

In order to better share useful notions, partners of the *Concertation Table on reproduction* (CIAQ, Alliance Boviteq, AMVPQ, CPCAB and PATLQ) periodically publish articles in each other's bulletin. We welcome this first contribution by CIAQ.

How do we evaluate sire fertility?



by Yves Brindle, Biologist, Director, Production, CIAQ

A complex problem

Laboratory examination of bovine semen helps to ascertain the vitality of individual spermatozoa, so that we can discard samples whose attributes of motility, concentration and rate of abnormalities are deemed unsuitable for a proper fertility rate. However, contrary to a widely held belief, these lab examinations cannot establish the actual fertility of sires. Here is why.

For decades, scientists have tried to create a test to predict accurately the fertility of a semen sample but, to this day, these efforts have been in vain due to the complexity of the problem. A spermatozoa is a cell that must display a wide range of attributes: morphology, motility, high-energy metabolism, intact plasmatic and

acrosomic (head) membranes, as well as presence of specific lipids, proteins and enzymes.

An ideal laboratory test would have to evaluate simultaneously all of these attributes on a wide sampling of spermatozoa, and to allow for calculation of the rate of spermatozoa displaying all the qualities required to fertilize an egg cell. Although new technologies seem very promising, the test that will fulfill all our expectations is not yet available.

Establishing the non-return rate

Since we cannot yet rely on a laboratory test, the best way to evaluate the fertilizing potential of a sire remains, to this day, to inseminate a large number of females with his semen, in order to establish after-

wards the **rate of non-return** of the sire. The rate of non-return is defined as the percentage of females that do not come into heat again in the 56 days following a first insemination. These females are then considered pregnant.

When calculating the non-return rate, you have to make sure to add up and validate enough first inseminations to reach a certain level of reliability in your estimate of fertility. For instance, inseminating 50 females with the seed of a sire will yield a reliability rate of only 17%. With 400 inseminations, the rate climbs to 63%, and it will reach 93% with 3000 inseminations.

In order to counteract the effect of several factors that can alter the non-return rate, we use a mathematical model that takes into account parameters such as the month of insemination, the age of the cow, the semen cost, the sire's breed and also the inseminator.

Conclusion

The fertility of a sire cannot yet be established in the lab. Only by calculating the rate of non-return can we appreciate the individual fertility of sires, since it is the result of hundreds, even thousands of inseminations. For the benefit of producers, the rate of non-return of each proven sire is published in the proof sheet under the heading: % non-return.

It is still through the insemination of a large number of females with the semen of a sire that we can establish afterwards the fertility rate of that sire.



Technical column

Solids non fat / fat ratio (SNF/F) SNF ratio can be reduced quickly



Jean Brisson, Agronomist and Robert Moore, Scientific Director R&D Team, PATLQ

"What should I do to avoid delivering kilograms of Solids non fat that I will not be paid for?"
Answer: increase the fat content of your milk. Nothing complicated. And the response is quick.

How about genetics ?

To be sure, in order to produce milk rich in fat, a cow must have the genetic ability to do so. The good news is, most cows in Quebec have the required potential. A statistical survey of close to 5000 PATLQ herds shows that 95% of them are within $\pm 0.14\%$ of the average genetic potential for the fat percentage, with the lowest herd at -0.30% and the highest herd $+0.27\%$.

So, the key word is feeding !

For all practical purposes, this means that if a cow with the potential to produce milk at 4.3% fat is only giving 3% fat milk, genetics is not the cause. The only factor that really matters is the feeding management. In most cases, the response to a feeding change takes only a few days, at most a few weeks. Here are two real life examples of the speed at which changes will take place after simple feeding adjustments.

At Farm X (Table 1), in only two months, the fat percent climbed steadily from 3.70 to 4.25% and the SNF ratio dropped from 2.52 to 2.26, without having to sacrifice protein !

Table 1. Weekly milk analyses - Farm X

Date	August 14	August 20	August 26	Sept. 5	Sept. 11	Oct. 23
% fat	3.70	3.77	3.83	3.95	3.98	4.25
% protein	3.49	3.57	3.56	3.63	3.59	3.83
SNF/F Ratio	2.52	2.50	2.44	2.35	2.34	2.26

At Farm Y (Table 2), in less than a month and a half, the fat percent climbed to 3.90 and the protein percent remained stable, for a SNF/F ratio reduction from 2.58 to 2.31.

Table 2. Weekly milk analyses - Farm Y

Date	Sept. 10	Sept. 16	Sept. 26	Oct. 2	Oct. 24
% fat	3.52	3.70	3.77	3.83	3.90
% protein	3.31	3.30	3.32	3.33	3.34
SNF/F Ratio	2.58	2.43	2.40	2.35	2.31

Conclusion

Their secret? These producers simply followed the recommendations of their PATLQ advisors. There is nothing to it: in order to deliver milk in line with market requirements, all you need is an adequate feeding management. As you well know, since June 1st, all producers have access to weekly bulk tank analyses. With this great monitoring tool and the expertise of your advisor, your SNF/F ratio is quite easy to control. *Quickly.*

¹For your herd's rating, check your *Herd Genetic Inventory Report*, published by PATLQ in collaboration with the *Canadian Dairy Network*.

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