Use of genomic versus daughter proven bulls
Introduction

• Optimal % young bulls?

• What mating strategy?

• How managing risks?

Delta Cupido
Introduction

- Geneticists’ point of view

\[ \Delta G_{\text{year}} = \frac{i \cdot r_{AI} \cdot \sigma_A}{L} \]

- i = Selection intensity
- \( r_{AI} \) = Accuracy
- \( \sigma_A \) = Genetic standard deviation
- \( L \) = Generation interval

- Farmers’ point of view

- Breeding company’s point of view
Geneticists’ point of view

Maximum • G per year

\[ \Delta G_{\text{year}} = \frac{i \ r_{AI} \ \sigma_A}{L} \]

- \( i \) = Selection intensity
- \( r_{AI} \) = Accuracy
- \( \sigma_A \) = Genetic standard deviation
- \( L \) = Generation interval

Use bulls with highest index

- index must match your breeding goal
- breeding company : restrict • F
- farmer : avoid high F matings

Don’t look at reliability

- BLUP methods take account of amount of info
<table>
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<tr>
<th>Bull name</th>
<th>Sire</th>
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CRV bulls >10 months old

**Young** | **Proven**
---|---
NVI > 300 | 7
NVI > 280 | 36
NVI > 260 | 74
NVI > 240 | 136

95% young, 5% proven
Geneticists’ point of view

Are genomic EBVs overestimated?

What % proven bulls in top 100 can you expect?
Verandering in NVI

5%
% proven bulls in top 100

Simulation study by De Roos et al. 2011 J Dairy Sci 94:1559

% genetic variance explained by markers

- dams 1 yr, sires 1 yr
- dams 1 yr, sires 5 yr
- dams 3 yr, sires 5 yr

% genetic variance explained by markers

0 10 20 30 40 50 60 70 80 90 100
If young bulls are so great, farmers probably use >80% young bulls?

No, it is about 40%

Why?
Proven bulls
~210 NVI

Young bulls
~250 NVI

#semen units sold

A  B  C  D  E  F  G  H  I  J

A  B  C  D  E  F  G  H  I  J
Our customers
Farmers’ point of view

Many farmers are primarily focused on continuity and progress for their herd, their farm and their way of life.

Performance of the herd is very important.
Breeding is important, but daily management even more.

Knowledge and opinions about breeding are variable.
Criteria for purchasing semen

Genetic merit (NVI, underlying traits)

Semen fertility

Price

Performance of daughters on own herd
Farmers’ point of view

Reasons why not to use young bulls (by some farmers):

• the genomic EBVs are overestimated
• it gives more variation, so more poor cows too
• there is no real daughter information, so I don’t trust it
• it is just a number game, that’s not breeding
• don’t know how they breed so you can’t do good mating
• I have good daughters of bulls X so I keep using him
• I will wait until the technology is proven
Technology adoption lifecycle

Innovators
- larger farms, more educated, and more risk-oriented

Early adopters
- younger, more educated, community leaders

Early majority
- more conservative but open to new ideas, active in community, influence to neighbors

Late majority
- older, less educated, fairly conservative and less socially active

Laggards
- very conservative, had small farms and capital, oldest and least educated

purchase patterns of hybrid seed corn by farmers
Breeding company’s point of view

We are market driven,
so we follow customers

Neutral in marketing, no push towards young bulls

No advertisements for individual young bulls

Variable knowledge and opinions among staff
Our advise

Our young bulls are our best bulls

Lower reliability, so can go up or down
Only few big drops
After big drop still comparable to proven bull

Use multiple bulls
## Which bull is best?

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3 Kian daughters
Implications for breeding program

Major changes have been implemented:
- use of 1-year-old sires & dams, intense selection among candidates,
- heavy reproductive programs, cow reference populations

% use of young bulls important for # bulls per year
More test bulls in 2013 = better proven bull portfolio in 2017
Additional costs are 4 years x 365 d x € 9 = € 13k / bull
  How many bulls is cost effective?

In future, all bulls will be culled after they produced enough semen to fulfill their demand as young bull
Conclusions

Young bulls dominate top list as they are better

Use of young bulls is growing and will continue to grow

Use multiple bulls to avoid bad luck

Breeding programs have changed enormously and will make keep changing