HOARD'S DAIRYMAN

by F. Diaz-Royon and A.D. Garcia

Are Jerseys really more efficient?

WITH feed as a dairy's largest expense, between 52 and 58 percent of the total cost of producing milk, feed conversion efficiency has been a valuable benchmark to assess profitability. In addition to milk production and dry matter intake (DMI), other parameters that have been associated with efficiency are genetics, breed, age, lactation number, pregnancy status, body weight (BW), BW change and body size.

Cornell University scientists note that improvements in feed efficiency can occur as a result of changes in digestion and nutrient absorption, maintenance requirements, utilization of metabolizable energy for production or nutrient partitioning. Recent reports have suggested Jersey cows present some anatomic or physiological advantages compared to Holsteins.

At the same time, research from Washington State University (WSU) using computer modeling reported that, when kept within their thermoneutral zone, a Jersey population would require 20 percent less feed to yield the same amount of cheese as Holsteins. The WSU researchers emphasized Jerseys are more efficient than Holsteins due to their lower BW and higher milkfat and protein content.

According to USDA reports, Holsteins continue to be the predominant dairy breed in the U.S. with no significant population changes between 1996 and 2007. The breed represented 94.4 percent and 92.2 percent of the cows in 1996 and 2007, respectively. Jerseys were the primary breed on only 3.5 percent of farms.

Does a difference exist?

Research that compares the energetic efficiency of Jersey and Holstein cows evaluated by respiration calorimetry is unfortunately scarce. This process measures oxygen consumption, carbon dioxide release and energy given off in the form of heat. Energy balances of multiparous cows fed a total mixed ration (50 percent forage: 50 percent concentrate) throughout one lactation were evaluated using respiration chambers at the Natural Resources Institute at Beltsville, Md. The researchers did not report breed differences for energy utilization at days 49, 154 or 271 of lactation.

In addition, manure excretion was lower in Jerseys. They excreted 35 percent less wet feces than Holsteins. However, those differences in excretion were caused by differences in BW (937 versus 1,384 pounds for Jerseys and Holsteins, respectively) and daily intake rather than differences in digestibility or nutrient absorption. When dry matter digestibility and total wet manure production were expressed per unit of BW, those parameters were unaffected by breed. Other studies carried out in the UK and the USA have compared digestion capacities of Jerseys with Holsteins, and none of them have discovered differences.

Since Holsteins are larger than Jerseys, intakes and milk yields are higher. A University of Connecticut study reported intakes of 49.3 and 36.3 pounds per day for lactating Holsteins and Jerseys, respectively. No differences were found between breeds when intake capacity was measured as net energy per kilogram of metabolic BW (MBW; BW raised to the power of 0.75).

In an Ohio State University study, daily 4 percent fat-corrected milk production of Holstein cows was 15 pounds higher than Jerseys (67.5 versus 52.4 pounds). In this experiment, however, milk energy output per unit of MBW did not differ between breeds. Similarly, in a recent study at the University of Reading, researchers compared third-parity Jersey and Holstein cows and did not find any breed differences on milk energy production per unit of MBW. Therefore, it may be assumed that milk production capacity is similar for both breeds.

University of California researchers evaluated the relative weight of tissues and organs of Holsteins as a percentage of Jersey cows. Relative weight of skin and lungs was significantly different between breeds. At similar BW, skin and lungs would be expected to be, respectively, 27 and 21 percent heavier in Holsteins than Jerseys. Other breed differences on weights of liver, mammary gland and gastrointestinal tract tissues were insignificant. The identical relative weight of tissues and organs of the digestive systems and mammary gland may explain the similar intake, digestibility and milk production capacities of those breeds.

Herd average summaries published by the Animal Improvement Programs Laboratory show the daily milk production of 3.8 million Holstein cows averaged 65.2 pounds per day with 3.66 percent milkfat and 3.08 percent milk protein. Performance data from 244,372 Jersey cows averaged 46.7 pounds of milk daily with 4.77 percent fat and 3.64 percent protein.

In addition, milk fatty acid (FA) composition in Jerseys and Holsteins are not the same. Milkfat from Jerseys contains more short-chain FA synthesized within the mammary gland and fewer long-chain FA derived from circulating FA (from dietary lipids or body fat mobilization). This is the reason why milkfat from Jerseys is firmer than that from other breeds. This demonstrates a main difference in nutrient metabolism between breeds.

Dairy cows' feed efficiency is customarily defined as the ratio of milk output to feed input. The results of the energetic efficiency comparison between Jersey and Holstein cows from production trials seem to be inconsistent (see table). In these studies, milk output was expressed as solids corrected milk, fat-corrected milk or milk energy, while feed input was expressed as feed or net energy intake.

Feed efficiency comparisons*

Source	Jersey/Holstein (%)
Blake et al. (1986)	equal
Blake et al. (1986)	20% lower
Gybson et al. (1986)	equal
Oldenbroek (1986)	7% higher
Oldenbroek (1988)	2% higher
Olson et al. (2010)	8% higher
Rastani et al. (2001)	14% lower
Rodriguez et al. (1997)	7 - 12% lower
Schwager-Suter (2001)	equal
West et al., (1990)	11% higher

*Efficiency as a percent of Holstein

Comparisons inconsistent

The lack of standardized units for calculating feed efficiency makes comparison among experiments difficult. For this reason, feed efficiencies of Jersey cows are expressed in the table as percentage of Holsteins. All of these studies were carried out on intensive systems with cows fed complete diets.

Some studies reported greater efficiencies for Jerseys (2 to 11 percent). Other experiments, however, found no differences in energetic efficiency between breeds or even showed greater feed efficiency for Holsteins (7 to 20 percent).

In a study carried out at Texas A&M University, energy efficiencies of Holsteins and Jerseys did not differ during the first trimester, but Holsteins exceeded Jerseys during the second trimester.

Based on this literature review, there is not enough evidence to suggest any differences in energetic efficiency between Jersey and Holstein cows kept in confinement systems. Information on comparative feed efficiency between dairy cattle breeds is scarce and inconsistent; therefore, additional research measuring energy losses through heat is warranted.

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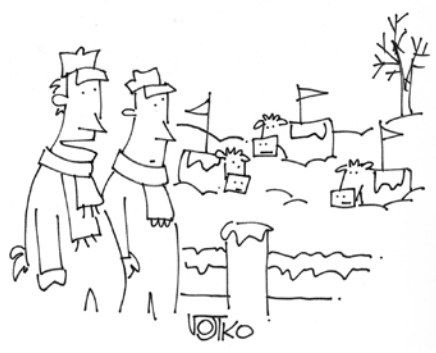

"They all have on a bicycle flag in case the snow gets too deep."