



14. Resilience and Efficiency in Small Ruminants

Title presentation

SMARTER – Which novel traits to improve feed efficiency?

Author(s)

F. Tortereau, P. Frutos, C. Marie-Etancelin, J. Conington, G. Arsenos, I. De Barbieri, J. H. Jakobsen, C. Moreno-Romieux & J.J. Arranz

Institution for which the first author of this abstract is working

INRAE, INPT-ENVT, INPT-ENSAT, GenPhySE – Castanet-Tolosan, France

Abstract

The aim of the SMARTER (SMALL Ruminant breeding for Efficiency and Resilience) H2020 project is to develop and deploy innovative strategies to improve resilience and efficiency (R&E) related traits in sheep and goats. Regarding feed efficiency, the objective is to identify novel traits that would be relevant, easy to measure and cheap enough to be used in a large number of animals in order to identify the most efficient individuals. For the moment, in practice, feed efficiency can be assessed by different criteria such as residual feed intake and feed conversion ratio. Both criteria require real feed intake to be measured for each individual which remains an expensive data to get and hardly feasible on large number of animals. Our objective is thus to identify novel traits related to feed efficiency, and to use them as proxies for feed intake and/or feed efficiency.

First, novel phenotypes are identified and studied in experimental farms where real feed intakes (of concentrate and forage) are recorded for each individual. Different novel traits are being considered to study feed efficiency in sheep and goats, such as biomarkers (from blood or milk metabolomics), differentially expressed genes in targeted tissues, genomic polymorphisms, ruminal microbiota, faecal NIR spectra, greenhouse gas emissions and body composition traits. These novel traits will be recorded either under classical feeding or under nutritional restriction to quantify, for example, the impact of a shortage of concentrate inputs.

Then, the most promising novel traits will be recorded on commercial populations. From these larger datasets, we will estimate their heritabilities and genetic correlations with other traits such as the ones already under selection.

Finally, for some case studies, we will quantify GxE interactions, particularly by considering the same breed under different breeding systems or regions.

Keywords: small ruminants, sheep, goat, resource use efficiency, novel phenotypes