The Montbeliarde breed

I. Origins and history

The Montbeliarde breed belongs to the Jurassic branch (descended from Bos Frontosus) which the group of Pie Rouge breeds stems from. It therefore belongs to the Simmental and Fleckvieh families, and as such is a member of the World Simmental-Fleckvieh Federation (WSFF) and the European Simmental Federation, which it chaired from 1993 to 1997.

Its History dates back to the beginning of the 18th Century when farmers from the Bernese Oberland in Switzerland came to set up home in the principality of Montbéliard, bringing their livestock with them. Thanks to a methodical selection process, this livestock soon became renowned and started entering shows from 1872 onwards under the name "Montbeliarde Breed".

In 1889, it was officially recognised and registered on the national register of French breeds by the French Minister of Agriculture.

The Montbeliarde Breed Herd Book was created the same year and its statutes were approved by the Préfet of the Département du Doubs on 2nd December 1889.

The official milk-recording programme for the breed started in 1923 and recording results form one of the main criteria for selection within the breed today. An additional aspect of this History is the cheese-making tradition in the area it originates from and the ancestral high standards of the cheese makers, who insisted on using high-quality milk, free from mastitis problems.

PROPORTION REPRESENTED BY THE MONTBELIARDE BREED IN FRENCH DAIRY LIVESTOCK

Artificial insemination has been continually on the increase since its beginnings in 1949 and represents a decisive factor in the livestock's evolution.

On 28th January 1997, the National Unit for the Promotion and Selection of the Montbeliarde Breed, l'Unité Nationale de Promotion et de Sélection de la Race Montbéliarde (UPRa Montbéliarde) took over from the Herd Book. Since this date, the UPRa Montbéliarde is the national organisation in France responsible for the breed's selection policy and objectives.

Since the end of 2007, to enforce the new french legislation, The Montbéliarde breed association has changed and her name is now *"Organisme de selection de la race Montbéliarde"* as O.S. Montbéliarde.


16,42%
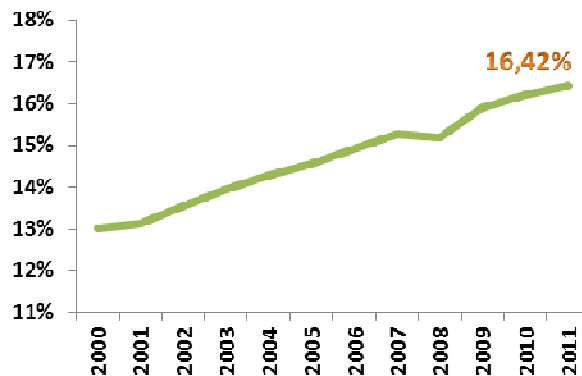
of the mountain regions in France where its proportion is still increasing. It is even the main breed in some cases: 56% of the cow population in the Rhône-Alpes region and 44% in Auvergne.

It has also greatly increased its presence in Western France, the south west of France, the north east and the centre.

She is now the second dairy breed in France with 16.4% of dairy cows.

II. Geographical presence and numbers

In the zone where the Montbeliarde breed first originated, composed of the limestone plateaux

EVOLUTION OF THE MONTBELIARDE POPULATION IN FRANCE FROM 1960 TO 2007
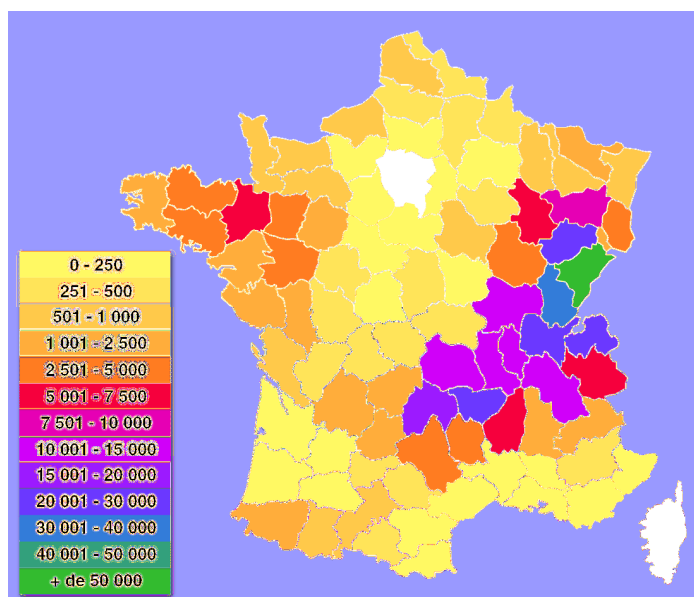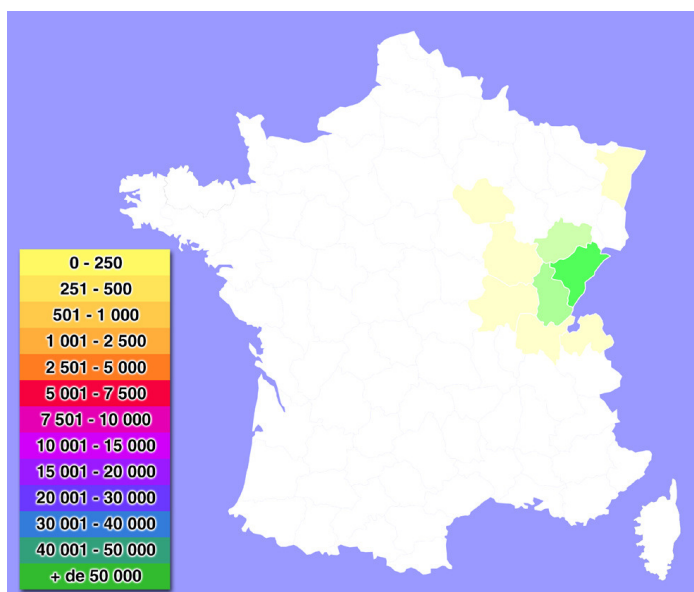
III. Uses

The entire population of Montbeliarde cows is used for dairy production.

1. Productivity and cheese value of the milk:

Productivity is as follows:

	all lactations	Equivalent in adult lactations
Number of results	382 965	348 498
Duration of lactation - days	305	324
Milk - kg	**6 671**	**7 874**
Solids - kg	488	578
Solids Content - g/kg	73,2	73,4
Protein - kg	229	272
Protein Content - g/kg	**34,3**	**34,5**
Fat - kg	259	306
Butterfat Content - g/kg	**38,9**	**38,9**

The cheese value of the milk depends on two aspects: better total protein content and a higher frequency of certain variants of casein that have a favourable effect on the quantity of cheese produced and the speed at which it coagulates. The essential element here is the B variant of Kappa Casein. A study in 1988 by Claude Gros, from INRA, the French national institute for agronomical research, reveals a frequency of 37% of the B variant in the population.
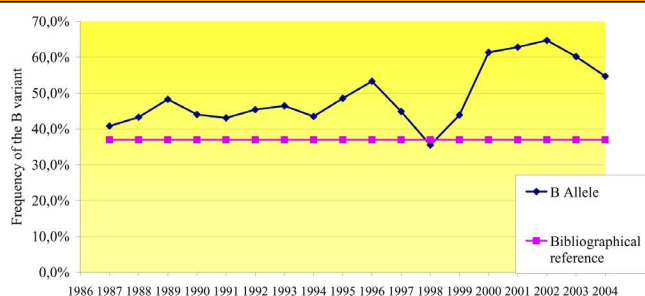
The selection plan offers all dairy farmers the possibility to choose their sires according to this criterion. The bulls are all genotyped before being proposed to the farmers and the B allele diffusion is very significant. It is systematically in excess of 37% and therefore highly appreciated by the cheese industry.

2. Beef performance:

Although the Montbeliarde breed is mainly selected on the basis of its dairy performance and the high protein content of its milk, its cull cows and young bulls sustain an excellent beef market value due to:

- Their size and their rapid growth: The liveweight of adult cows and of young bulls varies from 650 to 750 Kg depending on the age of slaughter. Average growth in young bulls is 1200 to 1300 g per day, depending on their diet.

- The quality of their carcasses: The dressing rate is 52/54% for the cows and 56/58% for the young bulls, with no excess fat on the carcasses; class R in the EU SEUROP classification grid.

Cull cows are also fattened at the end of their milking career and provide good-quality meat.

Bull-calves that are not used for reproduction are fattened for the beef market, either as veal calves or as young bulls at 20 - 22 months. They are in great demand and consequently their price is higher.

Carcass weight is much higher in the Montbeliarde breed than in Holsteins of the same age and the carcasses have less external fat.

The hindquarters weigh more, therefore the proportion of noble muscles is higher. The bone structure is finer and there is less waste, so the proportion of saleable meat is considerably higher in the Montbeliarde breed than in Holsteins.

SLAUGHTER RESULTS 2005 - 2006 (APPROXIMATELY 10 000 CALVES FOR EACH BREED)

SOURCE MAMELLOR - www.mamellor.com

		Montbéliarde	Prim'Holstein	Difference
Entry weight (kg)		54	49	
% Females		7	1	
Fattening period		141	154	- 13 days
Carcass weight		133.7	128.5	+ 5.2 kg
Feed conversion ratio (kg dry matter intake per 1 kg ADG)		**1,720**	**1,859**	**- 139**
ADG		1168	1051	+117 g/days
Carcass classification	% R	75	0	
	% O	24	95	
	% P	1	5	

COMPARISON BETWEEN CARCASS COMPOSITION IN YOUNG MONTBELIARDE AND HOLSTEIN BULLS

	MONTBELIARDE	HOLSTEIN
Carcass Weight	**352 kg**	**320 kg**
Cutting-room fat	**1,6%**	**2,2%**
Hindquarter	**52%**	**50%**
Forequarter	**48%**	**50%**
Bone	**18,2%**	**20,3%**
Fat trim and waste	**8,3%**	**10,6%**
Saleable Meat	**73,5%**	**69,1%**

Ref. INRA research station of Villers Bocage

EVOLUTION OF THE DIFFUSION OF THE B VARIANT OF KAPPA-CASEIN (IN BLUE) BY THE MALE VECTOR IN THE MONTBELIARDE POPULATION

3. Hardiness and adaptability:

The specific conditions of animal husbandry in the zone the Montbeliarde breed originates from, characterised by its altitude (varying from 400 metres to 1000 metres) and by a continental climate with rapid temperature changes and extreme conditions (+35°C in summer to – 20°C in winter) have endowed the Montbeliarde breed with unshakeable hardiness.

Its adaptability has been confirmed by results recorded during Thermo-tolerance tests carried out on cattle by the INRA in 1975, measuring rectal temperature (RT) in °C, respiratory rhythm (RR) in minutes and sweat tests (ST) in seconds. Tolerance was tested at the beginning of stress, in the middle and at the end.

	MONTBELIARDE	HOLSTEIN
Beginning of stress		
TR	39,07	38,93
RR	49	49,5
TS	556	629
Middle of stress		
TR	38,96	39,01
RR	84	92
TS	377	434
End of stress		
TR	39,15	39,26
RR	115	119,8
TS	314	365

It can be seen that the rectal temperature varies very little in the Montbeliarde breed during periods of stress and the respiratory rhythm and sweating are less prone to change in Montbeliardes than in Holsteins. This makes it easier for the breed to adapt to hot climates.

These scientific results are confirmed by "field" results obtained by Montbeliardes in hot climates (North Africa, West Africa, Central and South America), which demonstrate the Montbeliarde's superiority in difficult climatic conditions (drought, humidity) either as purebreds or when crossbred with local breeds.

4. Animal husbandry systems:

More than half of all Montbeliarde cows are employed in mountain zones where the basic diet consists of grass pastures in the summer and rich hay in the winter so the breed is perfectly suited to ingesting and transforming great quantities of roughage produced on the farm.

Elsewhere they are present in intensive systems using maize silage and in this case their protein potential and their beef performance is fully expressed.

IV. Selection objectives

The partners involved in the process of selection of the breed are all associate members of the O.S. Montbéliarde group, and have defined their objectives in order of priority as follows:
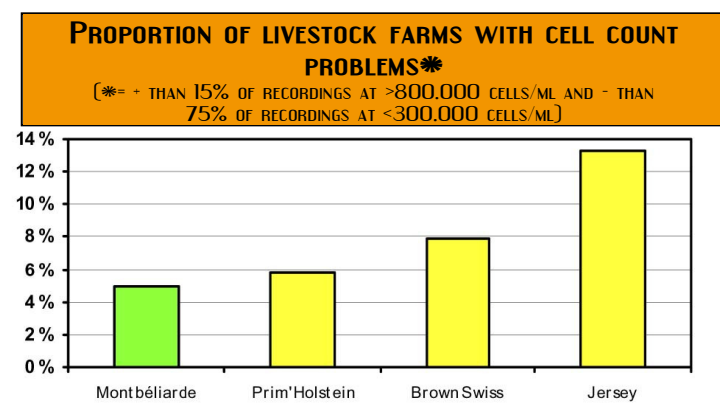
Dairy selection remains the No. 1 priority…

To obtain a specialised animal for dairy production, in other words, an animal that is feed-efficient, capable of producing great quantities of transformable milk solids (fat and especially protein) on a diet of roughage. The main objective (50% of our selection efforts) remains genetic progress in the domain of protein concentration and an optimum milk yield.

The Montbeliarde breed represents the best fat/protein ratio of the three major French dairy breeds: this is undoubtedly an asset that the breed must preserve. The cheese-making industry needs 840g of protein per kg of milk fat.

… while keeping the advantage of resistance to mastitis

The quality of the milk cannot be dissociated from resistance to these infections. The breed is already well placed in this criterion (c.f. diagram opposite) and selection efforts in this area remain high up on the list of priorities. It forms 12.5% of the overall objective.

PROPORTION OF LIVESTOCK FARMS WITH CELL COUNT PROBLEMS ✹
(✹= + THAN 15% OF RECORDINGS AT >800.000 CELLS/ML AND – THAN 75% OF RECORDINGS AT <300.000 CELLS/ML)

… of fertility

Fertility is at the root of an animal's productivity and cost-efficiency. In this instance also, the qualities of the breed must be maintained or even improved. The average AI success rate is 55%.

… of longevity

Longevity is the last visible quality in a breed. It is nevertheless a key factor of satisfaction to the breeder and makes the rearing phase cost-efficient. 32.8% of Montbeliarde cows reach their 4th lactation or more, compared to 22% for the other major dairy breed. The breed's population has over 3.8 times more cows in their 8th lactation and higher. Every year, at least 40 Montbeliardes reach the end of their career having produced over 100 000 kg of milk.

… without eroding the breed's beef yield or its breeding qualities

In improving the breed, care is taken to maintain the beefing qualities of the breed, especially the absence of external fat on the carcasses – one of the assets of the Montbeliarde.

This beef quality also means that Montbeliarde cows are strong and hardy – useful qualities for weathering the milk production peak and for adapting to difficult farming conditions.

Lastly, their functional morphology and their machine milking ability – essential in proper dairy husbandry – are very closely monitored and are also being improved.
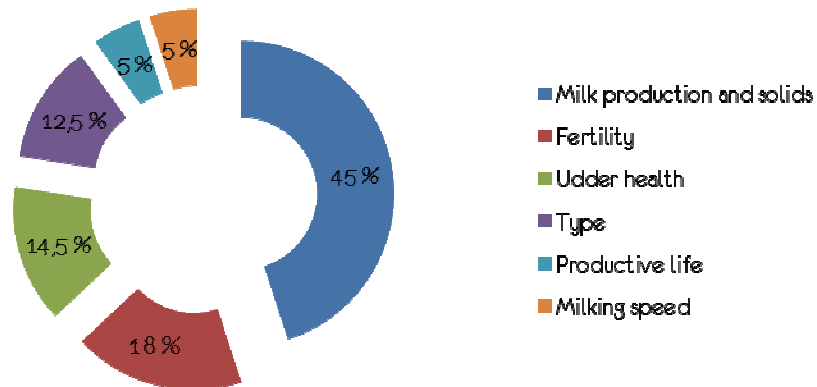
Every year over 60 000 cows are measured and described in order to guarantee the required results:

Tall breed, red and white in colour; the white extends to the lower part of the body and the extremities (head, limbs and tail); the red is distinct and bright, predominant on the upper part of the body. White head: red markings around the eyes or cheeks are tolerated. Hooves and mucosae tend to be light-coloured. Slender head; large at eye level, straight profile, large muzzle, neat neck with small dewlap, well-attached shoulders, large deep chest, straight topline with imperceptible backbone; tailhead not very prominent; long, wide, slightly sloping rump; deep flanks; long muscular thighs; straight limbs; wide, flat, lean hocks; pasterns at a slight angle. Very long fore udder attachment; high, wide rear udder attachment with a strong median suspensory ligament and a horizontal udder floor, situated well above the hocks; regular, cylindrical-shaped, medium-sized teats, centrally placed on the quarters, pointing slightly inward. The average weight of a female adult is in the region of 650 to 800 kg; bulls weigh approximately 1000 to 1200 kg. Measurements expected in adult cows (5 years old and upwards) are as follows (French criteria):

- ❧ Height at sacrum: 145 to 150 cm
- ❧ Rump length: 55 to 58 cm
- ❧ Chest depth: 75 to 78 cm
- ❧ Width at hips: 55 to 58 cm
- ❧ Body depth: 80 to 85 cm
- ❧ Width at thurls: 54 to 57 cm

THE OVERALL OBJECTIVE OF SELECTION IS REPRESENTED HERE:

New ISU

- ■ Milk production and solids
- ■ Fertility
- ■ Udder health
- ■ Type
- ■ Productive life
- ■ Milking speed

45 % — 18 % — 14,5 % — 12,5 % — 5 % — 5 %

CONCLUSION :

The Montbeliarde breed is renowned for its high level of performance. It also offers many qualities that have enabled it to make a name for itself amongst the dairy population worldwide. It represents an alternative to ultra-specialised dairy livestock and it meets the requirements of all cattle breeders because of its strength and its adaptability.

Farmers from every continent have adopted it, and they find that working with these animals is extremely rewarding. It is currently finding its niche in the big dairy herds in the United States.