MSc Thesis Opportunity – Call for applications

Genetic diversity and structure of local goats in oasis microclimates in northern Niger

Background

Diverse socioeconomic and environmental conditions hamper sustainable land use and are putting increasing pressure on natural resources in the Sahel. In Niger, two thirds of the total land area is covered by desert. In the northern region of the country, which receives less than 200 mm of annual rainfall, traditional oasis systems such as the oases of the Aïr Mountains in the Sahara Desert, prevail. These oasis systems integrate irrigated gardening and livestock keeping. Onions are the most valuable cash crop which is cultivated by men and exported as far as to Côte d'Ivoire. Livestock comprise mainly sheep and goats that constitute a primary source of women's livelihoods, especially for the poor. Increasing conflicts and political instability in the region lead to transformation of the oasis systems and may have potential impacts on the use of sheep and goats, thereby jeopardizing women's income security.

(Photo: A. Bürkert)

Study details

So far, there are no scientific studies on the genetic diversity and differentiation and local adaptation of goats in the oasis systems in northern Niger. However, these are the basis for the design of conservation strategies of local animal genetic resources. This study aims to fill this knowledge gap by addressing the following research questions:

1. Do the goats in the oasis systems in northern Niger represent genetically distinct populations within the local goat breed (Chèvre du Sahel) in Niger?
2. Has reproductive isolation due to restricted gene flow between fragmented populations of local goats within the country resulted in genomic divergence at a very local geographic scale in northern Niger?

This study will investigate the genotypic diversity and structure and inbreeding levels of goats from the oasis systems in northern Niger and from other regions in the northern and southern part country. A total of 188 goats were genotyped using the goatSNP50 BeadChip (Intl Goat Genome Consortium). The aim is to obtain a comprehensive overview of sequence variation in the genomes of the goat populations to provide deeper insights on whether reproductive isolation has resulted in the genetic fragmentation along oasis microclimates and associated human practices.

(Photo: R. Roessler)

The results will support the design of conservation and genetic improvement programs of locally adapted farm animal genetic resources. This will allow populations in these unique, centuries-old oasis systems to respond selectively to transformation processes and thus promote the future income security of women.

The planned master thesis project will analyze the SNP genotype data to answer the above mentioned two research questions. It is offered within the West African-German network "Promoting Academic Capacities for Sustainable Agricultural Resources Use in West Africa" (Pro-RUWA). Furthermore, a cooperation with the International Center for Agricultural Research in the Dry Areas (ICARDA) is envisaged. The place of implementation will be Witzenhausen. Start is as soon as possible.

For more information, please contact:

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