

## 17:00      **Adaptation of Mediterranean bovine livestock to climate constraints. Genetic diversity and breeding systems**

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According to IPCC, Mediterranean countries will be particularly affected by global warming, with rising temperatures, reduced rainfall during summer months and recurrent heat waves and droughts; this climate is estimated to move inland. In this context, local Mediterranean cattle breeds, genetically selected to adapt to this harsh environment and breed with specific practices are valuable genetic resources.

In order to identify genotypes and breeding practices capable of coping with the environmental challenge induced by climate change, we propose an integrative approach combining genetic analysis of cattle populations, climate conditions and livestock systems. For this purpose, 21 breeds from three southern (Algeria, Egypt and Morocco), two eastern (Cyprus and Greece) and three northern (France, Italy and Spain) Mediterranean countries were genotyped at 41187 SNPs. These data were combined to those available on breeds from neighbouring areas (Massif Central, Alps). Bioclimatic data (annual trends, seasonality, extreme factors) was obtained from WorldClim, a database for ecological modelling. Meanwhile, we have characterized the breeding systems of these local breeds thanks to questionnaires proposed to experts, completed by several extensive case studies.

Model-based clustered methods and Principal Component Analysis were first performed to address the overall structuration of populations. Then a redundancy analysis was performed to describe how geographical and bioclimatic features shape the genetic variation among breeds. Breeds are clearly differentiated according to geography and climate (temperature, rainfall). Finally, genomic regions that contribute the most to the genetic variation associated to climate are identified. The main features of breeding practices in Mediterranean environment are also determined as well as the main animal traits that breeders associate to breeds' adaptation.

This work was supported by the INRA Metaprogram ACCAF (GALIMED project)