

DAIRY VETERINARY NEWSLETTER

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Do Crossbreds with Colored Breeds Have More Dystocia than Purebred Holsteins?

Dystocia as a disease complex is not as prevalent or as much of a focus in the dairy industry as some other diseases. However, dystocia - definitions vary, but birth requiring some degree(s) of assistance - is never a good event, and besides causing possible death of the calf and/or cow, it has often been reported as predisposing affected cows to other important diseases. No one on dairy farms wants a cow's lactation to begin with calving difficulty. Any veterinarian who has experienced the phenomenon where animals pregnant via an unusual crossbred mating - or where many heifers were impregnated too young - resulted in nearly all subsequent calvings that season resulting in dystocia knows that is not a nightmare they want to repeat.



Dystocia during birth of a Holstein calf



Unspecified Holstein and Viking Red crossbred

The question of whether 2 of the 3-breed crossbreds utilized by some - and probably growing numbers of - dairy farms in the U.S. of Holstein, Montbéliarde, and Viking Red, or of Normande, Jersey, and Viking Red result in more dystocias or stillbirths than that of Holsteins was investigated recently. Results were reported in a paper by G.M. Pereira et al. in the Journal of Dairy Science, November 2022. The paper includes a nice introduction about the origin and history of the Northern European breeds listed above, and describes some of the limitations in reporting data on dystocia in several countries where those breeds are common. Summaries of earlier studies include that stillbirths resulted from approximately 10% of primiparous calvings, and 6% of older cows' calvings over the last 20 years, and that assisted delivery was reported in between 17% and 27% of Holstein calvings over the last 10 years.

The study took place on 2 farms: the Dairy Cattle Teaching and Research Facility at the University of Minnesota (UM) has 120 lactating cows housed in a 90-cow tiestall barn and a 30-cow compost-bedded pack barn, and there are 300 lactating cows in a seasonal pasture herd (PAST) at the West Central Research and Outreach Center in Morris, Minnesota. "Both the [UM] and [PAST] herds initiated a cross-breeding program [with Jersey bulls] in

2000.”, the paper states. Since 2009, UM and PAST have used a 3-breed rotational crossbreeding system of Montbéliarde, Viking Red and Holstein (MVH) cows as well as purebred Holsteins (HO). Since 2003, PAST has also used a separate 3-breed rotational crossbreeding system of Normande, Jersey, and Viking Red (NJV) cows as well as HO. (The initial Jersey breeding in the NJV program at PAST was with Holstein-Jersey crosses, but the Holstein breeding is apparently considered virtually gone and was ignored.)



Montbéliarde dairy cattle



Normande dairy cattle

From January 2009 to December 2019, 4 outcome variables at all calvings were recorded that were the focus of the study: Gestation length (GL), calf birth weight (CW), calving difficulty (CD), and stillbirth (SB). CW was the weight of the calf recorded within 24 hr after birth, and SB was defined as a calf that was expelled dead or died within 24 hr after birth. I agree with the latter diagnosis; many calves with congenital defects, fatal infections with pathogens that also often cause abortions, and/or traumatic dystocia injuries that are the direct primary cause of death may live for 24 hr. (There was no description of attempting to define whether infectious or congenital disease caused the stillbirths; those in the study were apparently considered only to result from dystocia.) CD was defined using the 2 most severe categories of a 5-point scale of difficulty for all calvings: 4 = used obstetrical chains, or 5 = extremely difficult birth, mechanical puller required. Only single-calf births were used in the study; multiple births such as twins or triplets were excluded.

For statistical analysis, the input variables sex of calf, breed of calf, herd, and year/season of calving were tested for associations with each of the outcomes (GL, CW, CD, SB). For multiparous calvings, cow was also an input variable (this was not explained, but probably was because many multiparous cows contributed multiple calvings to the data; evaluating to what extent the cow was significantly associated with the outcomes was of interest). A mixed linear model evaluated the continuous outcome variables GL and CW, and a generalized linear mixed model evaluated the categorical outcome variables CD and SB. Alpha, the critical P value for determining statistical significance, was < 0.05 .

Results

There were 2661 HO and MVH calves in the final data from UM and PAST combined, 486 HO calves from first calf heifers, 703 HO calves from 2nd-plus calving cows, 584 MVH calves from first calf heifers, and 888 MVH calves from 2nd-plus calving cows. There was some evidence of Type I error, which results when sample sizes are large enough that outcomes not biologically or practically different are still detected as significantly different. This apparently occurred with GL; the lengths of gestation for the 4 groups above were 278, 279, 280 and 281 days, with small standard errors of the mean indicating that there was not much variation in GL either. However, the GL of 278 and 280 days, and the GL of 279 and 281 days were found significantly different within each pair of those values at $P < 0.01$. Large sample size Type I error is an odd thing to deal with because most of the time, we do not want to exclude or discard data even from large sample populations. The best solution is to recognize

it when outcomes are not biologically important, based on expertise and experience, even if detected statistically. In summary, gestation length between the HO and MVH cows did not appear to be different in practical terms.

For the outcome CW, the HO first calving, HO multiparous, MVH first calving and MVH multiparous calves' mean weights were 86.8 lb (39.4 kg), 95.2 lb (43.2 kg), 88.8 lb (40.3 kg), and 97.6 lb (44.3 kg), respectively, all significantly different at P < 0.01. Again, these differences had small standard error, indicating that there was not marked variation in the CW, and the differences in CW within parity categories between HO and MVH did not appear to be of practical importance. Further evidence that the differences were not of biological significance was shown in the important outcomes below.

The mean CD scores and % of SB were not significantly different within parity group between HO and MVH breed categories. This is shown in Table 1 below:

Table 1. Calving difficulty and % stillbirths compared between Holstein and MVH crossbred dairy cattle.

Parity	Primiparous		Multiparous	
	Holstein	MVH ^μ	Holstein	MVH ^μ
Breed Category				
Calving Difficulty [£]	1.5	1.5	1.3	1.3
% Stillbirths	9.8	9.9	10.0	10.0

^μMVH = Montbéliarde, Viking Red and Holstein crossbred. [£]Calving Difficulty, these scores on a 5-point scale mean “no assistance”. All values not significantly different at P > 0.05. Modified from Pereira et al., 2022.

For only the cows at the PAST herd, their HO and MVH cows were analyzed twice, the second time as a subset of the previous data that compared only those 2 breeding categories on both farms. For the comparison of 3 breed categories among the cows at PAST, there were 1898 HO, MVH, and NJV calves in the final data, from HO 202 primiparous and 307 multiparous, MVH 377 primiparous and 596 multiparous, and NJV 166 primiparous and 250 multiparous dams. Similar to the UM and PAST two-breed comparison reported earlier, GL for all breed categories was between 278 and 282 days, but differences of 278 vs. 281 and 279 vs. 282 days were detected as significantly different within each pair at P < 0.01. This is an example of Type I error again; gestation length between the HO, MVH and NJV cows did not appear to be different in practical terms.

The mean CW of all primiparous cows ranged between 77.3 lb (35.1 kg) for NJV cows and 87.4 lb (39.7 kg) for MVH cows, and for multiparous cows, CW ranged between 83.7 lb (38.0 kg) for NJV cows and 94.5 lb (42.9 kg) for MVH cows, with CV means for all 3 breed categories significantly different from each other at P < 0.01. Again, these differences had small standard error, indicating that there was not marked variation in the CW. Based on my experience, none of these mean CW suggested a risk of dystocia problems, and did not appear to be of practical importance. Again, this was also suggested by the following important outcomes.

Similar to the 2-breeding category comparisons, mean CD scores and % of SB were not significantly different within parity group between HO, MVH and NJV breed categories. This is shown in Table 2 below:

Table 2. Calving difficulty and % stillbirths compared between Holstein, MVH and NJV crossbred dairy cattle.

Parity	Primiparous			Multiparous		
	Holstein	MVH ^μ	NJV [¥]	Holstein	MVH ^μ	NJV [¥]
Breed Category						
Calving Difficulty [£]	1.2	1.3	1.3	1.1	1.1	1.1
% Stillbirths	9.5	9.7	9.8	10.0	10.0	10.0

^μMVH = Montbéliarde, Viking Red and Holstein crossbred. [¥]NJV = Normande, Jersey, and Viking Red crossbred. [£]Calving Difficulty, these scores on a 5-point scale mean “no assistance”. All values not significantly different at P > 0.05. Modified from Pereira et al., 2022.

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The authors' conclusion to this study of an important practical issue was, "Dairy producers may implement 3-breed rotational crossbreeding systems with [Montbéliarde, Viking Red, Holstein, Jersey and Normande] breeds without an increase of [calving difficulty] or [stillbirth]."

Dairy Convention in Provo, UT January 11 - 12, 2023

Dairy West is organizing the 2023 Dairy Convention (it is no longer called the Utah Dairy Convention because it is an outreach event for Idaho and other states' members of the dairy industry also). It will be at the Provo, UT Marriott Hotel and Convention Center. There will be a dinner on January 11 and presentations on January 12, 2023 to finish by 3:00 p.m.

In the past, some subjects covered have been of interest to dairy veterinarians as well as dairy industry clients. Details of the program and events are still said to be coming. However, I recently obtained an update on this conference and it includes no program details. Therefore none will be available in this newsletter before the conference takes place. Let's look out for more information regarding the Dairy West convention.

I wish you all a great holiday season and a happy new year as we enter 2023. Thanks again for all that you do in our industry. Please let us know your comments and suggestions for future topics. I can be reached at (435) 760-3731 (Cell), or David.Wilson@usu.edu.

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