



Factors that Influence Colostrum Yield: Environmental Temperature and Photoperiod

This is the fourth article in the series.

Environmental temperature and possible hours of light (Photoperiod) are important factors in the development of colostrum and eventually milk. The purpose of this review is to go over weather changes that affect colostrum yield.

Environmental Temperature and Photoperiod

Colostrum yield appears to be related to environmental temperature (see fact sheet 1). Research using New Hampshire Holstein herds showed that colostrum yield was positively correlated with the number of days during the close-up period being greater than about 73°F during which cows produced more colostrum.¹ This is considered heat stress and when this occurs, blood vessels dilate making them more permeable resulting in more nutrients and hormones flowing to the gland.

As noted with Jersey cows on a large dairy in Texas, cows produced more colostrum during the summer than in the winter. The researchers suggested that this was due to the shorter daylight length during winter days and longer photoperiod in the summer.² Lactating cows given 16 hours of light produce about 10% more milk than cows given ambient light. Research conducted at UNH using Jersey herds from across the US found that the further north the herd the less colostrum the cows



made.³ These researchers also found that the hours of light the cows were subjected to did not affect colostrum yield. These data were supported by work with Holstein cows in New York where varying lux had little effect on colostrum yield. These same researchers observed that as the temperature-humidity index increased colostrum yield increased.⁴

When it is Cold Outside

UNH researchers showed that when cows were subjected to temperatures less than 41°F Jersey cows produced less colostrum.³ As discussed in the previous fact sheet, prolactin is essential for the conversion from colostrogenesis to lactogenesis, and prolactin is dampened when temperatures are low. Therefore, perhaps the response of cows not producing colostrum or reducing the yield of colostrum is not photoperiod at all but environmental temperature.

Take Home Message

Cows calving during the winter months may have reduced colostrum yield due to the failure of prolactin increase caused by seasonal environmental temperatures. It is advisable to have ample frozen colostrum or a colostrum-based replacer available for newborns.

References

- ¹Cabral, R.G., C. E. Chapman, K. M. Aragona, E. Clark, M. Lunak, and P. S. Erickson. 2016. Predicting colostrum quality from performance in the previous lactation and environmental changes. *J. Dairy Sci.* 99:4048–4055
- ²Gavin, K. H. Neiberger, A. Hoffman, J.N. Kiser, M.A. Cornmesser, S. Amirpour Haredasht, B. Martinez-Lopez, J.R. Wenz, and D.A. Moore. 2018. Low colostrum yield in Jersey cattle and potential risk factors. *J. Dairy Sci.* 101:6388-6398.
- ³Stahl, T.C., E.M. Mullin, J.M. Pineiro, M. Lunak, M. Chahine, and P.S. Erickson. 2024. Creating models for the prediction of colostrum quantity, quality, and immunoglobulin G yield in multiparous Jersey cows from performance in the previous lactation and environmental changes. *J. Dairy Sci.* 107:4855–4870.
- ⁴Westhoff, T.A., S.J. Womack, T.R. Overton, C.M. Ryan, and S. Mann. 2023b. Epidemiology of bovine colostrum production in New York Holstein herds: Cow, management, and environmental factors. *J. Dairy Sci.* 106:4874:4895.

About the Author

Dr. Peter Erickson is Professor of Dairy Management and Extension Dairy Specialist at the University of New Hampshire. His primary research area is in the area of optimal colostrum production and management through feeding of the prepartum cow and the newborn calf. He also works in the area of calf and heifer nutrition along with the feeding of alternative feedstuffs.

Contact Information

Dr. Peter Erickson | 603-862-1909 | Peter.Erickson@unh.edu

Reviewed by

Dr. Sarah Allen

Photo Credit

GilMordechai / stock.adobe.com 465021042



UNH Extension is committed to reducing barriers to learning and expanding reach to all people regardless of their backgrounds.

The University of New Hampshire Cooperative Extension is an equal opportunity educator and employer. UNH, U.S. Dept. of Agriculture, and New Hampshire counties cooperating. Our programs and policies are consistent with pertinent Federal and State laws and regulations prohibiting discrimination on the basis of race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, familial/parental status, income derived from a public assistance program, political beliefs, reprisal or retaliation for prior civil rights activity. To file a UNH or UNHCE discriminatory harassment complaint, use the Incident Report Form or call 603-862-2930. To file a USDA program discrimination complaint, complete the USDA Program Discrimination Complaint Form or call 866-632-9992.

© 2024 University of New Hampshire