



RESEARCH
PROGRAM ON
Livestock

More meat, milk and eggs by and for the poor

Genetics flagship ICARDA activities

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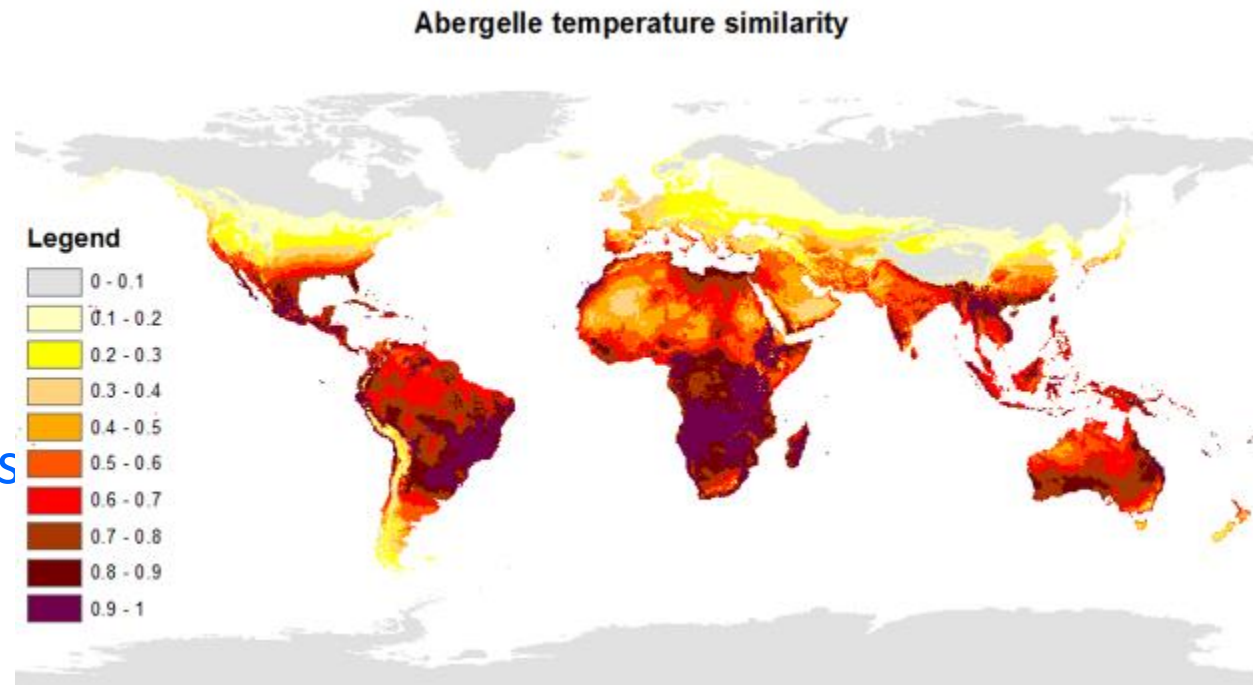
Mid-Term Livestock Genetics Flagship Meeting, ILRI,
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Development of suitability environmental maps for small ruminants breeds in Ethiopia

Factors being considered:

- Precipitation
- Temperature
- Soil type
- Landform
- Climate
- All evaluated factors



Maps being updated for at least 4 sheep and goat populations in Ethiopia

Assessing genetic diversity and structure and genetic mechanisms of heat tolerance in Sudanese desert sheep

Five Sudanese Desert sheep populations sampled:

- Shanabla
- Hammary
- Kabashi
- Alahamda or Solaimi
- Bazai

Missed population:

- Medobi out of reach

Geographic location/origin of the populations:

- North Kordofan

Total number of samples collected:

- 120 (24 from each population)
- Currently with the genotyping service provider

Phenotypic characterization (to be followed by a genomic approach) of Barbarine Tunisian sheep breeds for gastro-intestinal parasite resistance with a special reference to *Haemonchus contortus*



abomasa from Barbarine Sheep (n=600)

parasite collection
identification of *Haemonchus contortus* and other GIN



fecal samples

identification of eggs (coprocultures)
Fecal Egg Count



blood samples

Haematological Parameters
DNA extraction



(age, sex, reason of slaughter, anthelmintic use and management type: grazing, grazing and supplementation, intensive)

Genetic diversity and structure of Ethiopian goats

Three manuscripts generated:

1. Polymorphism analysis of kisspeptin (KISS1) gene and its association with litter size in Ethiopian indigenous goat populations – **Published**
2. Mitochondrial DNA variation reveals maternal origins and demographic dynamics of Ethiopian indigenous goats – **Addressing reviewers comments**
3. Genome-wide SNP data uncovers high genetic diversity and admixture among populations of Ethiopian indigenous goats - **Submitted**

Community-based breeding programs

- CBBPs are being implemented in 5 sheep and 2 goat sites
- Out scaling models being developed
- Reproductive technologies for management decisions and dissemination of genetics
- Optimization of CBBPs- intensity of selection, duration of ram use, data management and estimation of BV



Methodologies: Development of methodologies for up scaling of CBBP

- CBBPs are technically feasible and financially rewarding technology at pilot
- CBBPs need to be disseminated at scale to make changes to lives of the poor
- Use established CBBPs or set up new ones in strategically located sites along the breeding tract of the priority breeds
- CBBPs serve as production site for improved rams which would be distributed to participating communities
- The distribution of improved genetics would be supported by mass synchronization and artificial insemination
- Data needed to develop the model collected

Development of CBBP for pastoral production systems

- There are no? successful breeding programs in small ruminants in pastoral areas
- Different approaches need to be followed in different production systems
- Mobility, drought and climate change, lack of supportive infrastructure, breeding objectives dictated by social and cultural factors etc
- We have identified sites, description of production system and breeding objectives will start in September



Identification of genes associated with prolificacy in Bonga Sheep

- 84 individuals:

➤ Single	- 20	}	- Genotyped with Ovine HD Chip
➤ Twins	- 33		- Fst analysis
➤ Triplets	- 30		
➤ Quadruplet	- 1		

- Indicative results:

- Two candidate regions identified on Chromosomes 5 and X

- To be done:

- Identify causative mutations and differences in gene expression levels between ewes with different litter sizes
- Physiological study to assess endocrine and folliculogenesis differences between ewes with different litter sizes
- Sampling infertile animals

Analysis of base population for determining genomic change in CBBP flocks

- Five sheep and 2 goat parental (base) populations have been sampled:

Sheep Populations:

- Doyo gana
- Bonga
- Horro
- Atsbi
- Menz

Goat Populations:

- Abergelle - Tigray
- Abergelle - Zekwala

Evaluation of Bonga rams distributed in the Southern Regions of Ethiopia

- CBBPs were established in Bonga in 2010 and were successful
- The regional government started distribution of improved rams in the region as improver breed
- We designed a study to evaluate the performance of the breed out of its breeding tract
- Survey, monitoring and on farm performance data is being used for the study
- All data is collected, analysis is underway



Development of platforms for AI and related reproductive packages in sheep and goats in Ethiopia

- Platforms to deliver bundled interventions in CBBP sites. Some of the services provided include:
 - Males' breeding soundness examination
 - Mass synchronization and artificial insemination with fresh, non-cooled semen
 - Ultrasound service provision for pregnancy diagnosis

4 platforms in sheep

- Debre-Birhan/Menz
- Doyogenna
- Bonga
- Horro



2 platforms in goats

- Abergelle
- Konso

Mobile recording system in CBBP's ready for use

- Effective implementation of genetic improvement programmes depend on technology infrastructure to collect, store and process performance data and pedigree information
- The expansion of the CBBP relies on a user-friendly system that deals with information flowing from farmers through to the CBBP technical team which reports back to farmers.
- With OSU and EMBRAPA we developed mobile recording system but was not compatible with DREMS
- AniCloud is a cloud based data capture system developed in New Zealand by AbacusBio
- Testing of the system in CBBPs of Ethiopia and Tanzania will start this year

Development of national sheep and goat breeding strategies in Ethiopia

- Four sheep and 2 goat priority breeds were identified by MoLF and ATA
- We were asked to help design breeding programs
- In partnership with EIAR, ATA we helped the process and organized consultation program
 - To review and synthesize lessons learned in sheep genetic improvement activities so far,
 - Design a detailed plan for small ruminants genetic improvement and dissemination of improved genetics
 - Identify enabling environment for the breeding programs to succeed
 - Agree on roles, responsibilities and the timetable for the implementation of the breeding programs It is advised in one slide maximum 6 bullets
- The plan is available
- World bank project will work with these breeds

CGIAR Research Program on Livestock

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The **CGIAR Research Program on Livestock** aims to increase the productivity of productivity of livestock agri-food systems in sustainable ways, making meat, milk and eggs more available and affordable across the developing world.



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