The Spanish dairy sheep breeds face new challenges on Mediterranean area

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Sheep production in Spain

16 million heads
(19% of EU population, 2nd after UK)

<table>
<thead>
<tr>
<th>Dairy</th>
<th>% (Spain)</th>
<th>% (Europa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ewes</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Final livestock production value (%)</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>Milk (l)</td>
<td>25% (1st)</td>
<td></td>
</tr>
<tr>
<td>Cheese (kg)</td>
<td>35% (1st)</td>
<td></td>
</tr>
</tbody>
</table>
Diversity of conditions, breeds & systems

Grasslands

Mountains

Indoors

Cereal-stubble

Crops
Dairy production

➢ Local breeds

Latxa and Carranzana

Churra and Castellana

Manchega

➢ Foreign breeds

Assaf

Lacaune
### Farming systems

<table>
<thead>
<tr>
<th></th>
<th>Latxa</th>
<th>Manchega</th>
<th>Churra</th>
<th>Assaf</th>
<th>Lacaune</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of area</strong></td>
<td>Pastoral or mountain</td>
<td>Lowlands</td>
<td></td>
<td>Indoors</td>
<td></td>
</tr>
<tr>
<td><strong>Reproductive strategy</strong></td>
<td>1 lambing / year</td>
<td></td>
<td>3 lambings / 2 years</td>
<td></td>
<td></td>
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<tr>
<td><strong>Lambing</strong></td>
<td></td>
<td>Inddoors</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Lactation length</strong></td>
<td></td>
<td>5-7 months</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Milking period</strong></td>
<td>8 months</td>
<td></td>
<td>12 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Milking</strong></td>
<td></td>
<td>Machine</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Milk yield</strong></td>
<td>190 l/120d</td>
<td>194 l/120d</td>
<td>133 l/120d</td>
<td>350 l/150 d</td>
<td>363 l/150 d</td>
</tr>
<tr>
<td><strong>PDO Cheese</strong></td>
<td>Idiazabal and Roncal</td>
<td>Manchego</td>
<td>Zamorano</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Selection on pure breed consolidated 
Main goal: Milk yield 
Other traits: 
  Milk quality: fat & protein 
  Udder morphology 
  Scrapie 

Compulsory programs 
  Mastitis 
  Blue tongue 
  Respiratory problems 

Use of natural resources 
Alternative protein sources 

Factors affecting fertility 
  Artificial insemination 
  Natural mating
New challenges

- One health
- Improving competitiveness
- Climate change
- Predators
- Animal welfare
- Generational turnover
New challenges: Improving competitiveness

- Use of ICTs
  - Use of molecular information
  - New traits in genetic programs
  - Nutrition
  - Improving fertility
- Genomic selection:
  - Increase of production
  - Functional traits
- Integral traits: Functional longevity, robustness
- New raw materials
  - Feed efficiency
  - Microbiome
  - CH4 emissions
- New artificial insemination tools
- Molecular genetics
- Microbiome
- Nutrition-reproduction interactions
- Alternatives to hormonal treatments
- Seasonality

- Integral way
  - Circular Bioeconomy
  - Multidisciplinary approach
  - Individualized treatments
- Adding value to ecosystem services
- Microbiome
New challenges: One health

- Organic production
- Decrease medicalization

More efficient production systems
Alternatives to hormonal treatments for AI

Rationalization of the use of medicines
Improvements in livestock management
Alternatives to antibiotics (Vaccines, pre and probiotics)
Improvement of the immune system
New challenges: Climate change

- Heat stress
- Resilience
- Emergent diseases
- Methane emissions

- Genetic variability: population and individual
- Adaptation capacity and response to changes
- Epidemiological surveillance
- Feeding strategies & metabolic paths
  - Microbiome
  - Measurements
  - Relation with other traits
New challenges:

Predators (wolf, bear, vulture)

- Virtual fencing
- Use of shepherd dogs /donkeys
- Geolocation and monitoring
- Environmental payment schemes

Animal Welfare

- Indicators and assessment
- Protocols for certification
- Interaction with behaviour, production, health, reproduction
Projects

iSAGE
Innovation for Sustainable Sheep and Goat Production in Europe

ardi
Research, Development and Innovation in sheep

SheepNet
European Knowledge Exchange

GRUPO OPERATIVO REPROVI

ENCOMIENDA GENOMICA

metalgen

Nuevo RTA
Thanks a lot