Morphological and Genetic Diversity of Domestic Yak (*Bos grunniens*) at High Altitude Rangelands of Gilgit Baltistan, Pakistan

Asif Hameed¹, Eva Schlecht¹, Muhammad Tariq², Andreas Buerkert³, Carsten Scheper⁴, Sven Koenig⁴, Regina Roessler¹,⁵

¹University of Kassel/University of Göttingen, Animal Husbandry in the Tropics and Subtropics, Germany
²University of Agriculture, Dept. of Livestock Management, Toba Tek Singh, Pakistan
³University of Kassel, Organic Plant Production and Agroecosystems Research in the Tropics and Subtropics, Germany
⁴Justus-Liebig-University of Gießen, Institute of Animal Breeding and Genetics, Gießen, Germany
⁵University of Kassel, Animal Breeding, Germany

Introduction

- Yaks provide domestic and agricultural needs in high harsh mountain regions of northern Pakistan.
- Genetic studies are rare as animals are a neglected species in the region.
- We examined the morphological and genetic diversity of yak populations in Gilgit-Baltistan.

Material and Methods

- Selection of 6 valleys within Gilgit-Baltistan (Fig. 1a).
- Body measurements and hair samples were taken from 120 yaks (14 cows and 6 bulls per valley).
- Thirteen microsatellite loci were used for genetic characterisation.

Results

- Heart girth, height at withers, body length, horn length and muzzle circumference differ (p<0.01) between populations (Fig. 2).
- Six distinctive coat colors (black, blue, brown, grey white, yellow) and two patterns (plain and patchy) determined (Fig. 1 b,c).
- Shinny hair and medium tail length observed.

Conclusions

- High phenotypic and genetic diversity identified.
- Populations less related than expected under a model of random mating.
- Genetic conservation strategies and specific breeding programs should enhance local livelihoods.

Fig. 1: Study area (a) and yaks in Khaplu and Chipurson valley (b, c)

Fig. 2: Average values (cm) of body measurements of yaks across the six populations (valleys).

Fig. 3: Bayesian inference of most likely clusters (K = 3) of yak populations sampled in Gilgit Baltistan, Pakistan.

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