SIEOL: implementing a global information system for genetic and techno-economic support in dairy sheep in France

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Sheep dairying in France

Western Pyrenean Manech (red and black faced) and Basco-Béarnais breeds 480,000 ewes
Roquefort area Lacaune breed 870,000 ewes
Corsica island Corse breed 90,000 ewes
Impact of milk recording in dairy sheep in France

- 2,662 flocks in 2007 (55%)
- 945,000 ewes in 2007 (65%)

Official milk recording
AC method

Selection
flocks

Non-official milk recording
D method
+ non-recorded flocks

Production
flocks

Background

- High costs of genetic (especially milk recording) in sheep compared to cattle
- Necessity of a global approach for the services to breeders
- Common organizations, same field technician
  - Milk recording
  - Techno-economic assessment
  - AI
Background

- French Breeding Law (1966, 2005) : frame for
  - Estimation of breeding value
  - Genetic information system

- Field organizations : genetic and techno-economic support for breeders, sanitary data

SIEOL (dairy sheep information system for breeders)

SIEOL information system : conception & development between 2002 and 2005

Data managed by SIEOL

Genetic data : inventory / movements, pedigrees, lambings, matings, milk recording, udder appraisal, EBVs, qualification of the reproducers, molecular data (PrP)

Techno-economic data : description of the farm, the flock and its management, production & reproduction data, payment of the milk, feeding and cost of feeding, assessments

Official milk recording & non-official milk recording

Data from diverse organizations (recording, breed, AI, economic, analysis, evaluation)
Organization of SIEOL

- Same data model whatever the site
- Database updated only through portable national software (collection of functions)
- Exchanges
  - Field technician – regional center: intranet solution
  - Regional center – central database: replication
  - Field organizations – regional center: interfaces
On-farm valorization

Field technician (from milk recording organization)

- Printing
- Extractions
- Requests
- Assessments

Pocket PC on the milking parlor (milk recording, udder appraisal)

Local database (20-30 flocks)

- Increase quality of data
- Allow on-farm in real time valorizations, assessment, computation

Example of valorization: Sorting the ewes by milk or SCC at the test-day (advise for culling or replacement)

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SIEOL information system and genetic evaluation

- Operational database for evaluation and research
  - Pedigree file
  - Performances file
  - EBVs file
  - Scripts and software (extension of lactations, editing …, codification of effects and animals, evaluation, organization of raw data in a properly way)
- 4,15 M sheep since year 1945
- 7,5 M lactations since 1957
- 3 times a year, at each evaluation
- 4 M sheep (pedigree)
- 6,4 M lactations from 1978

Techno-economic

- **Technical** assessments (production, reproduction, inventory)
- **Techno-economic** assessments: margin on feeding cost and gross margin
- **Milk quality** assessments
- Benefits of gathering genetic and techno-economic data in the same database:
  - Facilitating the job of the technician
  - Allowing consistency between all statements produced to the breeder
  - Confronting data to rationalize breeding objectives with an economic background
Techno-economic assessments produced by SIEOL in 2007 in the Roquefort area

<table>
<thead>
<tr>
<th>Total number of breeders</th>
<th>Technical assessments</th>
<th>Techno-economic assessments</th>
<th>Chemical and hygienic assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,860 (all flocks in milk recording)</td>
<td>1,683</td>
<td>329</td>
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Sanitary data

- **Growing concern of sanitary data in sheep** (scrapie, blue tongue …)

  - **Getting causes of culling**
    - Providing advise to the breeder and overlooking sanitary situation of the flock
    - Establishing large-scale observatory of culling causes of sheep

  - Based upon the knowledge of the breeders

  - 3 levels of precision
    - Generic cause: Ex. mastitis
    - Sub-group: Ex. sub-clinical mastitis; clear symptoms
    - Precise cause: Ex. Somatic cell count; S. aureus
Sanitary data

Scrapie resistance : PrP information

Molecular laboratories → SIEOL database

Genotypes + computation of genotype predictions on relatives

Genotypings or predictions are available for the field technician to help the breeder

Conclusion

- Joint management of all collective technical data related to the dairy sheep breeder, gathering genetic and techno-economic data. Unique in France.

- SIEOL information system has been running for 3 years.

- Over its lifetime, SIEOL must evolve (new raw data, new selection criteria, new needs, new technologies).

- Organizing the link with other systems, such as the future tracing system (to be implemented in 2008).