Development of analytical tool for dairy cattle genetic progress assessment

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Genomics is effective, but how to persuade farmers to use it?

Even in the leading countries with developed genomic selection systems not all farmers use genomics!

Rates of farmers that use genomic information and evaluations when making a breeding decision:

- 50-90% in developed markets
- 10-20% in emerging markets
How to ease the adoption of genomic methods in breeding?

We try to understand, what differs in countries and farms which have successfully implemented genomic selection methods from the ones that have not.

So far we see great difference in the ways genomic data is provided to the farmers.

| Raw DNA data | List of EBVs and traits, animal rankings | Decision support tools | Breeding decisions outcome, herd assessment |
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The common belief is that all progress happens because of bulls

50% of the progenies’ genotype is from the dam

Without genotyping female part of the herd predictions on how herd will progress are not reliable

Do you have that common belief amongst your farmers?
Case study evaluates the impact of breeding decision support and maternal herd assessment impact to herd genetic progress

Farmer X

- 12,000 animals
- 5,000 milking cows
- 2,000 of them genotyped and evaluated
- Culling rate - 10% per year
- Use sexed semen on all animals
  - Best bull - $NM 1200
  - Worst bull - $NM -200
- Average year-to-year genetic gain in herd - about 1%

We demonstrated to this farmer that with the same bulls, same culling rate, he could achieve more genetic gain - up to +2% $NM growth in a year.

How? By using evaluations and making informed breeding decisions.
Last insemination results analysis

We noticed the absence of any correlation, and were asked to find a reason.

We compared NM$ between genotyped heifers and their sires.
The reason is that in mating decisions even mothers’ phenotypes were not considered.

Last insemination results analysis.

There is also no correlation for other phenotypes (fat, protein, fertility, health etc).
Same bulls – different mating approach

Informed mating - based on female herd EBVs.

Cows are distributed in groups according to EBVs.

Bulls and cows are mated in a way to make the progenies’ evaluations better than mothers’.
Two mating decisions with the same bulls

Initial mating, without maternal herd genomic evaluations consideration

Same bulls, but mating with genomic evaluations of maternal herd
Lost/possible outcome of mating process optimization

+$60 / +2%
additional avg. NM$ for progenies

Potential genetic gain changes from 1% to 3% in a year because of informed mating and culling decisions only
Mating decisions were the main reason for low year-to-year genetic gain.
Improved mating and culling decisions enhance overall herd performance

Example of a farmer that genotype maternal herd since 2018, and uses our decision support tools since 2019.
Key takeaways

- Using the same original resources, a farmer can achieve greater genetic gain and profit through informed breeding decisions
- It's crucial for farmers to understand the impact of their decisions on their future herd
- Do not underestimate the way genomic evaluation data is provided to the farmer

Accessibility of genomic data impacts the adoption rate of genomic selection methods

- 97% Of our customers use our tool for at least 1 breeding process
- 67% Use it for at least 2 breeding processes
We want to start open discussion

- How do you guide farmers towards proper genetic progress?
- How you motivate them to use genomic selection in their routine breeding decisions?
- Which tools and approaches allow for easier genomic selection adoption by farmers?

We’re launching survey to study how different associations and other service providers motivate farmers to use innovative breeding methods.

Reach out to us, we’re happy to share and discuss our experience and learn about yours!

Survey results will be shared with all participants and ICAR members.
Thank you for your attention

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