

Does selection on Estimated Breeding Values work? Results from 20 years of selection

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Does selection on **Estimated Breeding Values (EBV)** work?

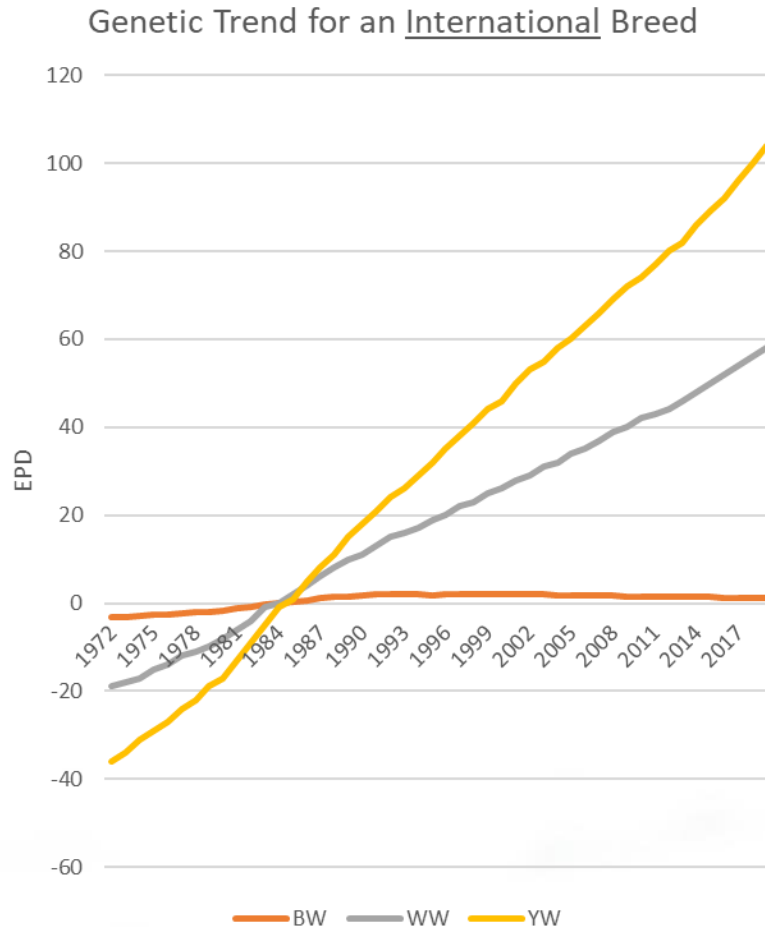
Answer:

« **A big YES** »

BUT

EBVs should be used with care

What is in the trends?



- » **Birth weight (BW)**
 - Bigger not always better
 - Pre-natal and post-natal viability vs difficult birth
- » **Weaning weight (WW)**
 - More kg per cow to the extent possible
- » **Yearling weight**
 - » Earlier sexual maturity

Watch out for « genetic » speed limits

Some genetic change can lead to performance “ceiling”

Message: *Favourable and unfavourable genetic trend*

How to think about it !!!

Individual Animal Performance



Mean Performance

- Performance of **typical** genetics (animals) in a breed under **typical** environmental conditions

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EBV

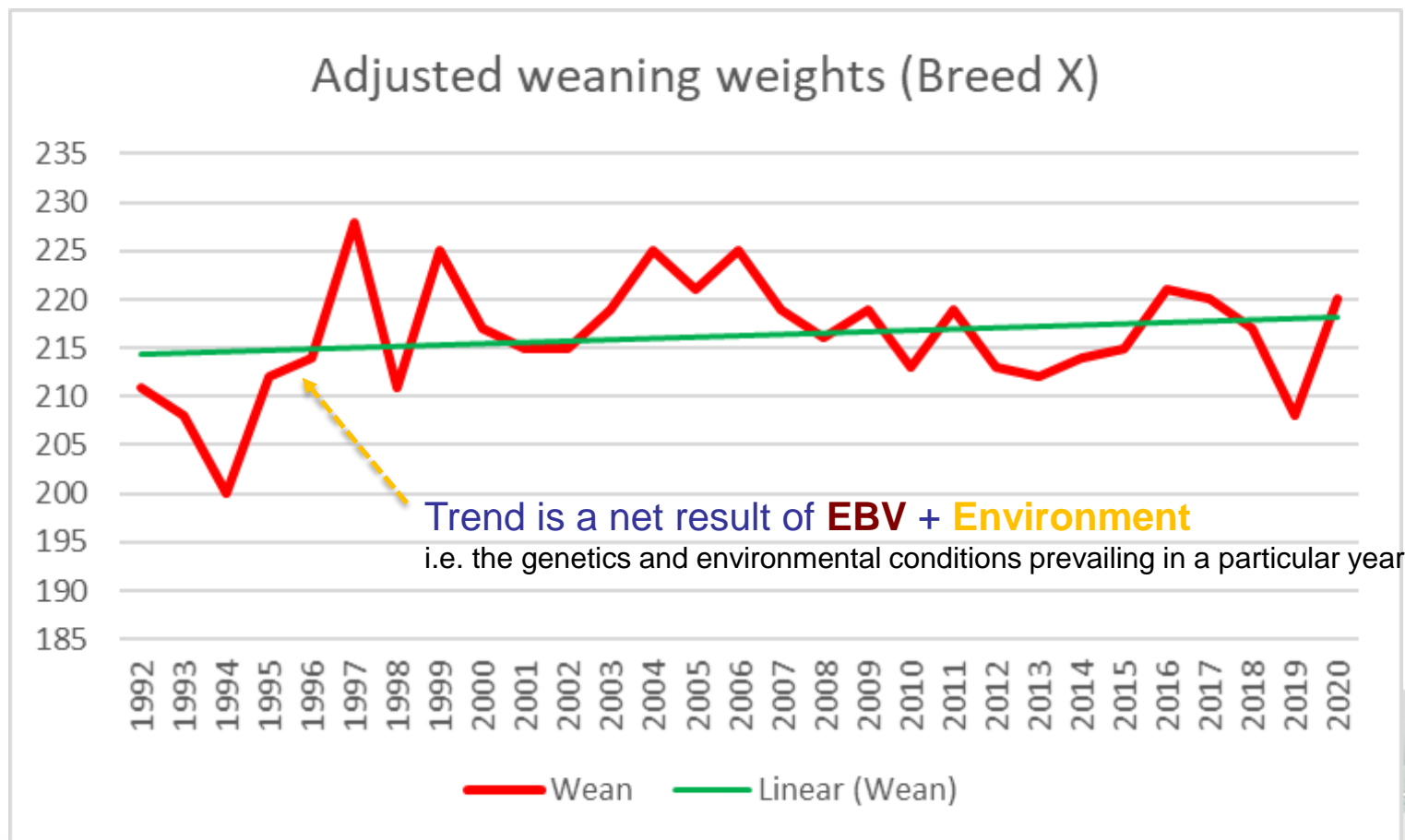
- Performance advantage / disadvantage due to **atypical** (“good” or “bad”) genetics

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Environment

- Performance advantage / disadvantage due to **atypical** (“good” or “bad”) environmental conditions

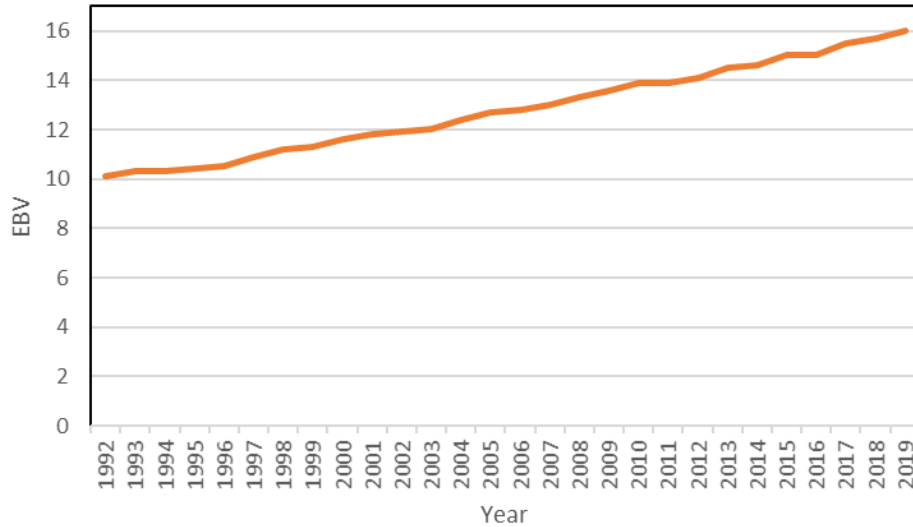
EBV and Environment: Implication on performance



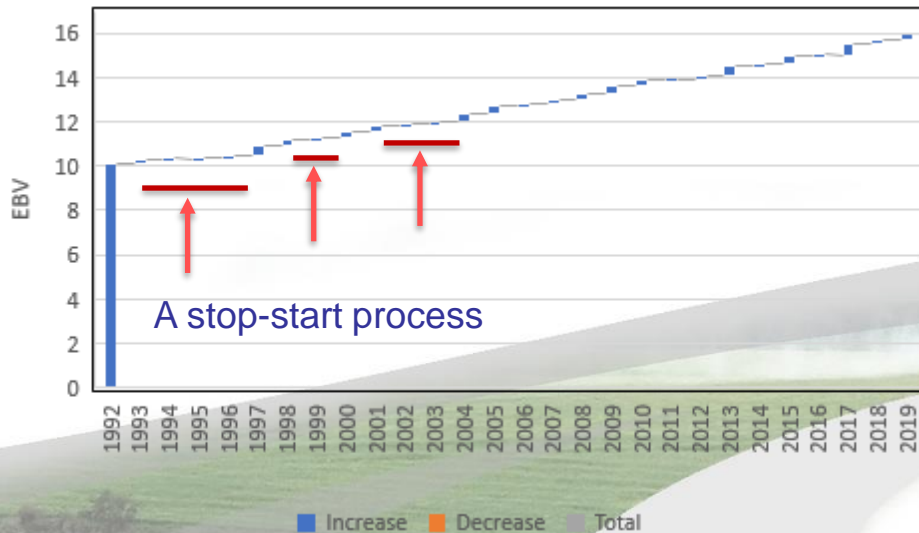
Graph: Courtesy of Ms Izaan Du Plooy

Genetic change is cumulative

200-day Weight in Breed A

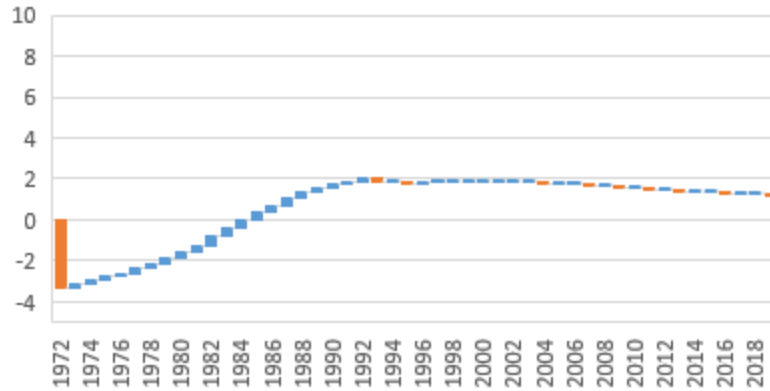


200-day Weight in Breed A



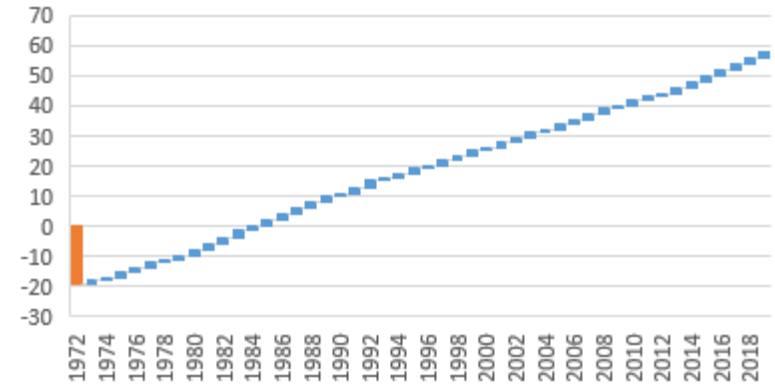
In the long run breeders change their minds or nature impose the change

Birth Weight trend in Breed B



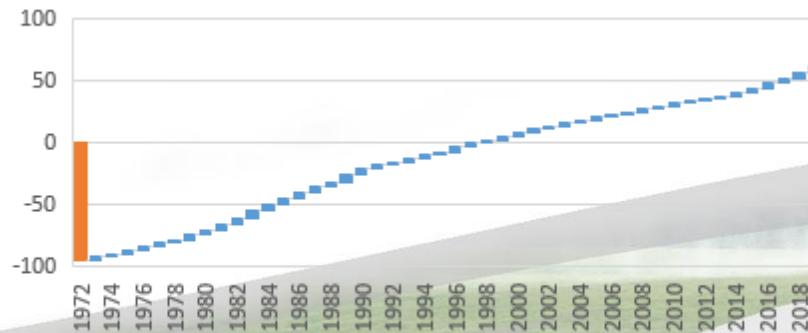
■ Increase ■ Decrease ■ Total

Weaning Weight trend in Breed B



■ Increase ■ Decrease ■ Total

Mature Weight trend in Breed B



■ Increase ■ Decrease ■ Total

Genetic *versus* phenotypic level

- **Phenotype** is the ultimate goal of selection and breeding
 - Stud breeders work with seedstock and are paid for **good genetics**
 - Commercial producers use **good genetics** and **environment** and are paid for **phenotype**
 - Consumers pay producers for **phenotype** (i.e. animal products)
- Good genetics assist commercial producers to farm in harmony with environment (i.e. minimal investment on environmental improvement)
- **What is good genetics?**
 - genetics that produce sustainably in a prevailing production environment

No free lunch

- **Genetic trend** provides a glimpse into progress resulting from breeding and selection
- But, continuous genetic improvement requires **genetic variation / biodiversity**
- Breeders should always keep an eye on **inbreeding** not only for its impact on performance but on genetic variation

Summary

- **EBV** works but should be used wisely as genetic mistakes are difficult to undue
- Genetic improvement is **cumulative** and pays for its investment
- Breeders should always watch out for **genetic “speed limits”** or unfavourable genetic trends
- Traits are genetically correlated
 - **Trait relations** should be maintained
- Prerequisites for **sustainable genetic improvement** are:
 - Genetic variation
 - Performance and pedigree recording

Thank you

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