Réseau laitier canadien
Canadian Dairy Network

A Look at Fertility from Two Perspectives

Producer interest in the reproductive performance of their herd has continuously grown in recent years. A common area of concern expressed by producers is the need to get cows pregnant easier. While conception in a dairy herd is heavily affected by nutrition, heat detection and other herd management factors, genetics can also play a role in reaching improved reproduction.

Two Sides to Fertility

When considering reproductive information at the cow or herd level, using measures such as pregnancy and/or conception rates, there are two components to consider in terms of genetic selection and improvement. Firstly, on a mating by mating basis, the fertilizing capacity of the semen used for insemination is a significant factor for successful conception and pregnancy. At another level, the inherent ability of the cow or heifer for fertility also plays a role. Information provided by Canadian Dairy Network (CDN) helps producers consider both of these perspectives of fertility when making sire selection and mating decisions and it is important they are understood and used properly.

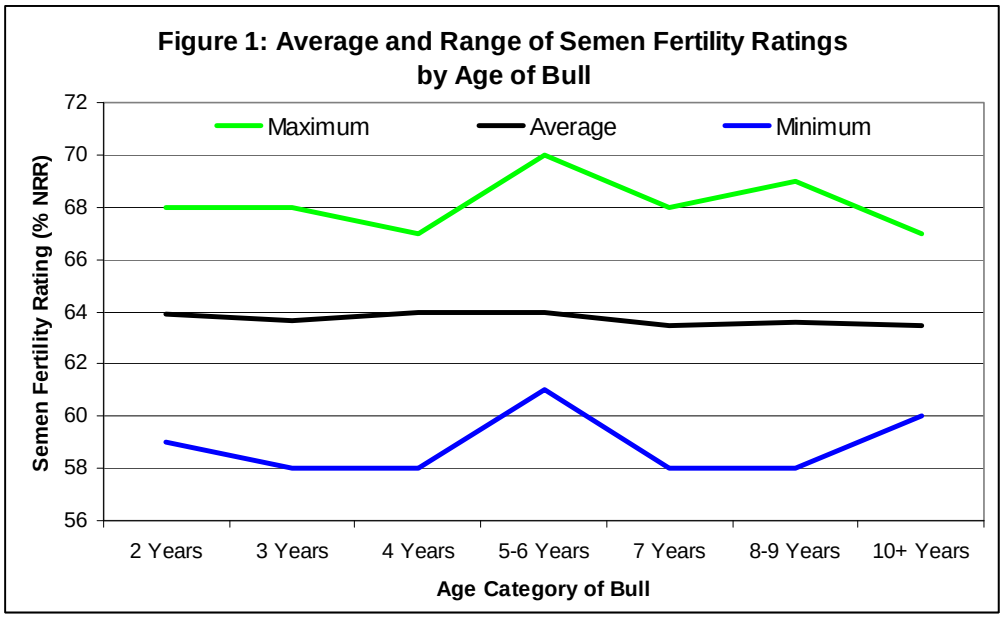
Semen Fertility

CDN receives insemination data from various sources including both A.I. sources and via the Canadian DHI partners, namely CanWest DHI and Valacta. From this combination of breeding information, it is possible to examine the success rate of semen used for insemination for all bulls offered for A.I. in Canada. When deriving a specific "Semen Fertility" rating for each A.I. sire, CDN accounts for key variables such as the age of the cow or heifer being bred, the month of insemination (i.e.: seasonal effects), the breed of the sire, the ability/experience of the inseminator and the general effect of herd management. Only inseminations performed in the most recent 12-month period are analyzed to reflect any changes in semen fertility over time and/or as semen processing techniques evolve.

Semen Fertility ratings are provided to A.I. companies for all bulls with first inseminations during the past year. These ratings are expressed in terms of an expected 56-day non-return rate with the average in Holsteins being 63.5% and the most extreme bulls ranging from 58% to 69% (± 5.5%). Semen Fertility is not a genetic evaluation of the bull itself but rather is an adjusted rating to reflect the fertilizing capacity of the bull's semen at the time of mating, compared to other bulls. Using Semen Fertility ratings allows producers to improve 56-day non-return rates, as a measure of female fertility, by 5 percentage points compared to using semen from an average bull.

A common misconception, however, is that producers believe that semen from young sires is more "fertile" compared to that from older, proven sires. Figure 1 shows the

average Semen Fertility rating as well as the maximum and minimum values across groups of Holstein bulls by age. This independent analysis by CDN confirms no clear difference, in terms of either average or range of semen fertilizing capacity, as bulls get older once the other factors, especially age of the cow or heifer, season of insemination and herd management are taken into consideration.

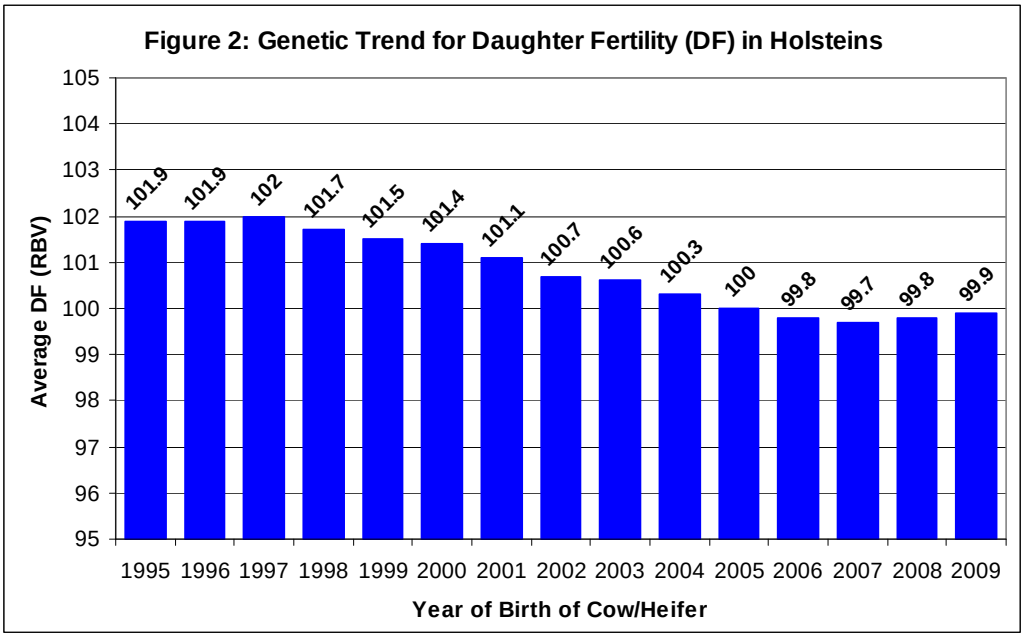


Genetic Evaluation for Daughter Fertility

CDN also calculates and publishes genetic evaluations for a series of traits that measure female fertility, which are combined together in a single index called Daughter Fertility (DF). This true measure of genetic potential for overall female fertility provides the expected fertility level of a bull's daughters. It is a reflection of the genes carried by each sire that would contribute positively or negatively to the reproductive performance expressed by their daughters, both as heifers and as lactating cows. All analysis conducted at CDN shows a consistent result that Semen Fertility and Daughter Fertility are totally independent from each other. In other words, selection of high Semen Fertility bulls to increase the chance of a successful insemination has absolutely no contribution to improving the overall genetic potential of the herd for female fertility.

Therefore, to achieve genetic improvement for reproductive performance at the herd level, bull proofs for Daughter Fertility must be given consideration in sire selection. As of 2005, Daughter Fertility has been included in the LPI formula as part of the national breeding goal. While it first received relative emphasis of 5% in LPI, this was increased to 10% in 2008 to address producer and industry concerns in this area. Figure 2 shows the genetic trend for Daughter Fertility realized in the Canadian Holstein population for females born from 1995 to 2009. The negative trend that took place from the late 1990s onwards, likely due to genetic selection for increased production yields, seems now to have been stopped. The emphasis on Daughter Fertility by producers and in the LPI formula since 2005 is gradually turning this trend around even while continuing to improve production. During the upcoming year, CDN will be launching a review of the current LPI formula, both in terms of traits included and their relative emphasis, to

ensure the future needs of the industry and the expectations of the Canadian dairy cow will continue to be achieved.



Summary and Conclusions

The reproductive performance of cows and heifers in a herd is a significant contributor to the overall profitability achieved. For this reason, Canadian dairy producers have expressed continued interest and concern for improving the breeding success rate in their herd. This must be done by considering Semen Fertility ratings of bulls at the time of mating as well as genetic evaluations for Daughter Fertility to improve the underlying genetic potential for female fertility within the herd. These two components of fertility are strictly independent from each other so both must be properly understood and used to maximize conception and pregnancy rates in the herd.

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