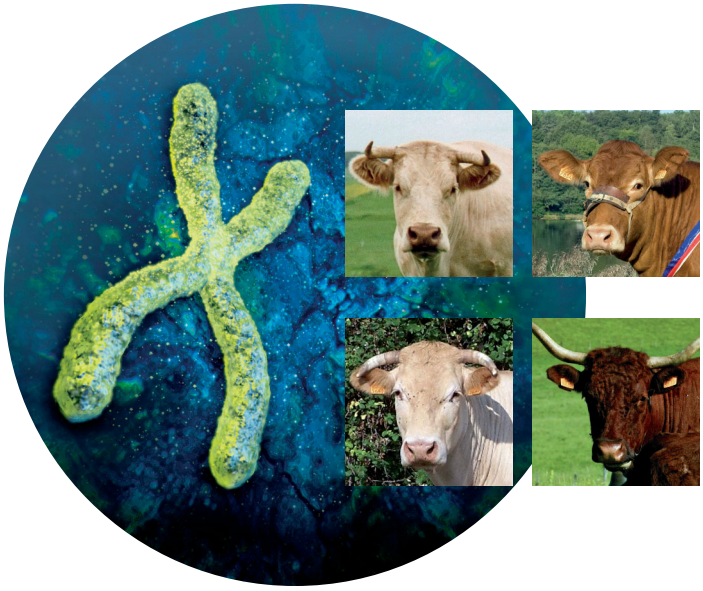
France Génétique Elevage



FRANCE, THE COUNTRY OF BEEF BREEDS

THE KEY FIGURE:

937 900

French beef-breed cows under official performance data recording

High-performance breeds
recognized among world leaders

With 11.3 million heads, including 4.2 million cows, France has the largest national beef herd in the European Union. **France is the cradle of specialized beef breeds of worldwide renown,** such as the Charolaise (1.7 millions cows), the Limousine (1 million), the Blonde d'Aquitaine (526,000), the Maine-Anjou, the Parthenaise, and many others. Beyond outstanding purebreds qualities, they are equally remarkable in cross-breeding to improve beefing abilities of offspring from poor conformation cows.

This offer is rounded off by breeds with impressive hardiness and maternal qualities, such as Salers, Aubrac, Gasconne, that reveal their potential particularly well under tough farm conditions.

Over the last 40 years, all of these breeds have benefitted from highly effective selection programmes. The French national genetic improvement system is coordinated by France Génétique Elevage, which federates all the actors of the French genetic selection programs.

1

Rigorous and comprehensive genetic selection programs

The genetic selection programs combine selection of pedigree and planned mating with on-farm, on-station and post-weaning zootechnical data recording and progeny testing.

Rigorous process control ensures that technical protocols are identical for every breed and at every stage in the selection process. These protocols are defined by the Institut de l'Elevage - the French national livestock institute tasked with heading coordination and technical assistance on the selection programmes for France Génétique Elevage.

2

Selecting for beefing abilities and maternal qualities

The selection objectives for each breed integrate calving ease and two set of core traits :
› **beefing abilities** (muscular development, growth, skeletal development, carcass yield, feed conversion efficiency)
› **maternal qualities** (fertility, longevity, reproductive efficiency, calving capacities and milking abilities)

Following each control phase (on-farm, on-station, on-progeny), **an genetic value index is calculated for each trait.** A global index is then calculated for the two set of core traits.

Each livestock farmer can thus choose his breeding stock according to objective criteria and the combination of qualities that is most appropriate for their targets and farm system, in France or anywhere else in the world.

TRACEABILITY AND EXPLOITATION OF SLAUGHTERHOUSE RESULTS

Back in 1978, France was a pioneer as the first country in the world to introduce compulsory individual identification of cattle all over its territory and then full traceability. Each cow's identification number acts as the recording basis for all that animal's data (zootechnical, genealogical, genetic, slaughter results, etc.) throughout its lifetime.

This specific feature proves yet another asset for integrating all the data needed to fine-tune the genetic indexes. In particular, it makes it possible to annually re-update the genetic value indexes of each bull according to the slaughterhouse results (carcass weight and conformation) of its progeny.

3

French selection programs: an unrivalled dimension

French breeds benefit from selection programs of which scale is unrivalled worldwide:

› **on-farm data performance recording:** fertility, ease of calving, calf birth weight and birthing conditions, 120-day weight and 210-day weight, morphology evaluation (muscular and skeletal development) by scoring at weaning.

In 2010, performance data was officially recorded for over 930,000 cows (i.e. 22% of the national herd stock), making France world leader on this topic.

The results of these controls allow the on-farm genetic values assessment (IBOVAL genetic indexes). Qualification system shortlists the best animals in each breed, which can then be classified for subsequent career paths.

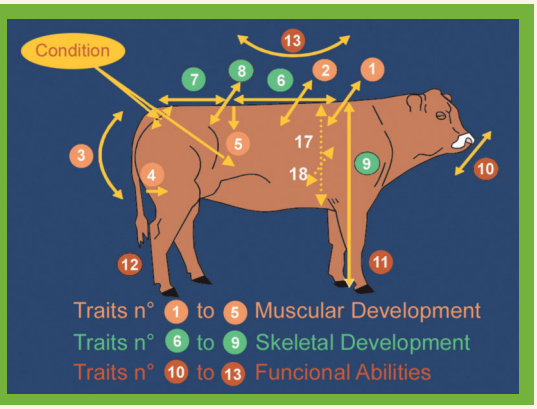
› **individual on-station testing after weaning** of the best young bulls (around 2200 per year): weighing, pelvic area measurements, feed conversion efficiency, morphological scoring,...

› **progeny testing** of the best young bulls (Charolais, Limousin and Blonde d'Aquitaine breeds) shortlisted through individual on-station testing.

A RIGOROUS MORPHOLOGY EVALUATION

The scoring method consists in a detailed evaluation of 19 morphology traits, all scored on a 1-to-10 scale. These morphology traits are then pooled to give muscular development, skeletal development and functional abilities (body set, muzzle width,...) overall values.

This scoring method allows a rigorous and objective evaluation of clearly defined morphology indicators. It's conducted by independent breed organization technicians, trained up by the Institut de l'Elevage and accredited for a given breed by France Génétique Elevage.



Every year, **around 60 bulls are assessed in terms of beefing abilities** (finishing performances and slaughter results of their sons).

Similarly, **around 45 bulls are assessed in terms of both beefing and maternal abilities** (growth, morphology, calving conditions and milking ability of their daughters in order to assess their maternal qualities).

› This genetic value evaluation of the bulls' beefing abilities is then extended throughout their career integrating the slaughter results of their progeny (around 1 million young bulls per year).

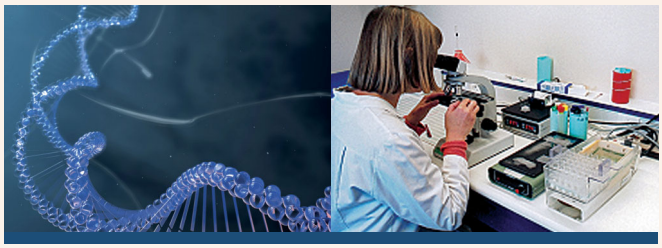
4
A reliable and independent genetic evaluation

As a data integrity measure, all genetic and zootechnical animal data is recorded under the same and unique **National Genetics Information System.** The French national genetics database almost certainly ranks as the biggest in the world: it pools genetic information on over 150 million cattle, including for example close-on 25 million weighings and 5.5 million morphology evaluation results.

› **Genetic value indexes** (IBOVAL, at station exit and after progeny testing) are calculated using the most up-to-date statistical methods (BLUP animal model) taking account of local-environment conditions and all parentage relationships.

Under the responsibility of the State, these genetic evaluations are carried out by the National Institute for Agronomic Research (INRA).

5
Breakthroughs in genomics set to open new perspectives



› France was one of the first countries in the world to gain official international validation from Interbull on its dairy cattle breed genomics evaluation method.

French beef cattle breed selection programs are on the verge of sealing these same benefits as the method is adapted to accommodate the breed reference population sizes and the number of animals under animal performance data recording system.

Scientific research programs currently underway will also make it possible **to extend the genomics-based evaluations to encompass meat quality criteria** that conventional selection programmes are incapable of integrating, such as tenderness, marbling, flavour, and more.

This cutting-edge technological and scientific research can be expected to set the scene for even **greater genetic advances, an even broader breeding stock offer, and the integration of new performance criteria.**

As is the case with dairy cattle, the next generation of breed sires will not be marketed until these genomics-enhanced evaluations gain proven reliability, international acceptance and recognition. These are the basic condition to achieve our quality expectation.

6
Convincing and recognised results

› All animal performance recording (on-farm and on-station; individual and progeny testing) and all processes that dictate the quality of the results are subjected to a full battery of independent audits and a Quality Management System.

The stringency of this quality policy has gained international recognition, enabling France Génétique Elevage **to obtain the ICAR (International Committee for Animal Recording) Quality Certificate.**

› French genetic improvement programs offer a range of beef cattle breeds selectively bred to the highest standards and spanning a broad panel of zootechnical abilities to cover the full range of livestock farmer objectives, farm system conditions and industries expectations worldwide.

Ten-year techno-economic follow-up on beef cattle farms demonstrate that using bulls and semen from French genetic selection programs brings a 15%-plus increase in profit.

› Many foreign livestock farmers with a very wide range of different breeding conditions rely upon the French genetic products. **In 2010, over 2.5 million doses of semen, several thousand embryos and around 50 000 bovines breeding stock were sold worldwide.**

Backed by impeccable animal health guarantees, French genetics is thus contributing to improve cattle production in over 90 countries around the globe.

For further information, feel free to contact France Génétique Elevage.

France Génétique Elevage

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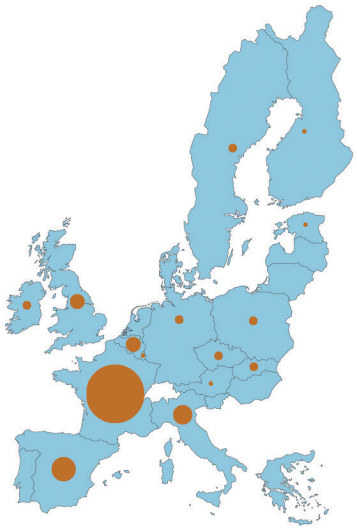
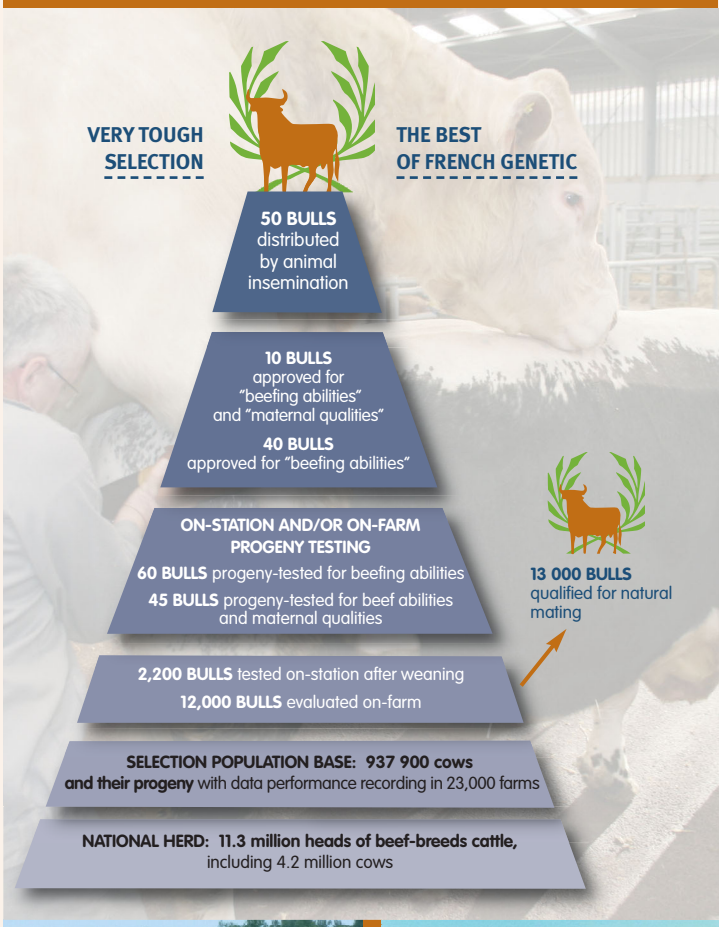


ON-FARM PERFORMANCE DATA RECORDING IN EUROPE

With 937,000 cows in data performance recording and 12,000 bulls in on-farm performance evaluation, the French national herd can claim to be the biggest European genetic pool for farming of beef cattle.

Crossbred Blonde d'Aquitaine x Zebu (Brazil)

Limousine calf in the tropics (Limousine)



Charolaise in Eastern Europe (Russia)

Crossbred Charolais x Salers