Producing lambs while limiting concentrates in various pedoclimatic contexts: which performances?

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Background

Decrease in European sheep production
- Profitability / Production cost, in particular feed and equipments
- Workload

Global stakes
- Livestock contribution to Climate change
- Energy consumption
- Feed-food competition

Great variability
- In farm performances (technical and economic)
- Pedo-climat contexts
- Breeds
Aims

In a large diversity of context

For optimized sheep farming systems (output/input)

• What strategies?
• What results? Technical, economic, environmental, feed-food
• What consequences?
Choice of 5 farming systems

Ewe productivity
Concentrate use: **Major impact**

1482 years- farms (1987-2016) - 118 farms (12 years in average)

**Uplands**
- Kg Conc./Ewe
- Ewe productivity %

**Lowlands**
- Kg Conc./Ewe
- Ewe productivity %

1482 years- farms (1987-2016) - 118 farms (12 years in average)

Marc Benoit – Efficient sheep farming systems
5 contrasting farming systems 1/2

- **Irel**: Belclare
- **Graz**: Mouton Vendéen, Texel
- **OF**: Limousine
- **DT**: Mourerous
- **3x2**: Rava x Ile de France
Simulation tool and performance indicators

OSTRAL (simulation tool)

- **Standardisation**
  - Economic situation (2015)
  - Adequation of equipments

- **Extrapolation for Irel. System**
  (60 → 420 ewes)

- **Indicators calculation**

[Technical indicators (flock perf.; feeding; ...)]

- **Feed/food competition**
  (protein) (*Ertl et al 2015, Wilkinson 2011...*)

- **Economics**
  - Net Income /worker
  - Added value /worker
  - Net Income/assets

- **Environment**
  - N balance
  - Gross and Net GHG emissions/kg carc (LCA)
  - MJ/kg carc (LCA)

- **Market adequacy**
  - Lambs selling Regularity
  - Lambs Conformation
## Main characteristics and performances

<table>
<thead>
<tr>
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<th>Irel</th>
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<tbody>
<tr>
<td>No ewe (&gt;6 mths)</td>
<td>420</td>
<td>541</td>
<td>470</td>
<td>405</td>
<td>2105</td>
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<tr>
<td>Stocking rate (ewe/ha Fodder Area)</td>
<td>11.4</td>
<td>6.6</td>
<td>8.7</td>
<td>4.4</td>
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<tr>
<td>Ewe productivity (+6mths) (%)</td>
<td>154</td>
<td>133</td>
<td>166</td>
<td>132</td>
<td>82</td>
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<tr>
<td>Ewe mortality (%)</td>
<td>8.3</td>
<td>3.3</td>
<td>5.8</td>
<td>4.8</td>
<td>18.9</td>
</tr>
<tr>
<td>Concentrates (kg.kg carc⁻¹)</td>
<td>1.22</td>
<td>1.55</td>
<td>5.24</td>
<td>3.41</td>
<td>0.00</td>
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<tr>
<td>Fodder self-sufficiency (%)</td>
<td>95</td>
<td>94</td>
<td>78</td>
<td>88</td>
<td>100</td>
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<tr>
<td>Added value (€.W⁻¹)</td>
<td>21400</td>
<td>31700</td>
<td>19800</td>
<td>22500</td>
<td>31900</td>
</tr>
<tr>
<td>Gross GHG emissions (EqCO2.kg carc⁻¹)</td>
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<tr>
<td>Total MJ Non Renew. Energy (MJ.kg carc⁻¹)</td>
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<td>31.4</td>
<td>50.9</td>
<td>47.6</td>
<td>22.7</td>
</tr>
<tr>
<td>Effic. conversion of edible proteins (%)</td>
<td>158</td>
<td>125</td>
<td>33</td>
<td>51</td>
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Synthesis of overall performance

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Discussion

• Fodder self-sufficiency
  → **high seasonality** of reproduc. & fattening

• Harsh environment and resources
  → rustic breed → **low lamb conformation**

- Cross organisation between territories? (regularity)
- Consumers education? ...in relation with labelling, certification and specificities
- Specific markets/consumers (ex: DT lambs for Muslims)
Conclusion

Very high use of fodder resources
// Farm sustainability

Sheep industry standards

Other services and impacts must be studied
Socio-economics, patrimonial aspects, nutritional quality, biodiversity, landscape

→ Use of Conceptual framework
(Dumont et al, Animal 2018)
Thank you for your attention
## 5 contrasting farming systems  2/2

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<tr>
<td>Plain</td>
<td>Oceanic climate</td>
<td>Plain Temperate</td>
<td>Mountain Continental</td>
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<td>Mountain /pastoral Mediterranean</td>
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<tr>
<td>Grass-based Intensive pastures (experimental device)</td>
<td>Grass-based system</td>
<td>Intens. Repro. Syst High ewe product</td>
<td>Grass-based Organic farming</td>
<td>Double transhum. 0 → 2500m alt. Harsh conditions</td>
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<tr>
<td>One lambing period (end winter)</td>
<td>One lambing period ; grass-fattened lambs No N fertilis.</td>
<td>3 lambing period Lambs indoors</td>
<td>2/3 spring lambings (grass- fattened lambs); 1/3 in autumn</td>
<td>Two lambing periods (March - October)</td>
<td>No concentrate</td>
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<td>High meat and N/ha</td>
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### Irel

| **Total Agricultural Area (ha)** | 36.8   |        |       |       |       | 110                |
| **Stocking rate (ewe/ha Fodder Area)** | 11.4   | 6.6    | 8.7   | 4.4   | 0.5    | 5.3                |
| **No ewe (>6 mths)**             | 420    | 541    | 470   | 405   | 2105   | 556                |
| **Work productivity (eq.Livestock Unit.W⁻¹)** | 66.3   | 54.6   | 46.0  | 59.7  | 72.5   | 61.5               |

### Graz

| **Ewe productivity (+6mths) (%)** | 154    | 133    | 166   | 132   | 82     | 126                |
| **Ewe mortality (%)**             | 8.3    | 3.3    | 5.8   | 4.8   | 18.9   | 6.3                |
| **Concentrates (kg.kg carc⁻¹)**   | 1.22   | 1.55   | 5.24  | 3.41  | 0.00   | 7.5                |
| **Fodder self-sufficiency (%)**   | 95     | 94     | 78    | 88    | 100    | 71                 |

### 3x2

| **Total Agricultural Area (ha)** | 81.9   |        |       |       |       |                     |
| **Stocking rate (ewe/ha Fodder Area)** | 6.6    | 8.7    | 4.4   | 0.5   |       |                     |
| **No ewe (>6 mths)**             | 541    | 470    | 405   | 2105  |       |                     |
| **Work productivity (eq.Livestock Unit.W⁻¹)** | 54.6   | 46.0   | 59.7  | 72.5  |       |                     |

### OF

| **Total Agricultural Area (ha)** | 53.9   |        |       |       |       |                     |
| **Stocking rate (ewe/ha Fodder Area)** | 8.7    | 4.4    | 0.5   |       |       |                     |
| **No ewe (>6 mths)**             | 470    | 405    | 2105  |       |       |                     |
| **Work productivity (eq.Livestock Unit.W⁻¹)** | 46.0   | 59.7   | 72.5  |       |       |                     |

### DT

| **Total Agricultural Area (ha)** | 91.9   |        |       |       |       |                     |
| **Stocking rate (ewe/ha Fodder Area)** | 4.4    | 0.5    |       |       |       |                     |
| **No ewe (>6 mths)**             | 405    | 2105   |       |       |       |                     |
| **Work productivity (eq.Livestock Unit.W⁻¹)** | 59.7   | 72.5   |       |       |       |                     |
Stakes representation

Majority of French sheep farming systems

Grass potential

Grass and conformed breeds

Rustic breeds

Fodder self-sufficiency

Sheep industry standards

Grass potential (quality-duration)

Farms economic profitability

Impacts of Climatic hazards

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