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Calving Difficulty and Stillbirths of Pure Holsteins versus Crossbreds of Holstein with Normande, Montbeliarde, and Scandinavian Red

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ABSTRACT

Pure Holstein cows and Normande/Holstein, Montbeliarde/Holstein, and Scandinavian Red/Holstein crossbred cows were compared for calving difficulty and stillbirth rates. Scandinavian Red was a combination of Norwegian Red and Swedish Red. All cows calved from June 2001 to August 2004 at 7 commercial dairies. Statistical models for analysis included effects of herd-year-season of calving and sex of calf in addition to breed of sire and breed group of dam. Male calves had significantly more calving difficulty and stillbirths than heifer calves. First-calf Holsteins bred to Holstein, Brown Swiss, Montbeliarde, and Scandinavian Red bulls were used to determine effects of breed of sire. Calves sired by Scandinavian Red bulls (5.5%) and Brown Swiss bulls (12.5%) had significantly less calving difficulty than calves sired by Holstein bulls (16.4%) from Holstein first-calf heifers. Also, fewer stillbirths resulted from use of Scandinavian Red bulls (7.7%) compared with use of Holstein bulls (15.1%) for first-calf Holstein heifers. Scandinavian Red-sired calves (2.1%) had significantly less calving difficulty than Holstein-sired calves (8.4%) for multiparous Holstein dams. Non-Holstein breeds of sire had significantly fewer stillbirths than Holstein sires when mated to multiparous Holstein dams. To determine the effects of breed of dam, 676 pure Holsteins, 262 Normande/Holstein, 370 Montbeliarde/Holstein, and 264 Scandinavian Red/Holstein crossbred virgin heifers that had been bred to Brown Swiss, Montbeliarde, and Scandinavian Red bulls were utilized. All groups of crossbred cows had significantly less calving difficulty at first calving than pure Holsteins (3.7 to 11.6% vs. 17.7%). Furthermore, Montbeliarde/Holstein (6.2%) and Scandinavian Red/Holstein (5.1%) crossbreds had significantly lower stillbirth rates at first calving than pure Holsteins (14.0%).
Key words: calving difficulty, crossbreeding, heterosis, stillbirth

INTRODUCTION

Calving difficulty causes trauma for both cows and calves and can lead to increased rates of stillbirth, lower milk production, and reduced health of cows. Meyer et al. (2001b) reported that 23% of first-calving Holstein heifers need some level of assistance in the birthing process. Furthermore, stillbirth rates have increased in US Holsteins; and Meyer et al. (2001a) reported that the number of stillborn calves increased 3.7 percentage units among first-calf Holstein heifers over an 11-yr period. Dairy producers seek ways to reduce calving difficulty of cows and decrease stillbirths of calves in their herds; and some have turned to crossbreeding to potentially alleviate problems with these traits.

A survey of dairy producers conducted by Weigel and Barlass (2003) indicated that some respondents tried to reduce calving difficulty by mating their Holstein heifers to bulls of another breed. Producer scores for calving difficulty and stillbirth in the survey were best for crosses of Holstein and Jersey. Numerous studies have documented the impact of crossbreeding on calving difficulty and stillbirths, but they have been mostly limited to crossbreds of Holstein, Brown Swiss, Jersey, Ayrshire, and Guernsey (Donald, 1963; Hollon and Branton, 1975; Vesely et al., 1986; Touchberry, 1992).

From 1948 to 1962, stillbirths from 2,049 calvings in Great Britain were recorded by Donald (1963), and purebred calves of Holstein, Ayrshire, and Jersey breeds were compared with crossbred calves of each of the 3 breeds. At first calving, pure Holstein dams had 19.1% stillborn calves vs. 4.7% for Ayrshire and 11.0% for Jerseys when bred to Holstein, Ayrshire, or Jersey bulls, respectively. Crossbred calves out of purebred dams at first calving had significantly lower stillbirth rates (6.4%) than purebred calves (14.7%).

In a study by Hollon and Branton (1975), Brown Swiss-sired crosses (16.0%) had the highest calving difficulty rates when compared with pure Holsteins (11.9%) and Holstein-sired crosses (6.0%). Furthermore, pure Holsteins (12.8%) had the highest incidence of stillbirths at first calving when compared with crossbred cows sired by either Holstein (6.9%) or Brown Swiss (6.7%) bulls. Touchberry (1992) reported results of a long-term crossbreeding trial with Guernseys and

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Holsteins and documented significantly fewer crossbred than purebred calves dead within 24 h after birth. Of 947 Guernsey and Holstein purebred births, 9.0% had stillborn calves compared with 6.2% of 1,068 crossbred births.

Vesely et al. (1986) reported pure Holstein cows had significantly higher stillbirth rates than pure Ayrshire, Ayrshire/Holstein, and Holstein/Ayrshire crossbred cows. Pure Holstein calves (15.1%) had higher stillbirth rates than calves from Ayrshire-sired calves of Holstein dams (10.7%) and Holstein-sired calves of Ayrshire dams (7.0%). Pure Holstein cows (14.5%) had significantly more stillborn calves than Ayrshire/Holstein crossbred cows (6.4%) at first calving.

In more recent studies, McClintock et al. (2004) reported pure Holstein cows had more calving difficulty than Jersey/Holstein crossbreds. Heins et al. (2003) reported that Jersey-sired calves were born with significantly less calving difficulty than Holstein-sired calves out of pure Holstein cows.

The objectives of this study were to determine the calving difficulty and stillbirth rates 1) in pure Holstein females bred to Holstein, Brown Swiss, Normande, Montbeliarde, or Scandinavian Red (**SR**) bulls; and 2) in pure Holstein cows vs. crossbred cows of Holstein with Normande, Montbeliarde, and SR.

MATERIALS AND METHODS

Background

The decline in fertility and survival of pure Holsteins led the managers of 7 large commercial dairies in California to mate Holstein heifers and cows with imported AI semen of the Normande and Montbeliarde breeds from France, as well as the Swedish Red breed and the Norwegian Red breed. The Swedish Red and Norwegian Red breeds share similar ancestry—mostly Ayrshire and Shorthorn—and exchange sires of sons; therefore, the breeds were collectively regarded as SR for this study.

All 7 dairies were enrolled in standard milk recording. They used AI for the majority of matings; however, some natural-service Holstein and Brown Swiss bulls were used for cows that were problem breeders. Sires for AI were selected amongst highest-ranking bulls with the Net Merit index for Holsteins and similar indices for the other breeds. Herd sizes range from approximately 500 to 1,500 cows. Production of cows in these dairies is provided in Heins et al. (2006).

Data

Calving difficulty and stillbirths were recorded for calvings from June 2001 to August 2004 on 7 large commercial dairies in central California. Calving difficulty was measured on a 1 to 5 scale, with 1 = quick, easy birth with no assistance; 2 = over 2 h in labor, but no assistance; 3 = minimum assistance, but no calving difficulty; 4 = used obstetrical chains; and 5 = extremely difficult birth that required a mechanical puller. For analysis, scores of 1 to 3 were combined and represented no calving difficulty, whereas scores of 4 and 5 were combined and represented calving difficulty. Stillbirths were recorded in a binary manner as alive (1) or dead (0). A calf was considered stillborn if it died within 24 h of birth. Twin calves and calves resulting from abortions were omitted from the data. Birth weights of calves were not recorded by dairy producers and were not available.

Unadjusted means for first-calf heifers were 10.8% for calving difficulty and 10.9% for stillbirths. For multiparous cows, unadjusted means were 5.0% for calving difficulty and 5.2% for stillbirths.

Breed of Sire

Pure Holstein dams were bred to Holstein, Brown Swiss, Normande, Montbeliarde, and SR bulls and resulting calvings were used for the analysis of breed of sire. Pure Holstein dams were separated into first-calf cows and second-calf to fifth-calf cows. Normande bulls were not included in the analysis of first calving because only 24 calvings were recorded. Data for the analysis of breed of sire were collected for calvings for the entire period from June 2001 to August 2004.

Herd-year-seasons were based on 4-mo seasons of calving and derived from climatic conditions in California. June, July, August, and September are especially hot months; October, November, December, and January are rainy months; and February, March, April, and May are cool and dry months. With data spanning June 2001 to August 2004, each herd had the potential of contributing 7 year-seasons of calving for first calving and 10 year-seasons for second to fifth calving.

Each herd-year-season was required to have calvings with more than a single breed of sire. Following this edit, 45 herd-year-seasons for first calving and 55 herd-year-seasons for second to fifth calving remained. Furthermore, 1,593 first-calf and 4,041 second-calf to fifth-calf pure Holstein dams remained in the data file. The 4,041 multiparous Holsteins were composed of 1,619 second-, 1,279 third-, 742 fourth-, and 401 fifth-calving cows.

Dependent variables in the model for statistical analysis were calving difficulty and stillbirths. Independent variables for first calving were the fixed effects of herd-year-season, sex of calf, and breed of sire. For the analysis of second to fifth calving, lactation number was