Characterization of dairy sheep and goats production systems in France: First step for a GxE study

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Introduction

Breeding dairy small ruminants in France:

⇒ News practices:
  ⇒ herd feed resources → feed autonomy
  + concerned by environment and societal demands
⇒ Diversity of pedoclimatic conditions

New questions for genetic selection:
Effective regardless of breeding environments? GxE interactions?

Objective: first step for a GxE study
Categorization of environment
Using a multiple-trait herd cluster analysis based on a large panel of descriptors (from the animal to the system)

Materials and methods

Dairy Goats
1136 herds⇒514
2 main breeds
• Lacaune (300)
• Basco-béarnais (84)
• Saanen
• Alpine

Dairy Sheep
1001 flocks⇒637
• Western Pyrenean (514)
• Blond-faced Manech (218)
• Basco-Béarnais (84)
• Corsica (35)

Characteristics of animals
Number of females
Breed(s)
Average phenotypic levels (milk, fat and protein contents, SCC)
EBVs & herd-year effects
Milk yield, Fat and protein contents, SCC

Herd-year identification
Geolocation
Herd in nucleus or in production
Area of production

Available data
Meteorological data
THI
Grass growth indicator

Herd-year management
%AI
% females in 1st lactation
Age at 1st lambing/kidding
Average age of the herd
Evolution of flock size
Lambing/kidding periods
Milking only/suckling period
AI Fertility
% of long lactations
Interval between kidding

Selection of the most discriminating variables (within breed in sheep):
Principal component analysis (PCA), Multiple correspondence analysis (MCA)

Cluster analysis:
Based on the MCA components for each herd

Test of the significant differences between clusters for the selected variables
(SAS® software)

Results

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<th>Breeds (number of herds)</th>
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<tr>
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Main discriminating factors of environments:
• Geographical location (Lacaune, goats), altitude (precocity of grass growth)
• Herd breeding goal: milk yield/composition
• Herd management: size, rate of 1st lactations at 2 years-old
• System of sales and of feeding (Goats)
• Amount of concentrate and forages (Lacaune)

Conclusion

Next step:
Are these contrasted breeding practices and conditions a source of GxE interactions?

Materials and methods

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  - Principal component analysis (PCA), Multiple correspondence analysis (MCA)
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