Impact of the DGAT1 mutation in a *Bos taurus* x *Bos indicus* crossbred population in India

M. A. Touchard[1], Y. Gaundare[2], S. Jadhav[2], V. Dhanikachalam[2], V. Podtar[2], N. Punde[2], T. Shirsath[2], A. Joshi[2], K. Bhave[2], S. Joshi[2], M. Swaminathan[2], M. Boussaha[1], V. Ducrocq[1]

[1] INRAe, Animal Breeding and Genetics, GABI 211, 78350 Jouy-en-Josas, France

[2] BAIF Development Research Foundation, Pune, 412 202 Maharashtra, India

Context

In India, the majority of small farmers raise 2 to 5 cows, with a production of a few liters per day.

High fat% in milk is considered very important.

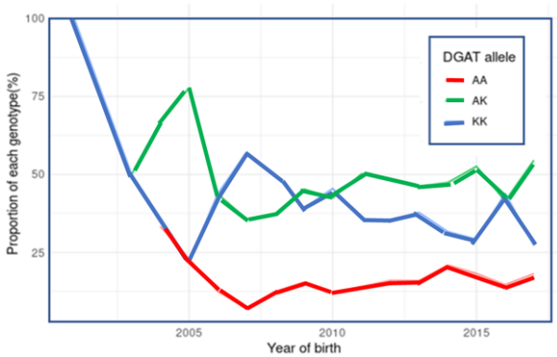
Bos indicus (zebus) have a higher level of fat% than *Bos taurus,* with a strong impact on the taste of milk.

To increase milk production, farmers are crossbreeding *Bos indicus* cows with Holstein or Jersey bulls by AI, **ignoring the impact of the DGAT1 gene on fat and fat%.**

Consequences

Based on 3017 genotyped crossbred cows (with 53543 milk records) from 6 states - Bihar, Jharkhand, Maharashtra, Odisha, Punjab, Uttar Pradesh) with various levels of crossbreeding (0.46 Holstein (*range: 0.14-0.67*), 0.18 Jersey *(0.09-0.0.38)* and 0.36 indigenous *(0.23-0.48)*

Distribution of DGAT1 alleles over 20 years



Crossbreeding *Bos indicus* cows with *Bos taurus* males introduced the **DGAT1 A allele** in the Indian dairy population

Effect of breed composition

Proportions			Impact on fat %
Indigenous	Holstein	Jersey	
1	0	0	0
0	1	0	-0,044
0	0	1	0,146
0.75	0.25	0	-0.033
0.5	0.5	0	-0.022
0.25	0.75	0	-0,011

Conclusion

The polymorphism of the DGAT1 gene has a significant impact on fat% and fat yield of crossbred cows. The **A** allele decreases fat % in milk. But selection is straightforward among genotyped males to avoid a continuous decrease of fat%:

- **Avoid selection of bulls carrying 2 copies of the A allele of the DGAT1 gene**
- **As much as possible, avoid selection of bulls carrying one copy of the A allele**

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