Canada's Semen Fertility Evaluation Revamped

The chance of getting a cow pregnant is influenced by a range of factors, many of which are related to herd management and environment. Genetics also plays a small yet important role in fertility. On the female side, Daughter Fertility is routinely evaluated as a functional trait for genetic selection. Semen Fertility, on the other hand, is a non-genetic evaluation calculated by Canadian Dairy Network (CDN) using semen performance data from the field. Recent improvements have been made to the Semen Fertility evaluation system and will be implemented by CDN effective the August 2013 genetic evaluation release.

Fertility Decisions: Long-term versus Short-term Impact

Selection for Daughter Fertility (DF) is a decision with long term impact. Over time, selection for DF will gradually boost your herd's genetic potential for female fertility. Selection of sires based on their Semen Fertility rating is a decision with short term impact. When used as a mating sire, a bull with above average Semen Fertility, or a higher 56-day non-return rate (NRR), will increase the likelihood of conception.

Improvements to the Semen Fertility Evaluation

In Canada, NRR has been used for over 20 years as an indirect indicator of semen fertility. NRR is defined as the proportion of cows that are not subsequently re-bred within 56 days after each first insemination. National bull evaluations for NRR have been published since 1993 but the system had some limitations, which have now been improved upon. The new Semen Fertility system accounts for breed of service sire, age of the cow or heifer at insemination, month of insemination, semen price category, A.I. technician and an overall herd management effect. Inseminations are excluded if known to have been with sexed semen or for embryo transfer.

Key improvements to the Semen Fertility evaluation include:

1. Breeding records are sourced from both A.I. and DHI (i.e.: non-technician), which almost doubles the total volume of information used for each year.
2. Only herdbook registered animals are included, ensuring the correct birth date for each inseminated cow or heifer and therefore an accurate age at insemination.
3. Insemination data from the past five years is included in the analysis, but the published rating for each bull is based solely on information from the most recent 12-month period for which they had the most number of first inseminations. Semen Fertility ratings based on at least 230 first inseminations have a Reliability surpassing 50%.

## What are the Major Factors Affecting Semen Fertility in the Field?

Five years worth of insemination data was analyzed to reveal key factors affecting fertility as well as general semen fertility trends. For the Holstein breed, of the 8,776 bulls included in the analysis, 967 met the threshold of 50% Reliability, which is considered an official Semen Fertility evaluation.

The average NRR for this group was 61%, representing the percentage of females that were not re-bred within 56 days after their first insemination. For the top 100 LPI sires, the Semen Fertility rating ranged from 57-65 percent (i.e.: average of 61 ± 4). Table 1 lists the 25 highest LPI sires that have a Semen Fertility rating of at least 64% indicating they are well above average at getting cows pregnant.

Table 1: 25 Highest LPI Sires with Semen Fertility of ≥64 in April 2013			
LPI	**Name**	**Semen Fertility**	**Reliability**
2789	MAINSTREAM MANIFOLD	64	97
2734	HYLLTOP PRESLEY RED	64	67
2595	TRAMILDA-N ESCALADE-ET	65	62
2563	GINARY JAKE	65	60
2560	BRYHILL LOYAL	64	46
2551	R-E-W SUNBURN	64	66
2539	ARDROSS STERLING	64	60
2532	DEMARC RANCH	64	67
2528	KERNDT BRILLO-ET	65	71
2501	MONUMENT IMPRESSION-ET	64	64
2468	SUNNYLODGE SHARK	64	52
2452	DELABERGE SHOCKER	65	91
2430	DIAMOND-OAK BARTON-ET	65	64
2381	ALTA TAZO	64	61
2366	SHEAROAD BUZZ	64	13
2351	ERBCREST ROLO	64	69
2345	BENNER JUDO	66	61
2335	KERNDT STALLION	65	78
2323	MARBRI FUSION	65	61
2314	WALLACEVIEW ALADDIN	65	65
2269	KERNDT-PREMIER BUTZE-ET	65	87
2269	SHEAROAD BOULEVARD	64	70
2267	COMESTAR EL TOREADOR	64	72
2267	GILLETTE JOB	64	69
2257	C.M.E. MR SAM TEDDY	64	52

Other noteworthy factors affecting Semen Fertility are listed below:

- **Breed of Service Sire:** NRR ranged from 59% to 75% based on the breed of service sire.
- **Age at Insemination:** The results showed a major advantage in the fertility of virgin heifers as compared to cows, for which fertility was highest for 2-year-olds and gradually decreased with age.
- **Month of Insemination:** A seasonal trend is evident in Figure 1, with conceptions peaking in the spring from April to June and at their lowest in winter months from November to January.
- **Year of Insemination:** Semen Fertility, as measured by NRR, has decreased slightly with each passing year (Figure 1). Over the five years analyzed, NRR decreased by a total 2.1 percent.

Figure 1: Semen Fertility over the Past Five Years
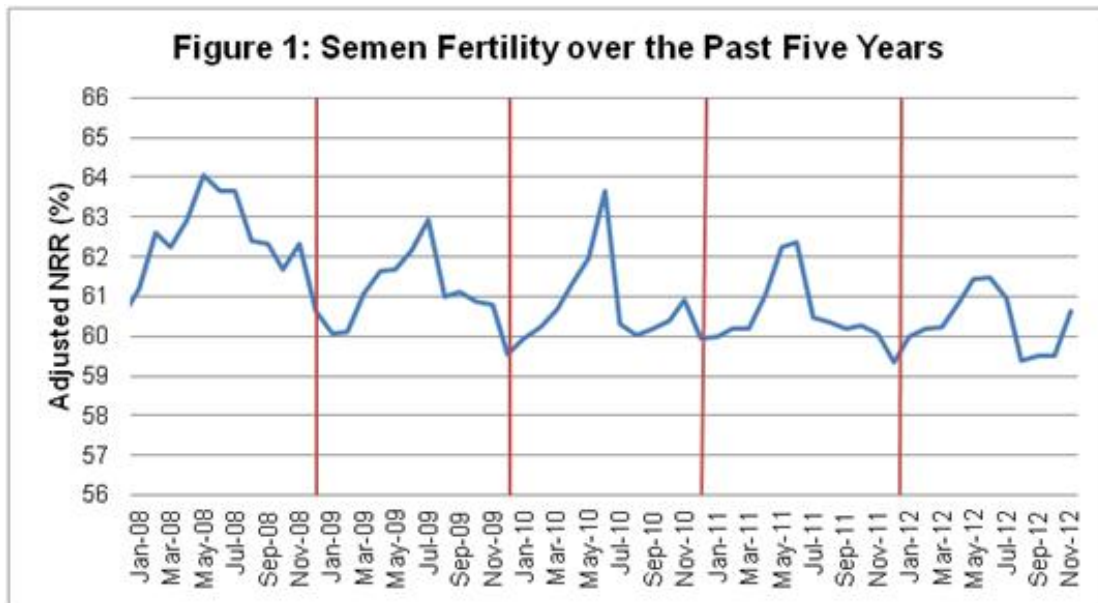
Summary

For all fertility evaluations, accurate reproductive event data is fundamental to genetic selection strategies. Semen Fertility evaluations have been available in Canada since the early 90's. Recent improvements to the Semen Fertility system at CDN will provide producers with increased confidence in service sire fertility. As a consequence, Semen Fertility ratings will soon be displayed on the CDN web site. They will also be available for genomic young sires as insemination data enters the CDN database and gets included in the routine evaluations released in April, August and December. Producers can take advantage of this information well before the bull receives an official domestic progeny proof and GLPI.

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