

Montbeliarde-sired Crossbreds Compared to Pure Holsteins for Body Size, Dry Matter Intake, and Profit During the First 150 Days of First Lactation

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Materials and Methods

Differences in body weight (**BW**), body condition score (**BCS**), hip height (**HH**), dry matter intake (**DMI**), and milk, fat, and protein production were recorded for 97 cows:

- 40 pure Holsteins cows (**HO**),
- 57 Montbeliarde-sired (**MO**) crossbred cows, which consisted of:
 - 33 F₁ crossbreds of Montbeliarde × Holstein (**M×H**),
 - 24 three-breed crossbreds of Montbeliarde × Jersey/Holstein (**M×JH**).

Cows were housed at the University of Minnesota, St. Paul, and calved from October 2005 to December 2007. All traits were recorded from day 3 to day 150 of first lactation. Cows were individually fed a TMR twice daily, and feed weigh-backs were collected once daily. Inputs for the profit analysis during the first 150 days of first lactation consisted of:

- Feed cost was \$0.1881 per kg of DM consumed (FINBIN, 2011),
- Direct plus overhead expense was \$3.41 per cow per day (FINBIN, 2011),
- Value of pregnancy was \$278 for cows that conceived at 137 DIM, and \$1.50 per day was added or deducted for cows conceiving prior to or after 137 DIM (DeVries, 2006), and
- Value of milk produced was calculated using Class III prices for Federal Milk Marketing order 30 (Upper Midwest) from 2005 to 2010 (USDA-AMS, 2011).

Body Size

Pure HO and M×H were similar for HH (141.8 cm and 141.4 cm, respectively). The M×JH (138.0 cm) had significantly less HH than pure HO, likely because of the ¼ Jersey content of M×JH. BCS was significantly higher for M×H (3.32) and M×JH (3.29) compared to pure HO (2.74), and the greater BCS may explain advantages of the MO crossbreds for reproduction (Table 2). Because of greater BCS, M×H had significantly more BW than pure HO cows (564 kg vs. 528 kg). The M×JH (537 kg) were similar to pure HO for BW, but were smaller in frame size with greater BCS than pure HO.

Production and DMI

The MO crossbreds were not different from pure HO for fat plus protein production (Table 1), which is the major contributor to value of milk. Despite the MO crossbreds having greater BCS, no evidence existed that the MO crossbreds had greater DMI. In fact, the non-significant difference in DMI was numerically lower for MO crossbreds than pure HO cows.

Table 1. Least squares means and standard errors of means for 150-day milk, fat, protein, fat+protein, SCS, and DMI for breed groups.

| | Pure Holstein (n = 40) | | Montbeliarde × Holstein (n = 33) | | Montbeliarde × (Jersey/Holstein) (n = 24) | |
|--------------------|---------------------------|------|--|------|---|------|
| | Mean | s.e. | Mean | s.e. | Mean | s.e. |
| Milk (kg) | 4,764 | 62.6 | 4,573 * | 71.4 | 4,552 * | 90.3 |
| Fat (kg) | 168 | 2.6 | 166 | 2.9 | 168 | 3.7 |
| Protein (kg) | 143 | 1.8 | 140 | 2.1 | 142 | 2.6 |
| Fat + Protein (kg) | 311 | 4.2 | 306 | 4.8 | 310 | 6.1 |
| SCS | 2.37 | 0.17 | 2.44 | 0.19 | 2.67 | 0.23 |
| DMI (kg) | 2,999 | 48.2 | 2,904 | 55.0 | 2,906 | 69.6 |

* $P < 0.05$ for difference from pure Holstein.

Early Lactation Profit

Profit did not differ significantly during the first 150 days of first lactation (Table 2), and the non-significant ($P < 0.14$) difference favored the MO crossbreds by 7%. The results are comparable to Heins et al. (2011), who reported M×H cows had 5% greater profit per day compared to pure HO. However, neither study considered potential differences in health treatments; therefore, results for breed differences likely are conservative.

Table 2. Least squares means and standard errors of means for revenues, expenses, and total profit from the 4th to 150th day postpartum of first lactation for breed groups.

| | Pure Holstein (n = 40) | | Montbeliarde × Holstein (n = 33) | | Montbeliarde × (Jersey/Holstein) (n = 24) | |
|-------------------------|---------------------------|------|--|------|---|------|
| | Mean | s.e. | Mean | s.e. | Mean | s.e. |
| | ----- (\$) ----- | | ----- (\$) ----- | | ----- (\$) ----- | |
| Milk value | 1520 | 20.2 | 1490 | 23.0 | 1506 | 29.1 |
| Pregnancy value | 244 | 19.1 | 288 | 21.2 | 302 † | 25.9 |
| Feed cost | 564 | 9.1 | 546 | 10.3 | 547 | 13.1 |
| Direct & overhead costs | 501 | 0.0 | 501 | 0.0 | 501 | 0.0 |
| 150-day profit | 697 | 25.6 | 733 | 29.2 | 759 | 36.9 |

† $P < 0.10$ for difference from pure Holstein.

Montbeliarde × Swedish Red × Holstein

Conclusions

- Body Condition Score -

- MO crossbreds maintained more BCS and body weight than pure HO without being larger in frame size.
- DMI and fat + protein production were not significantly different for Montbeliarde-sired crossbreds and Holsteins during the first 150 days of first lactation.
- Profit was similar for the breed groups, but health costs and survival of cows were not included in the analysis.

150-day Trial - Funding period.
Lifetime evaluations later

\$14.53/cwt.
the milk price

References are available from the author upon request.

Heterosis of cross breeding
would suggest longevity --
& Better Health & Reproduction