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Extent of genetic admixtures in dairy cattle breeds by genetic markers in Estonia

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Dairy population in Estonia: 110 000 cows

Estonian dairy population comprises 0.4% of European dairy cattle

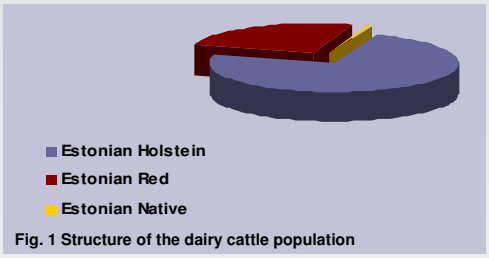

Fig. 1 Structure of the dairy cattle population

Material and methods

Sampling: totally 122 unrelated individuals

Markers: 25 microsatellites (Fig.2) at 19 chromosomes

3 lactoprotein loci

casein beta (CSN2)

casein kappa (CSN3)

lactoglobulin beta (LGB)

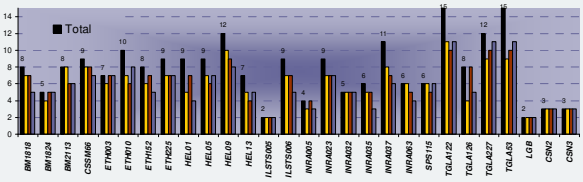

Fig. 2 Markers and number of alleles. Mean number of alleles per locus is 7.8. Number of alleles ranges from 2 (*ILSTS005, LGB*) to 15 (*TGLA053, TGLA122)*

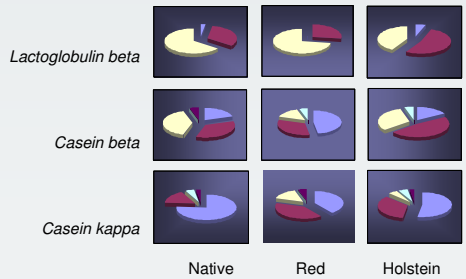

Fig. 3 Characterization of the studied breeds by milk protein genotypes

Individual clustering and admixture analysis were performed applying BAPS v. 4.14 program.
Coancestry coefficients were computed using Arlequin v. 3.11

Estonian Native, Estonian Red and Estonian Holstein cows

Results

Based on Bayesian mixture model, three and two genetic clusters formed analysing microsatellite and lactoprotein data, respectively.

Grouping of individuals to genetic clusters showed that individual grouping did not follow completly the breed origin.

Within the breeds, 9.6% of individuals had significant ($p<0.05$) admixture proportion analysed by microsatellites.

The coancestry coefficients varied more by lactoprotein types than by microsatellites (Table 1).

Table 1 Matrix of coancestry coefficients as t/M= -ln (1 - F_{ST}). Microsatellites above the diagonal and lactoprotein data below the diagonal

	Estonian Native	Red	Holstein
Estonian Native		0.052	0.071
Estonian Red	0.069		0.063
Estonian Holstein	0.025	0.126	

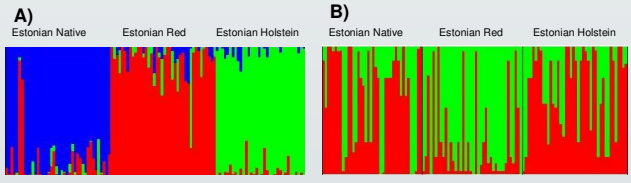

Fig. 4 Clustering of animals representing the three Estonian dairy breeds: microsatellite analysis (A) and lactoprotein data (B). Admixture proportions of individuals (vertical lines) are shown by different colours

The Estonian Native demonstrated similar admixture pattern to Estonian Red as well as to Estonian Holstein breed analysed by microsatellites.

Analysis based on lactoprotein markers indicated divergence between Estonian Red and Estonian Holstein. Estonian Native cattle appeared less diverged from Estonian Holstein than from Estonian Red breed.