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Alternative possibilities of selection in Slovenian population of Brown cattle

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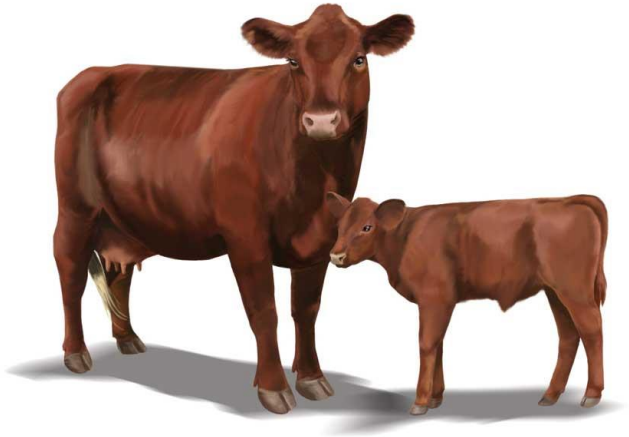
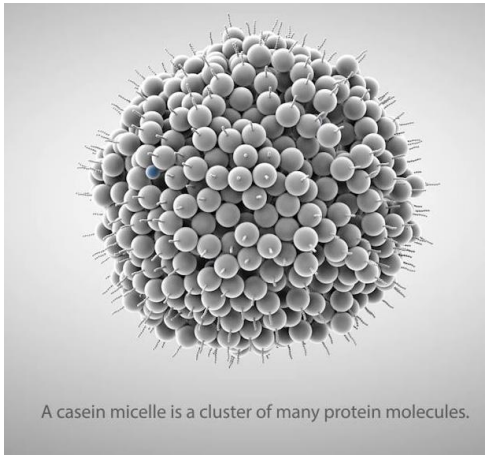


Introduction

- Brown cattle is very popular for dairy production in the mountains.
- Restricted environmental sources in the mountains influences on **limited milk production**.

Introduction

- **Kappa casein** is the most important milk protein for cheese production.
- Kappa casein determines **cow's genetic potential for cheese yield**.
- Increasing the economy of milk production for cheese processing → important to know animals' genotype for the Kappa casein gene.


A casein micelle is a cluster of many protein molecules.

Introduction

- Kappa casein gene: **14 allele variants.**
- Most frequent alleles: **A, B → positive correlation with milk protein and fat yields.**
- Allele **E: rare,** negative correlation with cheese yield – consume milk.

Introduction

Cows with **BB vs. AA** genotypes:

25 % shorter coagulation time

50 % higher curd firmness

7 – 15 % higher cheese yield

		Cheese yield (kg)		
Production	kg milk/year	**General**	BB genotype	**Yield gain**
Intensive	10.000	**909.1**	972.7 – 1045.5	**63.6 – 136.4**
Normal	7.500	**681.8**	729.5 – 84.1	**47.7 – 102.3**
Extensive	5.500	**500.0**	535.0 – 575.0	**35.0 – 75.0**

Material

- Database: Agricultural Institute of Slovenian.
- Genotyped animals: 277 BSW.
- Pedigree: 5050 animals (BSW, HOL and SIM), 5 generations.
- Alleles: A, B, **E** excluded.

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Methods

- Allele frequencies of genotyped animals.
- Estimated allele A and B probabilities for all animals in the pedigree using an animal model:

$$y = Za + e$$

- Estimated heritability.
- Genetic trends for population.

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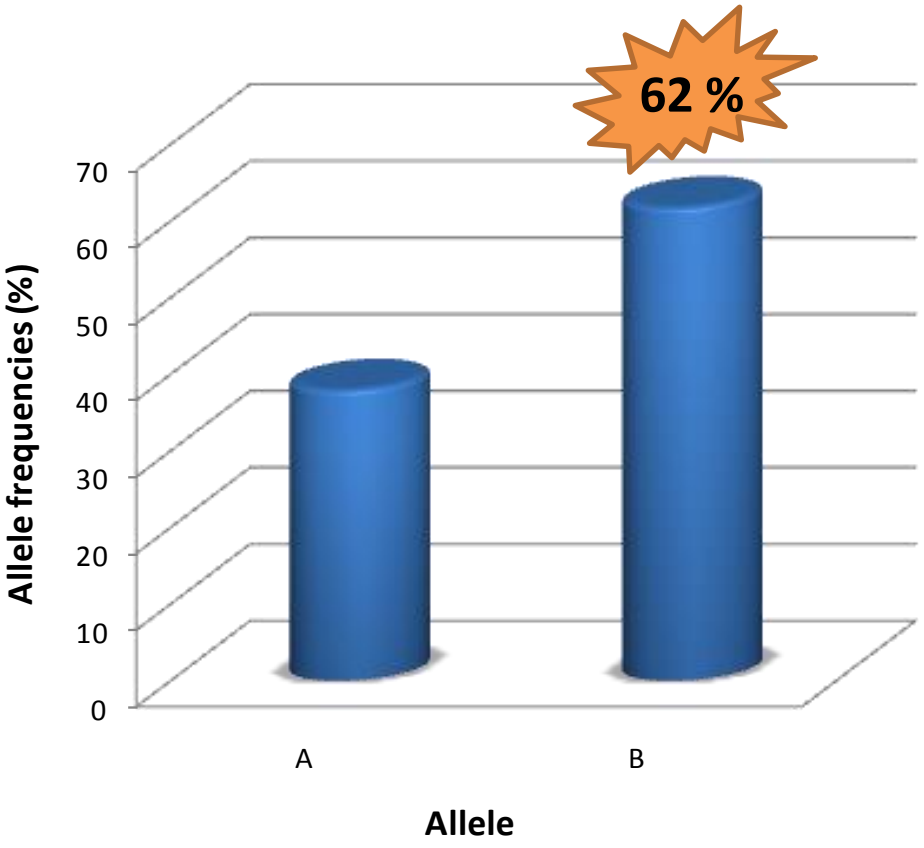
Results

Allele frequencies of genotyped animals



Estimated allele A and B probabilities

Ratio A : B allele = **3 : 4**

Average accuracy = **0.55**

Genetic 'trend' for brown population

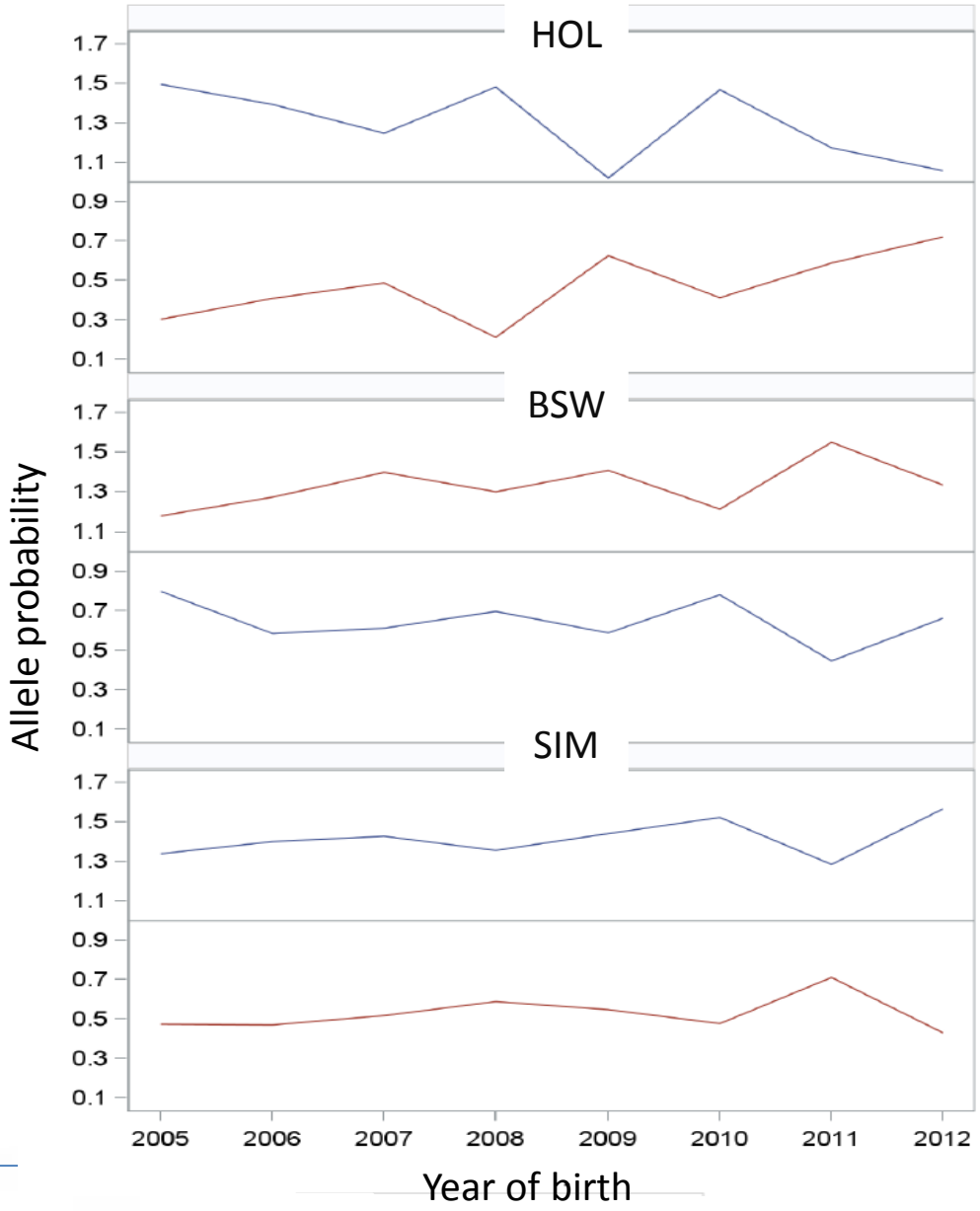
Great opportunity for selection!

Allele

A B

R = 0.55

Animals of **Brown cattle population** had **significantly higher frequency** of **B** allele compared to animals of other dairy breeds in Slovenia.



Allele

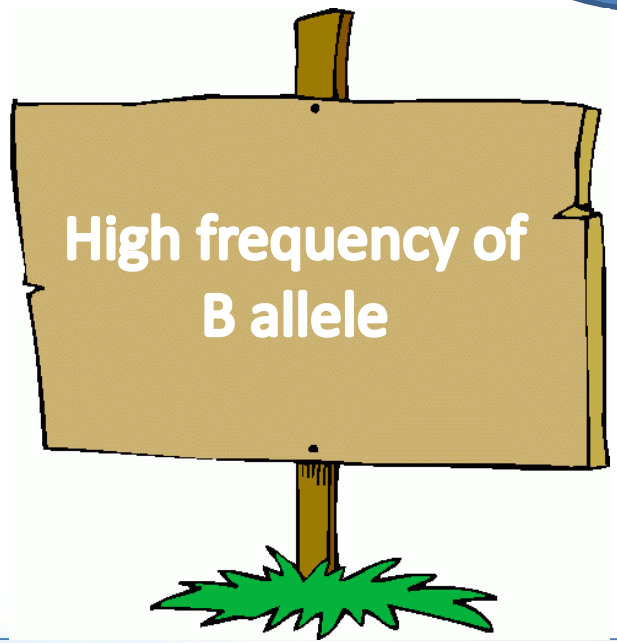
A B

Trend?

R = 0.54

Conclusion

Great opportunity to increase the economy of the milk production using estimated Kappa casein alleles as a selection criteria in the alternative breeding programs.



Questions?