Research Now

Prepartum Digital Dermatitis Negatively Affects Health, Reproduction and First-Lactation Performance of Dairy Cattle

Introduction:

This study was designed to gauge the effect of DD during the rearing period on postpartum health, reproduction and first-lactation performance of dairy cattle.

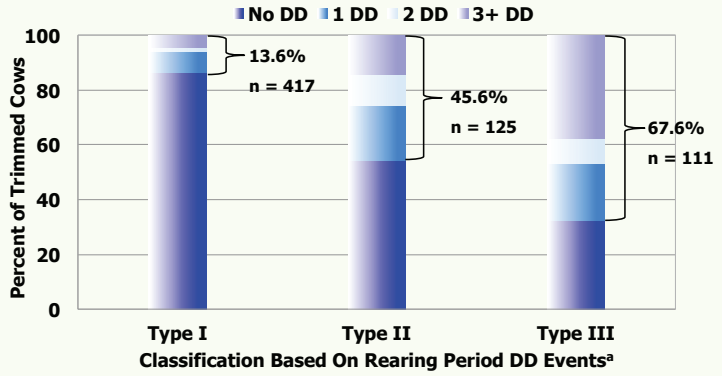
Experimental Design:

719 pregnant heifers were observed for six months pre-calving, and categorized according to number of DD events identified.

- Type I: no DD
- Type II: one DD event
- Type III: multiple DD events

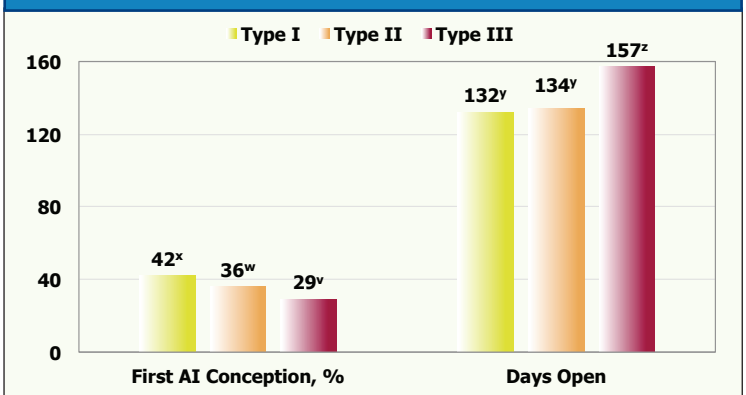
Post-calving, health during initial 60 days in milk (DIM), hoof health, reproduction and lactation performance were evaluated.

Digital Dermatitis Events During First Lactation



[a] Heifers were categorized in the rearing period, according to number of DD events identified: Type I, no DD; Type II, one DD event; Type III, multiple DD events

Reproductive Performance



[vwx] Means lacking a common superscript letter differ, $P < 0.05$
[yz] Means lacking a common superscript letter differ, $P < 0.01$

Results (Combined Data):

Reproduction

Compared to Type I cows, Type III cows had:

- Decreased first conception rate, $P < 0.05$
- Increased number of days open, $P < 0.01$

Hoof Health

Type II and III cows were at greater risk for DD incidence during first lactation compared to Type I cows (45, 67 and 13%, respectively; $P < 0.01$).

- These cows also experienced DD earlier, post-calving.

Lactation Performance

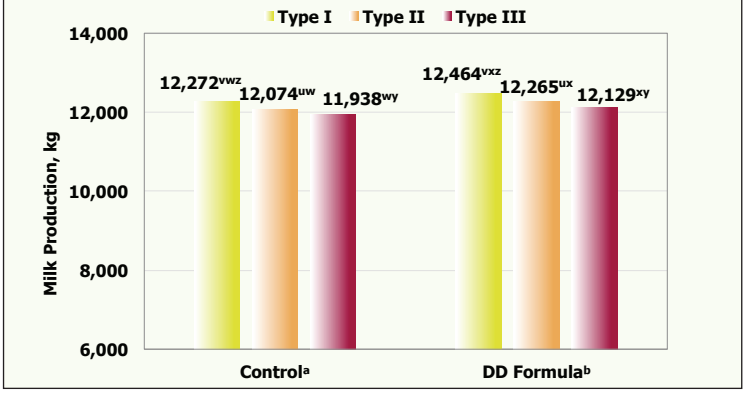
Compared to Type I cows, milk loss during the first 305 DIM was estimated to be:

- Type II: 199 kg
- Type III: 335 kg

These differences were caused by a greater decline in rate of milk production after peak yield ($P < 0.01$). Additionally, independent of DD occurrence, cattle consuming trace minerals from Zinpro Performance Minerals® during the rearing period produced 192 kg more milk than those fed inorganic trace minerals ($P < 0.05$).

This data underscores the need for prevention and control of DD in heifers during the rearing period.

Lactation Performance



[a] Control: during the rearing period, provided supplemental 29 ppm Zn, 20 ppm Mn, 9 ppm Cu, 0.2 ppm Co, 0.4 ppm iodine and 0.3 ppm Se

[b] DD Formula (original/modified): during the rearing period, provided supplemental 92 ppm Zn, 61 ppm Mn, 13 ppm Cu, 1.0 ppm Co, 3.8 ppm iodine and 0.3 ppm Se with a portion of the Zn, Mn, Cu and Co supplied by Zinpro Performance Minerals®; Iodine was supplied by EDDI in the original formula and iodine dried on a silica carrier in the modified formula

[uv] Between cow types (Type I vs Type II) in the same nutrition group (Control or DD Formula), means lacking a common superscript letter differ, $P < 0.01$

[wx] Between nutrition groups (Control vs DD Formula), means lacking a common superscript letter differ, $P < 0.05$

[yz] Between cow types (Type I vs Type III) in the same nutrition group (Control or DD Formula), means lacking a common superscript letter differ, $P < 0.01$

Abstract

Effects of prepartum digital dermatitis on first-lactation performance. A. Gomez*[1,2], N. Cook[1], M. Socha[2], and D. Dopfer[1], [1]University of Wisconsin-Madison, Madison, WI, [2]Zinpro Corporation, Eden Prairie, MN

The objective of this study was to describe and quantify the effect of prepartum digital dermatitis (DD) on first-lactation performance. A cohort of 719 pregnant heifers was monitored for DD for a period of 6 mo before calving. The heifers were classified by the number of DD events diagnosed as Type I, Type II and Type III (no DD, one DD event, and multiple DD events, respectively) during this period. After calving, health during initial 60 d in milk (DIM), reproductive and hoof health outcomes, and milk production were compared among the 3 group types. Multivariable logistic and linear models were adjusted for age, height, and girth circumference at enrollment, as well as type of trace mineral supplementation during the pre-partum period. Overall, cows experiencing DD during the rearing period showed inferior production and health outcomes compared with healthy heifers during the first lactation. A numerical difference was found on the percentages of assisted calvings, stillbirths, culls before 60 DIM, and diseased cows during the fresh period between Type III and Type I cows. Significantly lower conception risk at first service (OR [95% CI] = 0.55 [0.33, 0.89]) and increased number of days open (mean [95% CI] = 24 d [5.2, 43]) were observed in Type III compared with Type I cows. In relation to hoof health, a significantly increased risk of DD during first lactation was found in Type II and III cows (OR = 5.16 [3.23, 8.29] and 12.5 [7.52, 21.1], respectively), as well as the earlier occurrence of DD post-calving (mean [95% CI] = 59 d [20, 96], and 74 d [37, 109]). Compared with Type I cows, decreased milk production during initial 305 DIM was estimated at 199 and 335 kg for Type II and III cows, respectively. This difference was due to a greater decline in rate of production (less persistence) after peak yield ($P < 0.01$). Given the long-term effects of DD on health, reproduction, and production, priority should be given to efficient DD prevention and control programs during the rearing period of dairy heifers. Intensive intervention programs are expected to increase overall well-being and farm profitability, based on active long-term DD surveillance, mitigation of risk factors, and prompt treatment.

Key words: digital dermatitis, heifer, milk production

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