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Group Housing Preweaned Dairy Calves:

Socialization versus Disease Transmission

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Calves are raised outside by their mothers in beef herds while dairy farmers have invested in a variety of types of housing to raise the newborn to weaning; traditionally in individual hutches or pens. Newer research on calf behavior has shed light on the potential effects of individual versus pair or group housing. What are the current recommendations and what are the advantages and disadvantages of different housing systems?

Behavior

A calf reared in a semi-natural environment spends its time either alone or with its dam until it is about one week old and begins interacting with other calves. Rearing calves in individual hutches or pens from birth to weaning may have a detrimental impact on a calf's social development (1). Calves raised in pairs or groups demonstrate several favorable behaviors over calves raised

individually. The table (Table 1) below summarizes the behavioral differences seen in pair or group-housed calves when compared to individually-housed calves.

Table 1.

	Increased Lying Time[2]	Decreased Aggression [3,1]	Decreased Time Before Eating Novel Foods [4]	Increased Social Interactions [5]	Increased Time Spent at Feeder [6,7]	Decreased Time Before First Visit to Feeder [6,7]
Pair Housing	5% Increase	32% Decrease	N/A	71% Increase	26-59% Increase	42%-82% Decrease
Group Housing	N/A	60% Decrease	50% Decrease	N/A	N/A	N/A

Health

During the first 90 days of life, approximately 23% of calves will develop one or more diseases. Diarrhea is commonly more prevalent than respiratory disease during the first six weeks of life with the most diarrhea cases reported during the first week (8). With all this talk about disease incidences in preweaned calves, farmers and veterinarians are concerned that group housing will lead to more calf health issues. Multiple studies have found no differences in calf health treatments or mortality when comparing calves in group housing versus individual housing; however, a few differences in health have been detected in other studies. Table 2 highlights what we know so far about disease prevalence in pair or group-housed calves.

Table 2.

	Reduction in Respiratory Disease Incidence[9]	Decreased Heart Rate during Novel Environment Test [5]	Decreased Odds for Antibiotic Resistance in *E. coli* [10]
Pair Housing		13% Decrease	
Group Housing		N/A	
Individual Housing	57-71% Reduction		50% Decrease

Performance

Taking into consideration the behavioral and health implications of pair or group housing, many farmers are interested in how calf performance may be affected by these housing systems. Take a look at Table 3 to learn how calf average daily gain (ADG) and feed intake differs in pair or group-housed calves when compared to individually-housed calves.

Table 3.

	Increased Preweaning Starter Intake[11,6]	Increased Postweaning Starter Intake [9]	Improved Average Daily Gain [11,12]
Pair Housing	 37% Increase	 18% Increase	 14% Increase
Group Housing†		 18% Increase	 16% Increase

†Note: The outcomes associated with group housing greatly vary depending on group size. Larger group sizes tend to result in additional calf health complications.

Additional Considerations

It is apparent that advantages and disadvantages exist for individual, pair, and group housing systems. Before deciding which housing system is most appropriate for your dairy, please also consider the following:

- Cleaning protocols for calf care equipment (pens, buckets, bottles, etc.) should be in place and all calf care employees should be trained on proper cleaning procedures.

- Large group sizes are associated with an increase in respiratory disease and more severe cases of diarrhea: "Before changing to group pens, evaluating ventilation in the calf housing area is critical." (See the WSU Extension information on calf housing and ventilation assessment for more information: http://vetextension.wsu.edu/research-projects/calfscience/calfhousingenvironment/).

- Consult with your veterinarian before drastically altering your calf management practices

- Colostrum management (quality and quantity) is vital to calf success regardless of the housing system (See our CalfScience resources at: http://vetextension.wsu.edu/research-projects/calfscience/resources/).

- For more items to consider in your calf facility read Amber's Top Ten Tips: Calf Management (http://dairynews.puyallup.wsu.edu/2014/12/).

References

1. BØe, K.E and G. ærevik. 2003. Grouping and social preferences in calves, heifers and cows. Appl Anim Behav Sci 80:175-190.

2. Pempek, J.A., M.L. Eastridge, N.A. Botheras, C.C. Croney, and W.S. Bowen Yoho. 2013. Effects of alternative housing and feeding systems on the behavior and performance of dairy heifer calves. Prof Anim Sci 29:278-288.

3. De Paula Vieira, A., A.M. de Pasillé, and D.M. Weary. 2012. Effects of the early social environment on behavioral responses of dairy calves to novel events. J Dairy Sci 95:5149-5155.

4. Costa, J.H.C., R.R. Daros, M.A.G. von Keyserlingk, and D.M. Weary. 2014. Complex social housing reduces food neophobia in dairy calves. J Dairy Sci 97:7804-7810.

5. Jensen, M.B. and L.E. Larsen. 2014. Effects of level of social contact on dairy calf behavior and health. J Dairy Sci 97:5035-5044.

6. De Paula Vieira, A., M.A.G. von Keyserlingk, and D.M. Weary. 2010. Effects of pair versus single housing on performance and behavior of dairy calves before and after weaning from milk. J Dairy Sci 93:3079-3085.

7. Duve, L.R., D.M. Weary, U. Halekoh, and M.B. Jensen. 2012. The effects of social contact and milk allowance on responses to handling, play, and social behavior in young dairy calves. J Dairy Sci 95:6571-6581.

8. Svensson, C., K. Lundborg, U. Emanuelson, and S. Olsson. 2003. Morbidity in Swedish dairy calves from birth to 90 days of age and individual calf-level risk factors for infectious diseases. Prev Vet Med 58:179-197.

9. Cobb, C.J., B.S. Obeidat, M.D. Sellers, A.R. Pepper-Yowell, and M.A. Ballou. 2014. Group housing of Holstein calves in a poor indoor environment increases respiratory disease but does not influence performance or leukocyte responses. J Dairy Sci 97:3099-3109.

10. Duse, A., K.P. Waller, U. Emanuelson, H.E. Unnerstad, Y. Persson, and B. Bengtsson. 2015. Risk factors for antimicrobial resistance in fecal *Escherichia coli* from preweaned dairy calves. J Dairy Sci 98:500-516.

11. Jensen, M.B., L.R. Duve, and D.M. Weary. 2015. Pair housing and enhanced milk allowance increase play behavior and improve performance in dairy calves. J Dairy Sci 98:2568-2575.

12. Valníčková, B., I. Stěhulová, R. Šárová, and M. Špinka. 2015. The effect of age at separation from the dam and presence of social companions on play behavior and weight gain in dairy calves. J Dairy Sci 98:5545-5556.

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