Genomic evaluation on the French scale of Holstein bulls from a large Indian NGO reveals import history and potential directions of progress

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Context

- BAIF Development Research Foundation (http://www.baif.org.in) is the largest Indian NGO in agriculture. BAIF runs a bull stud which produced 12.5 million doses in 2016 from bos taurus bulls (Holstein (HF) and Jersey used to produce F1 crossbred cows), bos indicus, crossbred bulls as well as buffaloes.
- 55 HF bulls from the bull stud and 22 HF cows from the bull dam nucleus herd (founded in the late 70’s from Canadian HF and Danish Friesian) were genotyped (among others) with the Bovine SNP50 Beadchip®.

Objectives

- To study the genetic structure of pure HF animals at BAIF.
- As the development of an Indian genomic evaluation based on a local reference population is still in progress, to genomically evaluate these animals on the French scale (as if born in France), acknowledging the existence of GxE (i.e., best in France ≠ best in India)

Conclusion

- 4 subsets of bulls identified, reflecting the initial procurements and past mating strategies (in « lines »).
- With no real bull dam selection at BAIF, French GEBV reflect these « lines »: the older the bulls’ sires, the lower the GEBV on traits that were heavily selected in North America / Europe (production, type traits).
- GEBV of BAIF bulls show high GEBV on traits with negative trends in North America/Europe until recently (Fertility, Clinical Mastitis).

Perspectives

- GEBV on the French scale brings valuable information especially on numerous traits not recorded in India
- Similar results found on Australian scale (Gibson, UNE)
- Even though G x E interactions are huge, a HF bull with poor GEBV on fitness traits in Europe is unlikely to perform well in India ➔ Use these GEBV for screening of bulls and bull dams at BAIF

• average genetic merit (AGM) of bulls from « old » clusters are very low for yields (maybe better for Indian conditions?) but high for fat contents
• Poor AGM for udders (except for recent sires)  strong positive genetic trends in HF populations over last 30 years
• correct AGM for Somatic cells and good for clinical mastitis (compared to French population)
• Good AGM for fertility traits ➔ to negative genetic trends in all HF populations until recently (compared to French population)
• Poor AGM for feet and legs
• Poor AGM on body traits due to strong selection
• Poor AGM for longevity ➔ Poor udders feet and legs?