With the high genetic potential of more than 4.7 million sheep, France is one of the European leaders in sheepmeat production. It is the third biggest producer in the European Union with an annual production of sheepmeat of around 123,000 tonnes.

The French livestock is characterised by the diversity of the races which compose it. More than 10 meat breeds (Ile de France, Charollais, Berrichon du Cher, Rouge de l’Ouest, Vendéen, Texel, Suffolk, to name but a few) and prolific breeds (Romane ex-INRA 401), have value added characteristics as pure bred or terminal cross animals.

Additionally there are more than a dozen rustic breeds (Caussenarde du Lot, Blanche du Massif Central, Préalpes du Sud, Lacaune viande, etc.) making it possible to choose a breed to make the best of even the most difficult environments.

Genetic improvement of all these breeds rests on constantly improving selection programmes. These have provided a very high genetic quality reproductive stock which satisfies the requirements of all those involved in the sector.

Always mindful of the need for preserving biodiversity, even the rarest breeds are not forgotten. They are the subject of specific selection or conservation programmes.

The potential of French livestock is remarkable, with its exceptional variety of breeds and, in particular, the internationally recognised meat breeds and over 30 years of genetic selection and improvement.

The French livestock breeders and breeders organisations offer high quality genetic provision of breeding stock and sperm that will meet the requirements in a wide variety of contexts and objectives.
Extensive experience and know how in the organisation of mechanisms and information systems for genetic improvement.

The national mechanism for genetic improvement is piloted by the interprofessional organisation France Génétique Elevage (FGE) and the French Ministry of Agriculture.

The Livestock Institute is responsible for technical co-ordination, and the methods, protocols and tools used, the information system and also quality control of operations in the field. The mechanism’s national database is managed by INRA (National Institute for Agricultural Research) which provides the genetic evaluation calculations in collaboration with the Livestock Institute.

This mechanism organises the zootechnical data gathering and management systems, and then also has a system for evaluating and selecting male brood stock. Started in the 60s and continually modernised since then, it combines:
- unique, permanent and comprehensive identification of the animals;
- pedigree certification;
- precise quality control of performance adapted to suit the breeders’ working conditions;
- quality control stations and breeding centres for selecting and qualifying the best rams;
- genotyping (quality control of pedigrees and selection for resistance to scrapie);
- inspection of the progeny for final evaluation of the insemination rams.

This mechanism, which deals with both meat breeds and rustic breeds, is built on the development of a National Genetic Information System.

Continuous integration of technical advances ensures the reliability and effectiveness of registration and information availability, both for the participating organisations and the breeders.

Using the OVALL performance control software, any registered breeder can directly access all their results, from the crucial performance indicators tables to manage their flock (inventory, reproduction, growth, breeding, index) and to make comparisons with other participating breeders.
Similarly, this organisation’s know-how in the fields of organising a mechanism for genetic improvement and their information system is at the disposal of overseas partners, to respond to the requirements of modern breeding and contribute to the development of its productivity.

**Rigorous quality control of performances and eradication of sensitivity to scrapie in the selected rams**

Similar to the current national mechanism for beef and dairy cattle, performance control of sheep breeds is particularly demanding and methodical.

The selection programme for each breed is co-ordinated by a Selection Body (SB) specifically in charge of keeping the stud book up to date and defining the selection objectives.

Nearly 310,000 ewes in 1,300 herds are enrolled in the official performance control programme. Protocols and methods are developed by the Livestock Institute and validated by France Génétique Elevage. The registrations are done by accredited inspectors.

The inspections provide data on reproduction (lineage, breeding declaration, prolificacy), the milk value (weight at 30 days) and growth (weight at 70 days). Lineage inspections by genotyping, done by sampling, strengthen the reliability of the mechanism.

This national mechanism provides a guarantee of a methodical and rigorous collection, based on a reliable data supply for genetic evaluations.

Since 2002 combating scrapie has been a particular concern. The particular attention paid to genotyping of rams and then the dams has meant that a specific selection strategy could be developed, with convincing results.

In 2008, there were no active rams in the database that had the VRQ allele for hypersensitivity to scrapie and more than 90% were resistant to scrapie. (ARR/ARR).
An exacting system of selection and evaluation for male brood stock, for both meat breeds and rustic breeds

Supplementing the quality control of performances at the farms, 3,500 of the best rams in the selection database of the 15 principal sheep breeds are entered at the control station or the breeding centre. They are the result of carefully chosen and genotyped matings, between males already giving favourable test results for lineage and the 20% best dams in the selection database (Dams to rams).

In the individual control station, more than 2,500 young rams are rigorously tested (rapid growth, weight-age type, conformation, fat level). These checks are completed with live ultrasound measurement of the muscle development and fat level.

After 20% of the least good beasts are eliminated in the individual control station, the young rams qualify as “recommended” and released for natural servicing.

Additionally, each year, the 200 best rams (10 to 50 per breed) from these individual control stations are tested and checked for lineage. The objective is to have a more precise definition of their genetics in terms of improvement of the meat qualities and/or maternal qualities.

Lineage testing for meat suitability includes checking performance on the livestock farm and then in the fattening sheds for an average of thirty lambs from each male tested.

The evaluation criteria after slaughter are the weight, width and length of the carcass, the yield rate, as well as the conformation, the extent of external fat, the amount of internal fat, the colour and the behaviour of the fat.

Finally, for all the meat breeds, only the 100 best scrapie resistant rams, tested for lineage will qualify as Améliorateurs Boucherie (AMBO) (meat-production improver) and accredited for use as animal inseminators.
Selection companies also test their rams’ lineage to evaluate the maternal suitability (prolificacy, milk value) of their ewe lambs. These programmes test 100-120 rams per year.

The best rams qualify as “Livestock Improvers” (AMEL) or “Meat and Livestock improvers (ELITE).

**Very high selection criteria to ensure top quality genetics**

If the French specialist meat breeds, a quarter of the total stock, the Average Daily Gain between 30 and 70 days varies between 287 and 378 g depending on the breed, the sex and the farming method.

The Weight at age type (WAT) at 30 days for lambs of specialist meat breeds were between 11.3 and 14.1 kg depending on the sex and farming method. The WAT at 70 days varied between 23.2 and 28 kg.

Over the last 10 years these weights at 70 days have increased from 1.1 to 1.5 kg depending on the category.

Source: Résultats Contrôle de Performances 2009, Institut de l’Elevage
A well performing National Information System to control and increase the value of all the data from the national genetic improvement mechanism

All the data from the various links in the national chain for genetic improvement (pedigrees, performance inspection at the farms and at the station, lineage checks) is managed by the National Genetic Information System.

All the information available and checked throughout the length of the chain is sent to the National Centre for Processing Genetic information INRA (National Institute for Agricultural Research).

This national centre manages the national stud book for each breed (results of performance control, genetic values, Qualifications) and performs the official genetic evaluation calculations.

The various indices are calculated using the multicharacter Best linear unbiased predictor (BLUP) Animal Model.

This method combines the most modern statistical methods, taking into account both the data specific to each animal, the correction for environmental effects, and also the blood line relationships existing between the animals.

These genetic evaluations are published at least twice a year.

The totality of the indices provided will allow each breeder, in France or anywhere else in the world, to make their genetic choices in the full understanding of their motives, based on their production objectives and how they manage their breeding system (intensive or extensive).