calf's birth weight by 60 days of age is becoming an industry standard for Holstein calves (Dairy Calf and Heifer Association Gold Standards I, 2012). However, for the current study only 42 to 51% of calves doubled their birth weight during the first 60 days of life. Although some calves did not double their birth weight in 60 days, all calves at 60 days were at least 1.5 times greater in weight than their birth weight, and some calves tripled their birth weight. For breed groups, 8 of 16 HO calves and 30 of 54 HMS calves doubled their birth weight by 60 days, whereas only 9 of 23 H64 calves and 11 of 32 HJS calves doubled their birth weight by 60 days. Quite possibly, doubling calf birth weight by 60 days of age is not achievable in this study because of the different genetic composition of the calves.

The EW and MW calves were not significantly ($P > 0.05$) different from the LW calves for 90-day weight. Furthermore, the EW (226.0 lb) calves were not significantly different from the LW (239.1 lb) calves for 120-day weight. Individual weaning weights and heights of LW calves were higher than EW calves at weaning, but growth differences had dissipated by 120 days of age.

Table 2. Pre-weaning and early post-weaning body measurements of group-fed organic dairy calves by weaning group.

	Early Wean		Mid-Wean		Late Wean	
Measurement	Mean	SE	Mean	SE	Mean	SE
Time on milk (d)	47.6[a]	1.2	64.5[b]	1.1	93.7[c]	1.0
Birth weight (lb)	84.7	2.6	82.6	2.2	83.2	2.2
Weaning weight (lb)	136.2[a]	3.9	174.7[b]	3.1	238.2[c]	3.4
Weaning hip height (in)	35.3[a]	0.35	36.1[a]	0.3	38.1[b]	0.3
Weaning heart girth (in)	37.7[a]	0.57	39.5[b]	0.5	44.2[c]	0.6
Total gain (lb)	53.2[a]	3.9	91.7[b]	3.1	155.2[c]	3.4
ADG (lb/d)	1.11[a]	0.05	1.40[b]	0.04	1.66[c]	0.05
Double weight by 60-d (%)	42.9	13.5	50.5	11.7	41.7	11.3
90-d weight (lb)	226.0	8.6	230.1	7.5	239.1	7.2
120-d weight (lb)	306.5[a,b]	14.2	288.2[a]	13.1	309.6[b]	12.2

[a,b,c] = Means within a row without common superscripts are different at $P < 0.05$
ADG = Average daily gain

Means for pre- and early post-weaning body measurements for breed groups are in Table 3. Body measurements were similar for HO and HMS calves. The similarities in body growth may be expected for the HO and HMS calves because the Holstein and Montbéliarde breeds tend to be similar in body size. The H64 calves and HJS crossbred calves were very similar for pre-weaning body measurements and had similar average daily gains from birth to weaning. The H64 and HJS calves were smaller in body size; however, by 120 days of age, differences in body size between the HJS and HMS breed groups had dissipated, but the HJS was significantly ($P < 0.05$) smaller than the HO calves at 120 days of age.

Milk intake, grain intake, and economic sensitivity analysis of milk and grain for weaning groups during the pre-weaning period are in Table 4. The EW calves had significantly ($P < 0.05$) lower milk intake, lower grain intake, and lower total feed cost during the pre-weaning period, simply because they were weaned much earlier than the MW or LW calves. The average costs per pound of gain for an organic dairy calf was $2.51 for the EW calves and was significantly ($P < 0.05$) higher than the LW calves at $1.88. During the pre-weaning period, the EW calves did not grow quick enough for the amount of milk and feed they consumed in the short period of time prior to weaning to have lower costs per pound of gain.

Table 3. Pre-weaning and early post-weaning body measurements of group-fed organic dairy calves by for 1964 Holstein, Holstein, and crossbred calf groups.

	1964 Holstein		Holstein		HMS[1]		HJS[2]	
Measurement	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Time on milk (d)	68.0	1.1	69.8	1.2	68.6	0.9	68.1	1.0
Birth weight (lb)	86.0[a]	2.6	86.6[a]	3.0	85.9[a]	1.8	75.6[b]	2.2
Weaning weight (lb)	173.0[b]	4.5	192.6[a]	5.2	187.7[a,c]	2.7	178.8[b,c]	3.7
Weaning hip height (in)	36.1[a]	0.4	37.3[b]	0.4	36.4[a,b]	0.2	36.3[a,b]	0.3
Weaning heart girth (in)	39.4[a]	0.7	42.2[b]	0.8	39.7[a]	0.4	40.6[a,b]	0.6
Total gain (lb)	90.0[b]	4.5	109.6[a]	5.2	104.7[a,c]	2.7	95.8[b,c]	3.7
Average daily gain (lb/d)	1.28[b]	0.6	1.52[a]	0.7	1.44[a,c]	0.4	1.32[b,c]	0.5
Double weight by 60-d (%)	30.0	12.9	56.8	14.2	52.2	9.6	41.5	10.9
90-d weight (lb)	215.1[b]	8.2	251.2[a]	8.9	238.1[a]	6.2	222.4[b]	7.2
120-d weight (lb)	290.5[a]	12.6	313.3[b]	13.0	305.1[a,b]	11.3	296.7[a,b]	11.9

[a,b,c] = Means within a row without common superscripts are different at $P < 0.05$

[1]HMS = Crossbreds of Holstein, Montbéliarde, and Swedish Red

[2]HJS = Crossbreds of Holstein, New Zealand Friesian, Jersey, and Swedish Red

Table 4. Milk, intake, grain intake and economic sensitivity analysis of milk and grain for weaning groups during the pre-weaning period[1].

	Early Wean		Mid-Wean		Late Wean	
Measurement	Mean	SE	Mean	SE	Mean	SE
Milk intake (lb.)	3,658[a]	186.4	5,890[b]	166.9	8,646[c]	175.5
Average milk price ($27.97/cwt.)	1,023.15[a]	52.15	1,647.49[b]	49.69	2,418.39[c]	49.09
Higher milk price ($34.96/cwt.)	1,278.84[a]	65.18	2,059.21[b]	58.35	3,022.77[c]	61.36
Lower milk price ($20.98/cwt.)	767.45[a]	39.11	1,235.76[b]	35.02	1,814.01[c]	36.83
Lowest milk price ($10/cwt.)	365.80[a]	18.64	589.02[b]	16.69	864.64[c]	17.55
Grain intake (lb.)	285.1[a]	66.5	851.7[b]	59.6	2,073.8[c]	58.7
Grain cost ($0.256/lb.)	72.98[a]	17.0	218.03[b]	15.25	530.90[c]	15.02
Total gain - birth to weaning (lb.)	444.6[a]	43.6	902.0[b]	39.2	1,579.9[c]	43.5
Average total feed cost ($)	1,093.03[a]	44.65	1,871.33[b]	40.25	2,956.77[c]	44.65
Higher total feed cost ($)	1,349.48[a]	56.46	2,283.17[b]	50.89	3,563.31[c]	56.46
Lower total feed cost ($)	836.58[a]	33.24	1,459.48[b]	29.96	2,350.23[c]	33.24
Lowest total feed cost ($)	433.75[a]	18.0	812.55[b]	16.22	1,397.47[c]	18.0
Average cost ($)/gain (lb.)	2.51[a]	0.10	2.09[a,b]	0.09	1.88[b]	0.10
Higher cost ($)/gain (lb.)	3.10[a]	0.13	2.54[b]	0.12	2.26[b]	0.13
Lower cost ($)/gain (lb.)	1.92[a]	0.08	1.63[a,b]	0.07	1.49[b]	0.08
Lowest cost ($)/gain (lb.)	0.99	0.04	0.90	0.03	0.89	0.04

[a,b,c] = Means within a row without common superscripts are different at $P < 0.05$
[1] = Means for groups are expressed for a group of ten calves

The economic results for the first 90 days of life are in Table 5. These results evaluate all calves through 90 days of life. During the first 90-day period, EW, MW, and LW calves were not significantly different from one another for grain intake. Perhaps, the EW calves consumed more grain post-weaning because they were not provided milk, and thus, differences in grain intake were not found. Average feed costs per group were significantly ($P < 0.05$) lower for the EW ($1,595.65) and MW ($2,240.04) calves than the LW ($2,956.77) calves. Including grain intake for the EW and MW calves through 90 days of age for total feed cost reduced the difference between all of the weaning groups compared to the pre-weaning period; however, the EW calves still had the advantage in lower feeds costs compared to the LW calves. Consequently, the EW ($1.37) calves had significantly ($P < 0.05$) lower costs per pound of gain than the LW ($1.88) calves with the average milk price. The average milk price had a greater impact on total feed cost for the LW calves than the EW calves, because the LW calves consumed more milk during the first 90-days of life than the EW calves. However, difference in

costs per pound of gain were not significantly different between the weaning groups at the lower milk prices.

Table 5. Milk, intake, grain intake and economic sensitivity analysis of milk and grain for weaning groups during the first 90 days of life[1].

	Early Wean		Mid-Wean		Late Wean	
Measurement	Mean	SE	Mean	SE	Mean	SE
Grain intake (lb.)	2,224.6	99.4	2,312.8	89.6	2,069.3	99.4
Grain cost ($0.256/lb.)	569.50	25.50	592.10	22.90	529.80	25.50
Total gain - birth to 90-d (lb.)	1,166.6	105.8	1,469.9	95.4	1,579.90	105.8
Average total feed cost ($)	1,595.65[a]	46.90	2,240.04[b]	42.30	2,956.77[c]	46.90
Higher total feed cost ($)	1,852.09[a]	57.90	2,651.99[b]	52.20	3,563.31[c]	57.90
Lower total feed cost ($)	1,339.20[a]	36.80	1,828.20[b]	33.20	2,350.23[c]	36.80
Lowest total feed cost ($)	936.37[a]	25.30	1,181.27[b]	22.84	1,397.47[c]	25.30
Average cost ($)/gain (lb.)	1.37[a]	0.12	1.59[a,b]	0.09	1.88[b]	0.11
Higher cost ($)/gain (lb.)	1.59[a]	0.14	1.83[a,b]	0.12	2.26[b]	0.14
Lower cost ($)/gain (lb.)	1.15	0.09	1.26	0.07	1.49	0.09
Lowest cost ($)/gain (lb.)	0.81	0.06	0.81	0.03	0.89	0.05

[a,b,c] = Means within a row without common superscripts are different at $P < 0.05$
[1] = Means for groups are expressed for a group of ten calves

Conclusion

Our results report that adequate gain can be achieved in organic dairy calves that were group fed once a day. Successful group feeding of organic dairy calves is enhanced with aggressive suckling during infancy and early consumption of high quality organic calf starter. Organic dairy producers should regularly evaluate their costs for organic milk and grain fed to calves, along with growth rates, to determine the optimum time to weaning for their operation.

As no organic milk replacers are available, whole milk from high somatic cell organic cows, as well as bulk tank milk, must be fed. Therefore, organic dairy producers will have to decide whether to use high somatic cell count cows from the herd to feed calves or use expensive milk from the bulk tank. The cost versus benefits of milk consumption and weaning age is very important and may drive important decisions on an organic dairy. Future research will explore the impact of weaning age of organic dairy calves with heifer growth, fertility, and first lactation performance. Results of research will provide guidance to organic dairy producers for methods for feeding organic dairy calves for specific management systems. Irrespective of feeding system, successful management of dairy calves is of critical importance to an organic dairy.

Outreach and Extension

Preliminary results of this research were presented at:

- American Dairy Science Association/American Society of Animal Science meetings (July 2012, Phoenix, AZ)
- 72nd Minnesota Nutrition Conference (September 2011, Owatonna, MN)
- Minnesota Organic Conference (January 2012, St. Cloud, MN)
- McIntosh Dairy Days (March 2012, McIntosh, MN)

The West Central Research and Outreach Center hosted its first annual Organic Dairy Day in Morris on August 7. More than 80 people, mostly dairy producers, from three states attended the event. Three seminars were presented during the morning session, and the afternoon concluded with three field tour stops at the WCROC dairy. The field tour provided opportunities for producers to view several research projects at WCROC. The pasture tour focused on group feeding organic dairy calves once per day.

In the future, scientific results will be published in the Journal of Dairy Science, and an extension fact-sheet will be published with on the Unveristy of Minnesota Dairy Extension website. Information will also be prepared and presented at the MOSES Organic conference in LaCrosse, WI. These results will be a portion of Elizabeth Bjorklund's Masters thesis.

Publications authored by Investigators

Heins, B. J. and E. A. Bjorklund. 2012. Effect of feeding duration on growth, health, and economics of group-fed dairy calves in an organic production system. J. Dairy Sci. Vol. 95 (E-Suppl. 1): 474

Heins, Brad. You can group feed calves once per day? University of Minnesota Dairy Extension Website. February 25, 2012. http://www1.extension.umn.edu/dairy/calves-and-heifers/you-can-group-feed-calves-once-per-day/index.html

Heins, Brad. You can group feed calves once per day? The Dairy Star, February 25, 2012. (Popular Publication)

Heins, B. J. 2012. Group feeding calves for low-input dairy systems. *In:* Proc. University of Minnesota Virtual Dairy Days. March 7, 2012, p. 27-28.

Heins, B. J. 2011. Group feeding calves for an organic production system. *In:* Proc. 72nd Minnesota Nutrition Conference. Owatonna, Minnesota, September 20-21, 2011, p. 74-75.

Advantages for group feeding systems

- Labor for feeding calves is reduced
- Calves are socialized for group living
- Group learning occurs – especially for early starter consumption
- Growth is equal to individual housing. Adequate growth of 0.75 to1.5 lb./day depending on milk feeding level
- Easier to bed and clean super hutches than individual hutches

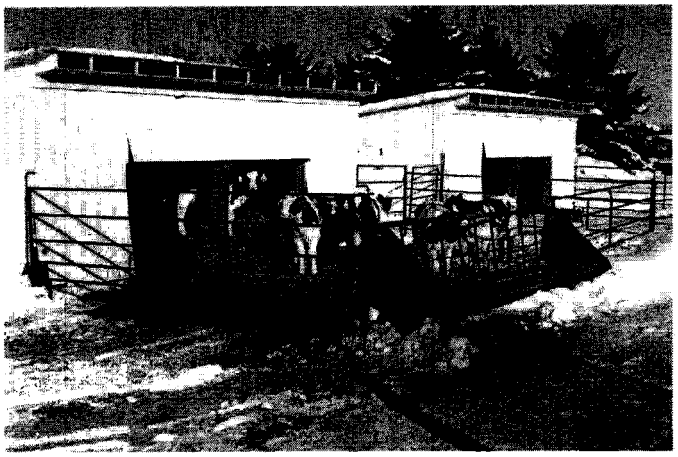
Challenges of group feeding system

- Calves must be aggressive drinkers when they are grouped
- Weak calves must be separated
- Calf attendant must be a good observer
- If age spread is large, the oldest calves will have delayed weaning or youngest will be weaned too soon
- Contagious disease may affect more calves
- More difficult to provide individual attention

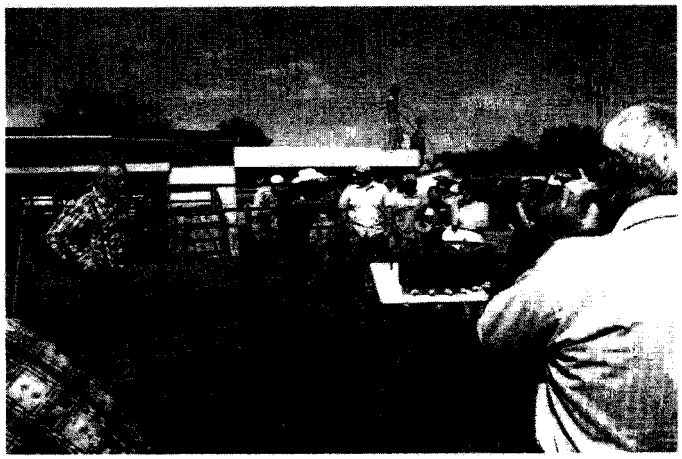
Tips for group management systems

- Separate newborns from fresh cows ASAP and hand feed colostrum
- Train calf to drink from a firm nipple in an individual pen during colostrum feeding period
- Do not add new calf to a group until it is a fast aggressive sucker. Most are ready by the third day. Consider calves < 75 lb. to be at risk and require careful observation, especially during winter
- Feed at least 1.1% of birth weight of total solids high quality milk. Calves fed >2% may have loose manure initially
- Restrict range of age and size within a group when possible. One week range works well, more than 3 weeks increases milk feeding cost for the group as weaning is based on the youngest calf in the group
- A super hutch works well for 8 to 10 calves
- Temporariliy leave the nipple feeder with the group following feeding so they suck the nipple instead of each other
- Provide abundant water, bedding, and an outside exercise area
- Wean when group average starter intake is 2.0 lb./day for 3 consecutive days
- After weaning maintain original group at least 1 week before co-mingling into larger groups

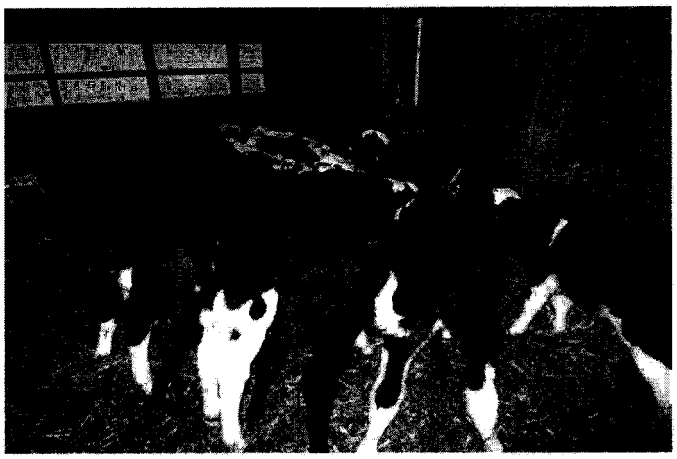
Photos



Group housing of organic dairy calves in super hutches during the winter and spring months.



Discussion of group feeding of calves at WCROC organic dairy in August 2012



Group feeding of dairy calves in groups of 10 calves