Genetics can improve fertility by 15 percent

by H. Duane Norman and Janice R. Wright

HERD fertility can be improved through genetics. We think most of you will be shocked to see how much. Don't misunderstand us, attention to the herd's daily reproductive activities is critical (even more important than genetics) but the management requires a sustained effort every day, while the genetic part simply means choosing the right bulls now and reaping the benefits for generations, once the daughters calve.

It is unfortunate that few folks appreciate that genetics can play an important role in herd reproduction. This misunderstanding was solidified from the well-reported fact that the heritability of most reproductive traits is extremely low, often in the range of 1 to 5 percent. On this basis, some of our influential educators professed that it would be ineffective to try to improve reproduction through genetics. Unfortunately, virtually no one challenged this thesis for decades.

Genetic evaluations for fertility were initiated by USDA's Animal Improvement Programs Laboratory in 2003 using the trait Daughter Pregnancy Rate (DPR). DPR is defined as the percentage of nonpregnant cows between 50 and 250 days in milk that will become pregnant within the following 21 days. Breed averages for days open and DPR are shown in Table 1.

Table 1. Breed averages for days open and DPR

Breed	Days open	DPR (%)
Ayrshire	143	22.4
Brown Swiss	143	22.4
Guernsey	151	20.5
Holstein	148	21.2
Jersey	127	26.5
Milking Shorthorn	135	24.5

Daughter Pregnancy Rate or DPR = 0.25 (233 - Days Open)

Breed averages for days open ranged from a low of 127 days for Jerseys to a high of 151 days for Guernseys. Thus, breed averages for DPR are reversed and ranged from 20.5 percent for Guernseys to 26.5 percent for Jerseys with Holsteins at 21.2 percent.

Top bulls really improve . . .

There are A.I. bulls being marketed that can help you improve herd fertility, so let's look at how. There are two Holstein bulls currently marketed that are +3.2 and 3.4 for DPR, respectively, as of the February 2007 sire summaries. Daughters from the first bull (3.2) are expected to raise the average herd DPR from 21.2 to 24.4 percent. At first glance, this looks like a 3.2 percent improvement in the percentage of open cows becoming pregnant in the following 21 days. But it is actually a 15 percent improvement to 21.2 percent for an average bull, 24.4 percent for a +3.2 bull (24.4/21.2 = 1.15, 15 percent more).

For every 1 percent increase in a bull's DPR, days open falls by four days. A bull with a DPR of +3.2 can be expected to reduce days open by almost 13 days in the average herd by having earlier conception from daughters of bulls with the best fertility.

GOOD HERD REPRODUCTIVE management practices are absolutely essential if one expects to achieve good reproductive performance in the herd. However, after you begin milking daughters of high fertility bulls, we bet most producers would never want to go back to the disappointing fertility of the recent past.

All herds benefit . . .

The extent that dairy producers should emphasize fertility depends on their management system. All producers would be wise to consider service sire fertility and DPR when choosing herd sires, but especially those calving seasonally, like many relying on grazing. In nearly every livestock species, there is a negative relationship between body condition (weight loss) and reproductive performance.

As our dairy cows production potential has grown over the last 40 years, average days open for Holsteins went up by 37 days. Of that number, 17 days were associated with genetics and the remaining 20 days were attributed to changes in the management practices. By using a few bulls with DPR averaging +3.2 (equivalent to nearly 13 fewer days open), most of the genetic decline in fertility from using high-producing bulls for 40 years could be recovered in one generation. So why should anyone believe that genetics would not be an effective tool in a herd's reproductive management program?

Can make a difference . . .

The purpose of this article is to point out that genetic evaluations for fertility traits can make a difference to dairy producers, and that selection for improved reproduction is possible. However, we do not advocate selecting bulls based only on DPR. Instead, bulls should be selected for overall merit using one of the Lifetime Net Merit indexes. Three choices provided are Lifetime Net Merit which is appropriate for most producers, Fluid Merit Dollars for producers receiving no payment for their milk protein, and Cheese Merit Dollars for those producers paid on cheese yield pricing.

Clearly, there are producers that have a reason to emphasize traits differently from the typical producer. Managers struggling with herd fertility should seriously consider emphasizing DPR even more extensively.

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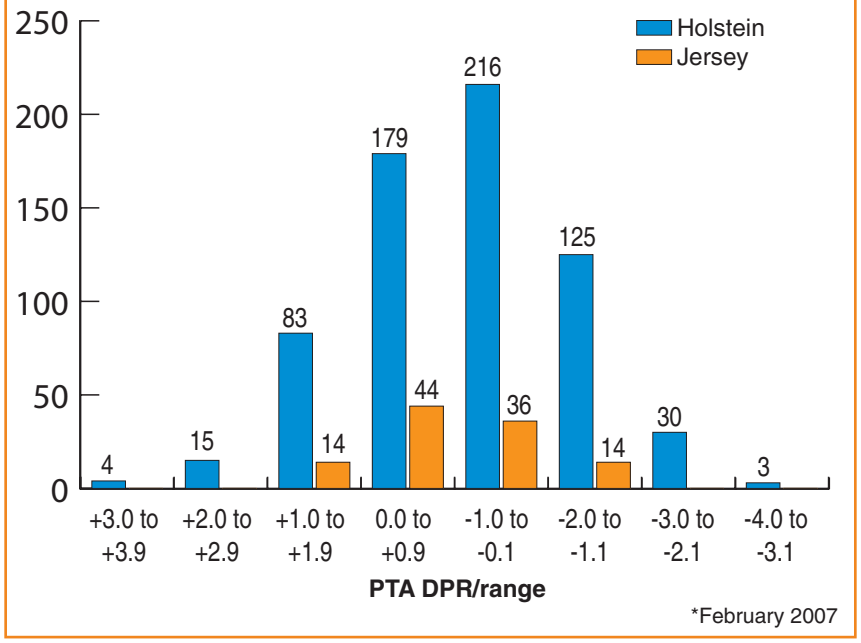
Distribution of active A.I. bulls for daughter pregnancy rate (DPR)*



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