PEDIGREE-BASED GENETIC RELATIONSHIPS AND GENETIC VARIABILITY IN ESTONIAN HOLSTEIN POPULATION

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AIM

- Assess the bulls' use in Estonian Holstein population.
- Estimate the genetic relationships between more frequently used bulls.
- Study the genetic variability among heifers.

DATA

Two different databases obtained from the Estonian Livestock Performance Recording Ltd were used:

- the whole Estonian dairy cows' pedigree (as of March 2018) containing more than 1.7 million animals,
- the sires, owners and pedigree-based estimated milk production breeding values of all heifers born in 2017 and 2018 (49,522 animals).

CONLUSIONS

- According to known pedigree data there is no problem with inbreeding, however ~93% of all bulls' pairs are related, ~4% have additive genetic relationship ≥0.125 and ~0.8% ≥0.25.
- Most of the heifers come only from the small number of farms (57.9% from 50 farms) and are daughters of the small number of bulls (50% from 31 bulls).
- In different farms relatively different bulls are used and the bulls' use frequency does not depend their EBV.
- There is no big difference in heifers' milk production EBV between farms – the within farm variability considers ~85% of the total variability of EBV.

RESULTS

Pedigree-based relationships

- The average inbreeding of animals born in last decade was 0.023.
- Among 325 bulls with more than 100 daughters (with at least one daughter born after 2013) there were
  - 2122 pairs of bulls (4.0% of all pairs) with their additive genetic relationship higher than 0.125 and
  - 420 pairs of bulls (0.8%) with their additive genetic relationship higher than 0.25.

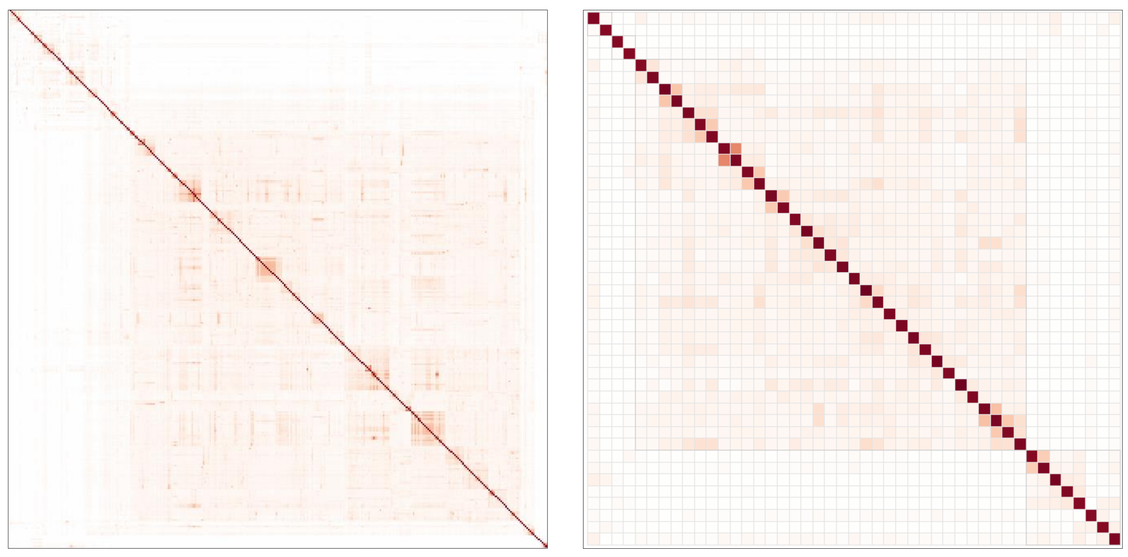

Figure. Additive genetic relationship matrix of bulls with more than 100 daughters (n=325; left figure) and bulls with more than 500 daughters (n=45; right figure).

Heifers' distribution by bulls and farms

- 767 bulls in total, eight bulls with >1000 daughters born in 2017-2018 (26.4% of all heifers).
- 453 farms in total, eight farms with >1000 heifers born in 2017-2018 (19.1% of all heifers).

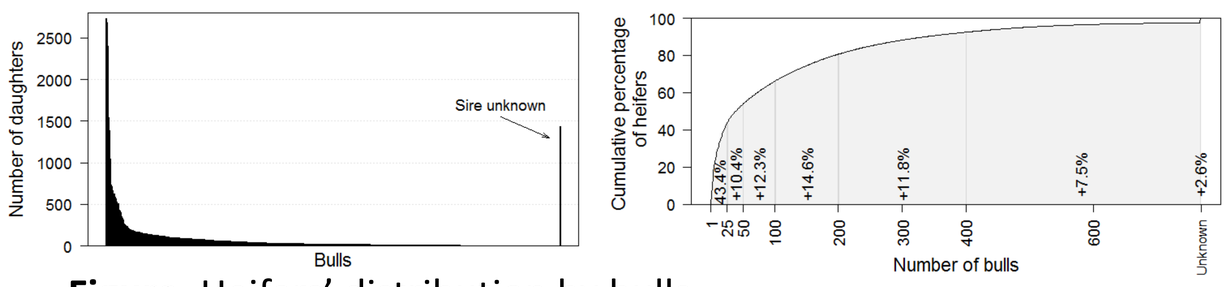

Figure. Heifers' distribution by bulls.

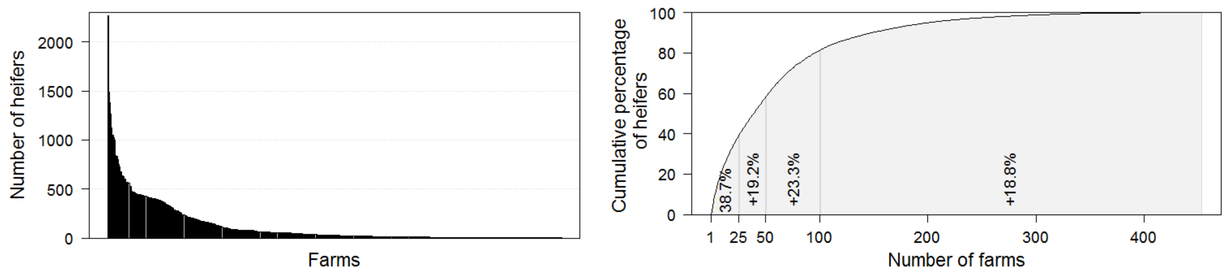

Figure. Heifers' distribution by farms.

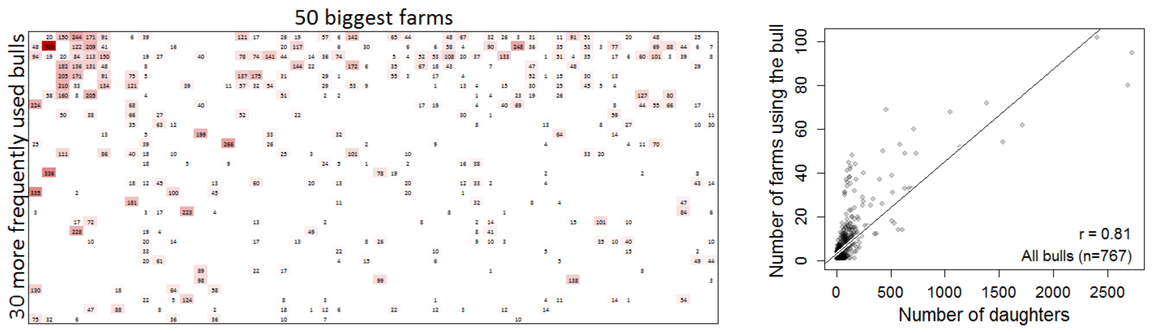

Figure. Bulls' use by farms and relation with number of daughters.

Heifers' milk production estimated breeding value (EBV)

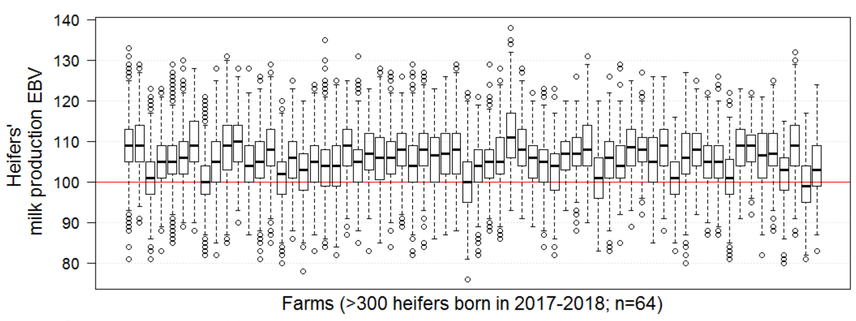

Figure. Heifers' milk production EBV by farms.

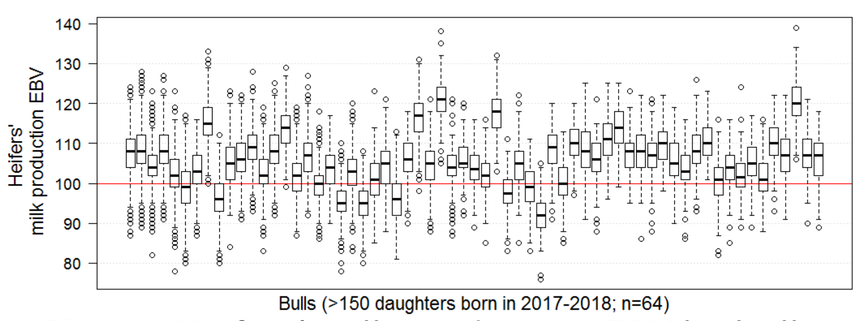

Figure. Heifers' milk production EBV by bulls.

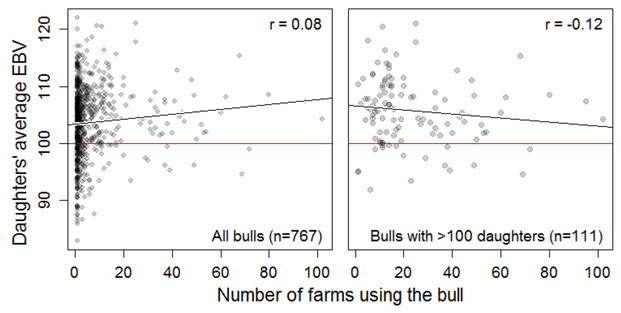

Figure. Bulls' use *vs* their daughters' milk production EBV.

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