

Relatedness among cryo-bank bulls of the Yakutian Cattle breed as estimated with microsatellite data

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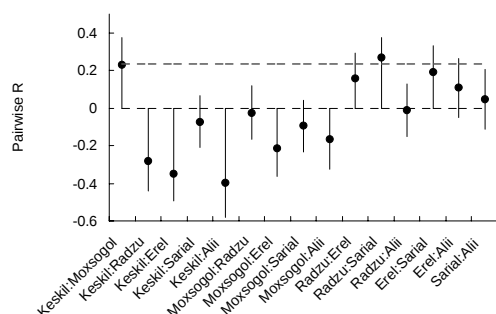
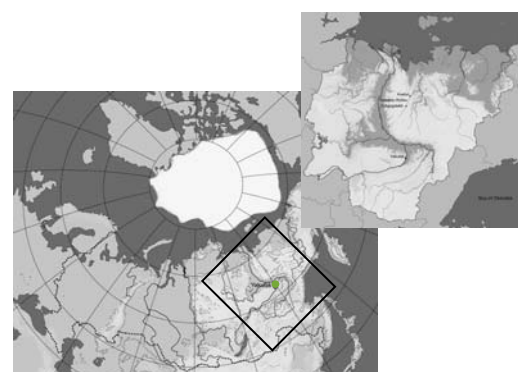
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- Semen of 6 Yakutian bulls - *Keskil*, *Moxsogol*, *Radzu*, *Erel*, *Sarial* and *Alii* - is stored in a cryo-bank, but pedigree records of these bulls are not available.
- We analysed 30 autosomal microsatellites to clarify genetic relatedness between these bulls and provide recommendations for the use of their semen in conservation and breed management.



YAKUTIAN CATTLE are the unique last remnants of the Siberian Turano-Mongolian cattle, with 1200 purebred animals left, and well adapted to the extreme sub-arctic conditions.

Up to 74% of the Yakutian Cattle are distributed in the three northern villages of Dzhargalakh, Kustur and Batagay-Alyta.



Observed mean relatedness (R) [black spots] and standard deviation bars for pairwise R comparisons for Yakutian cryo-bank bulls were computed using MER v.3.0 (Wang J. 2002. *Genetics* 160:1203-1215). The upper dashed line represents the upper limit of the 90% confidence interval for simulated random individuals. Ten out of 15 pairwise R-estimates approached zero or fell below it, suggesting that for those pairs relatedness did not significantly deviate from the average (zero) in the contemporary population.

Individual pair	MER R (SD)	ML-Relate H0	H1	P
Keskil:Moxsogol	0.233 (0.149)	UR	HS	0.0003
Radzu:Erel	0.163 (0.133)	UR	HS	0.08
Keskil:Radzu		UR	HS	0.184
Keskil:Sarial		UR	HS	0.032
Moxsogol:Radzu		UR	HS	0.037
Moxsogol:Erel		UR	HS	0.037
Moxsogol:Sarial		UR	HS	0.042
Radzu:Sarial	0.271 (0.112)	UR	HS	0.032
Erel:Sarial	0.196 (0.144)	UR	HS	0.037
Erel:Alii	0.053 (0.162)	HS	UR	0.042

SD=standard deviation of a relatedness estimate (R) obtained using the MER program
UR=unrelated and HS=half-sibs hypothesis tested using ML-Relate, P=significance of test result

The R-estimates above zero were tested using a maximum-likelihood estimator using ML-Relate (Kalinowski ST et al. 2006. *Molecular Ecology Notes* 6:576-579). A statistical test between two *a priori* hypotheses (unrelated (H_0) vs. half-sibs (H_1)) was applied.

- We suggest that Keskil:Moxsogol, Radzu:Sarial, Erel:Sarial and Radzu:Erel can be treated as bulls having up to 25% of their genes in common. We are more concerned about the type II error (related individuals are missclassified as unrelated) than the type I error (unrelated are identified as related).
- We suggest dividing the bulls into 3 separate groups in a rotation mating scheme: **I) Keskil and Moxsogol II) Alii III) Radzu, Erel and Sarial**. In the rotation, a female belongs to the same group as the sire and is crossed with a bull from another group.

SAKHA YNAGA – CATTLE OF THE YAKUTS. 2009. *Annales Academiae Scientiarum Fennicae. Humaniora* No. 355. A new book edited by Leo Granberg, Katriina Soini and Juha Kantanen will tell a story of the endangered Yakutian Cattle, of their important role in the Siberian cultural heritage and of their status for safeguarding the food production in the future. The book is based on multidisciplinary studies and published in autumn 2009. Please make your order on web bookstore www.tiedekirja.fi