

SZENT ISTVÁN UNIVERSITY  
FACULTY OF VETERINARY SCIENCE  
Institute for Animal breeding, Nutrition and Laboratory Animal Science  
Department for Veterinary Genetics and Animal Breeding

**Genetic endangerment and sustainability of French Draft Horses.**

Sarah Florence

Supervisor: Prof. László Zöldág

Budapest  
2014

## **Table of content**

Summary

Introduction

**I.** Material and methods

**II.** Results

**A.** The french draft horses: presentation of the 9 national breeds

- A.1.** Ardennais
- A.2.** Auxois
- A.3.** Boulonnais
- A.4.** Breton
- A.5.** Cob Normand
- A.6.** Mulassier Poitevin
- A.7.** Percheron
- A.8.** Trait Comtois
- A.9.** Trait du Nord

**B.** How History shaped the draft horse

- B.1.** Before modern breeding
- B.2.** Changes brought about by the agricultural and industrial revolutions
- B.3.** The golden age of the draft horse
- B.4.** Reconversion into meat producing animals
- B.5.** Upgraded status of the draft horse
- B.6.** Draft horse in the city: the example of Lampertheim

**C.** Today's state of draft horse breeding in France

- C.1.** Genetic diseases found to affect draft horses breeds
- C.2.** Populations status
- C.3.** General selection criteria of draft horses
- C.4.** Genetic diversity and contribution to horse gene pool of french draft horses
- C.5.** Real life example: meeting with an Ardennais breeder
- C.6.** Breeding programs for the preservation of draft horses

**III.** Discussion

Conclusion

Acknowledgement

References

## Summary

This work presents the nine breeds of draft horses that find their origin in France. Most of them have evolved from indigenous horses found in the different regions of France and are often well adapted to the particular climate and geography of the given regions. Just like in all developed countries, horses are not used as much as they once were before the apparition of cars and tractors. Therefore the horse population is greatly reduced when compared to times before the industrial revolution. This is especially true for the draft horse.

We look into the evolution of breeds throughout History and how the draft horse adapted to the needs of the people. The evolution of draft horses closely follows the evolution of man made technologies. This explains why there aren't as many draft horses nowadays as in the past.

However draft horses are a sympathetic image for the public, who is reluctant to see them disappear completely. There still are passionate breeders and associations that wish to preserve those breeds the best they can.

It has to be noted though, that preservation of all these breeds is very costly since no breeder can live solely from the breeding of horses, therefore it is worth wondering if it is wise to make such high preservation efforts on all of the nine breeds or if we should rather focus on some breeds and let others fade out. There are indeed some breeds that are genetically very close to each other, and on the contrary some breeds that have a quite unique genetic background.

## Introduction

Draft horses do not belong to the past. Although it is true that a century ago draft horses were much more common in people's every day's life, the traditional breeds still subsist by various ways and should be preserved for a matter of cultural heritage. The draft horses populations all over Europe have decreased dramatically since the generalization of motor engine both for farm work and for people's transportation. Even though these kind of horses are not as needed nowadays, these breeds should not be left threatened by extinction. They are indeed a richness and a living testimony of the European past.

In this study we are going to focus most particularly on the traditional french draft breeds recognized by the breed association "France Trait". There are nine french draft horse breeds that originate from different regions in France and that were crafted for a range of specific works. We are going to examine to which extent they may be threatened of endangerment. We are going to try to find out what are the main lines of conduct that breeders have in mind while selecting today's breeding horses. What are the main goals of today's breeding? How to preserve the genetic capital of these breeds?

First of all we are going to present the nine french draft horses breeds in more details, specifically regarding their region of origin, their morphology and their particularities. After that we are going to review the past and present usages of draft horses in Frances, thinking about their obvious use as drafting but also use for riding and last but not least their use for meat production which is a very important point in those breeds. Finally we are going to investigate today's status of the breeding of those horses as well as the plans for the future.

## I. Material and methods

This study aims at portraying the current situation of draft horses breeding in France as well as to ask the question of their sustainability.

Many resources were used to complete this work, most of them in the french language.

Books:

- Attelages et attelées. Un siècle d'utilisation du cheval de trait. Marcel Mavré. Editions France Agricole.
- Le Breton. Gérard Alle. Editions Castor et Pollux
- Le Trait Poitevin. Allain Bougrain Dubourg. Editions Castor et Pollux.

Scientific articles:

- A mutation in the LAMC2 gene causes the Herlitz junctional epidermolysis bullosa (H-JEB) in two French draft horse breeds.
- Phenotypic description of multiple congenital ocular anomalies in Comtois horses.
- A GYS1 gene mutation is highly associated with polysaccharide storage myopathy in Cob Normand draught horses.
- Genetic diversity of a large set of horse breeds raised in France assessed by microsatellite polymorphism.

Pictures:

Personal pictures were used for illustration that were taken during the interviews (see later), other pictures were used from the site wikimedia commons where one can find free files in the public domain.

Websites:

- Les Haras Nationaux  
<http://www.haras-nationaux.fr/>
- France Trait  
<http://www.france-trait.fr/>

- Union des Eleveurs de Chevaux de Race Ardennaise <http://www.cheval-ardennais.fr/>
- Syndicat d'Eleveage du Cheval de Trait Auxois  
[www.traिताuxois.com](http://www.traिताuxois.com)
- Syndicat Hippique Boulonnais  
[www.le-boulonnais.com](http://www.le-boulonnais.com)
- Syndicat des Eleveurs du Cheval Breton  
[www.cheval-breton.fr](http://www.cheval-breton.fr)
- Syndicat des Eleveurs et Utilisateurs de Chevaux Cob Normand  
[www.cobnormand.com](http://www.cobnormand.com)
- Association Nationale du Cheval de Trait Comtois  
[www.chevalcomtois.com](http://www.chevalcomtois.com)
- Société Hippique Percheronne de France  
[www.percheron-france.org](http://www.percheron-france.org)
- Association des Races Mulassières du Poitou  
[www.racesmulassieresdupoitou.com](http://www.racesmulassieresdupoitou.com)
- Syndicat d'Eleveage du Cheval "Trait du Nord"  
[www.le-cheval-trait-du-nord.fr](http://www.le-cheval-trait-du-nord.fr)

Personal communications:

- Workers at the town of Lampertheim and their horse Quadrille
- Mrs Annick POINSIGNON, Lampertheim mayor's deputy, who initiated and follows the draft horse project.
- Mr. Jean ERWEIN, breeder of Ardennais horses.

## II. Results

### A. The french draft horses: presentation of the 9 national breeds

#### A.1. Ardennais

**a) Origin:** The Ardennais is one of the oldest horse breeds in France (together with the Boulonnais and the Percheron), being known since the Roman era. It's name comes from the region where it has been mostly bred: the Ardennes which is a mountain range located in the north-east of France extending into Belgium and Luxemburg. In the 19th century until World War I, crosses with Belgian draft produced a horse that was more bony and more powerful, with the aim of working the heavy lands of eastern France. Before that, it was used as a saddle horse.

**b) Conformation:** The Ardennais has a rather short body. According to breed standards: the height at wither is 1.62 m for males and 1.60 m for females, the weight at birth is 50 to 80 kg, the adult weight is 700 to 1000 kg. The coat is bay or roan, sometimes chestnut, dark grey or dun. The head is expressive, the profile is squashed shaped or straight, the orbitae are prominent, the ears are small and directed forward, the neck is well carried, often arched in the male, the body expresses mass, density, power, the chest is broad and deep, the back and hip are powerful and well supported, the hips are broad, the hindquarters are long and very muscular, the shoulder is tilted, arms, forearms and legs are very muscular, the articulations are low, broad, well defined, the feet are broad with a healthy horn.

**c) Characteristics and use:** The Ardennais is still used as a draft horse for some works: vineyard work, skidding. It can nowadays be used in a city for diverse works, in a riding school to teach driving, in forests for skidding. It can also be used as a leisure riding horse.





Fig 1: Ardennais. Source: « Ardenner » par Steffen Heinz (Caronna 12:19, 26 August 2007 (UTC)) — Travail personnel. Sous licence Creative Commons Attribution 3.0 via Wikimedia Commons - <http://commons.wikimedia.org/wiki/File:Ardenner.jpg#mediaviewer/Fichier:Ardenner.jpg>

## A.2. Auxois

**a) Origin:** The Auxois is very similar to the Ardennais and actually derives from breeding with Adrennais horses. Local mares were bred to Ardennais stallions and Trait du Nord stallions to yield the actual Auxois. It is bred in the Auxois area, in the center-east of France. The breed is relatively new since it has been recognized as a breed only at the beginning of the 20th century.

In the 19th century, many crosses were realized with different kind of draft horses but there was no will to fix a breed, later, the local breeders were willing to create a local breed and this was the beginning of the Auxois as a breed.

**b) Conformation:** The Auxois is taller than the Ardennais: 1.60 m to 1.70 m at wither. The coat color is bay or roan, sometimes chestnut or red-roan, the head is short, the forehead is broad, the ears are small and mobile, the neck is short, muscled, well



carried. The body is massive with a prominent withers, a broad chest, back and hips broad and short, the hindquarters are long with a very well muscled rump, the tail hangs low. The shoulder is tilted, arms and forearms are well muscled with broad knees and powerful hocks on short cannon bones. The limbs are sturdy with few feathers. The gaits are wide and flexible despite the mass.

**c) Characteristics and use:** Well known for its rusticity and its easy-going character, both strong and flexible, it can nowadays be used for tourism carriage.



Fig 2: Auxois. Source: "A harnessed Auxois horse before a competition at the Salon international de l'agriculture 2013 in Paris, France" Eponimm. Wikimedia Commons.

### A.3. Boulonnais

**a) Origin:** The Boulonnais is another one of the oldest breeds of french draft horses, its origins are supposed to be oriental with an influence of arabian horse. The ancestors of this breed supposedly arrived in the region of Boulogne with the armies of Julius Caesar. But there are other theories regarding the exact origin of this breed, namely with a huge influence of the geographical and climatic conditions. All agree

however that the breed is ancient. From the Middle Age to the 17th century the breed evolved according to crosses with foreign horses brought in the region due to diverse wars. Around the 17th century, an important influence of spanish and arabian horses fixed the grey color. Before the French Revolution, the Boulonnais was not as heavy as today and was very good at combining strength for pulling charges and speed. Therefore it was used to transport the fresh fish delivered on the west coast to Paris.

**b) Conformation:** The Boulonnais can be from 1.50 m to more than 1.70 m. The head is elegant, short, with a broad and flat forehead, the eye is very sharp with a great pride, the nares are well opened, the ears are short and mobile. The neck is often arched, broad and muscular, the mane is double, dense, not very long. The chest is broad, with well rounded ribs, the shoulders are perfectly brought out, the wither is well placed but often buried in the musculature. The back is straight, the limbs are strong, muscled, the articulations are sharp and solid, the hock are opened, the cannon are short, the extremities have little feathers. The coat is grey, from very light to dark dapple, rarely chestnut.

**c) Characteristics and use:** The Boulonnais is very appreciated for carriages because of it's elegance and is often seen in carriage competitions.

There are two types of Boulonnais:

- the so called "mareyeur" (can be translated as "wholesale fish merchant") which is lighter and endurant and that was used for the transport of fish from Boulogne-sur-Mer to Paris.
- the other type being taller and strong, designed during the 19th century for working beetroot fields.

Up to date, there is an ongoing carriage endurance race organized every second year called "la Route du Poisson" in memory of the time when Boulonnais horses transported the fish to Paris.



Fig 3: Boulonnais. "Boulonnais 3" by Roland Darré - Own work. Licensed under Creative Commons Attribution-Share Alike 3.0 via Wikimedia Commons - [http://commons.wikimedia.org/wiki/File:Boulonnais\\_3.jpg#mediaviewer/File:Boulonnais\\_3.jpg](http://commons.wikimedia.org/wiki/File:Boulonnais_3.jpg#mediaviewer/File:Boulonnais_3.jpg)

#### A.4. Breton

**a) Origin:** There is no agreement as to how horses arrived in Bretagne, but the most widely accepted hypothesis is that they are descendant of celtic horses. During the Middle Age, local horses were crossed with oriental ones due to the crusades. At that time comfortable gait is appreciated. From the 16th century, two types start to be seen: the first type is used for carrying charges, the second type, lighter and thinner is used for riding. The Breton was used only very lately for agriculture work since oxen were preferred for a long time.

During the 19th century, horses of the "de Léon" breed (which is extinct nowadays) were crossed with Norfolk trotter from Great Britain, which has had a determining influence on the Breton. Especially for the establishment of one of the two types of the Breton: the so called "Postier". The Postier is a lighter version, by comparison of the other type: the "Trait".

**b) Conformation:** The coat is chestnut, red-roan, rarely bay or roan. The height is around 1.58 m, depending on the type (1.55 m to 1.63 m). The head is square with a



medium volume, a broad forehead, the nose is straight, sometimes squashed-shaped, the nares are opened, the eye is bright. The neck is long, strong but well carried and slightly arched. The back is taut, broad and muscular, the rump is broad and double, the rib is round. The shoulder is long and tilted, the chest is deep, the tights and forearms very muscular, the cannons short and dry.

**c) Characteristics and use:** The Breton, and particularly the Postier type is excellent for carriages, it is widely used for this purpose both in competition and tourism. Unlike other draft horse breeds, the Breton is still used nowadays in agriculture in some precision work in vegetables culture.



Fig 4: Trait Breton. Source: "Chevaux trait breton Creyssac (1)" by Père Igor - Own work. Licensed under Creative Commons Attribution-Share Alike 3.0-2.5-2.0-1.0 via Wikimedia Commons - [http://commons.wikimedia.org/wiki/File:Chevaux\\_trait\\_breton\\_Creyssac\\_\(1\).JPG#mediaviewer/File:Chevaux\\_trait\\_breton\\_Creyssac\\_\(1\).JPG](http://commons.wikimedia.org/wiki/File:Chevaux_trait_breton_Creyssac_(1).JPG#mediaviewer/File:Chevaux_trait_breton_Creyssac_(1).JPG)

## **A.5. Cob Normand**

**a) Origin:** The Cob Normand's origin are rather similar to those of the Breton, being almost in the same region. It is only during the 19th century that the breed gets really defined following the importation of Norfolk horses from Britain. This improves the local horses by giving more blood, a better frame, more energy and more elegance. After the apparition of the automobile, the breed splits into the Cob Normand and a trotter that would eventually become the Selle Francais.

**b) Conformation:** The Cob Normand has a height of 1.58 to 1.71 m and weighs between 550 and 900 kg. The head is refined, the eye is bright, the ears are well placed, the nostrils are opened, the nose is straight, sometimes hooked. The neck is nice, strong, well placed and the mane can be shaved. The back is straight, relatively short, the hip is straight and broad, shoulders are broad, chest is deep, ribs are rounded, the tail is long. The rump is reasonably double and muscular. The limbs are slender, neat, strong, with no heaviness nor defect in stance. The coat is bay or chestnut with all nuances accepted.

**c) Characteristics and use:** The Cob Normand is appreciated and sought after for being a good hobby horse, used for riding as well as carriage driving (as well as carriage driving competitions).





Fig 5: Cob Normand. Source: Larayevire.  
[http://commons.wikimedia.org/wiki/File:Cob\\_Normand\\_Haras\\_St\\_Lo\\_001.jpg](http://commons.wikimedia.org/wiki/File:Cob_Normand_Haras_St_Lo_001.jpg)

#### A.6. Mulassier Poitevin

**a) Origin:** The Mulassier Poitevin is originating from the ancient marshes of Poitou, where remains of horses from the Mesolithic era were found. Those are likely to be the ancestors of nowadays' Mulassier Poitevin. It can also be named Poitevin Mulassier or Trait Poitevin.

During the 17th century, the breed was crossed with Fleming horses that were imported to be used for works of drying up of the marshes. At the end of the 18th century, breeders were encouraged to cross their mares with english and norman horses with the goal of producing lighter horses for light cavalry. In the middle of the 19th century, Breton blood was introduced. The official stud book of the breed was opened in 1884.

**b) Conformation:** The head is very strong, rather long, the nose is slightly hooked, the lower jaws are spread, the zygomatic arches are prominent. Ears are thick and

long, the neck is long and loaded with abundant and long hair, the wither is well visible. The chest is broad and deep, the back is often long and broad. The hips are wide, the rump is broad, the ribs are long. The shoulder is long and tilted, the limbs are powerful, the articulations as well as the hooves are broad. Hairs are thick and abundant, sometimes curly at the knees and hocks. The coat is often dun, but can also be chesnut, bay, grey or black, often with a back line. The shapes of this horse are more elongated than broad.

**c) Characteristics and use:** This breed has an interesting particularity: it is mainly used for the production of mules by crossing with donkeys (essentially of Baudet du Poitou breed: those are tall donkeys). Mules originating from this cross are extremely powerful in drafting. The mulassier poitevin is also a horse that is well adapted to damp areas.



Fig 6: Mulassier Poitevin Source:

[http://commons.wikimedia.org/wiki/File:Poitevin-mulassier02\\_SDA2012.JPG?uselang=fr](http://commons.wikimedia.org/wiki/File:Poitevin-mulassier02_SDA2012.JPG?uselang=fr)



## A.7. Percheron

**a) Origin:** The breed's name derives from its region of origin: the Perche in Normandy. It is the most well known breed of French draft horses and has been exported in the United States. There are many theories around the exact origin of the Percheron, one of these, which is favored by the breed association is that it is an Arabian horse that evolved over many centuries and adapted to the environment and to the use as draft horse.

Spanish blood was introduced by decision of the count of the Perche during the XI<sup>th</sup> century.

**b) Conformation:** The average height is 1.68m (between 1.60m and 1.85m). It weighs between 500 and 1200 kg. The coat is grey or black, the gaits are light. The head is thin and straight, the forehead is broad and square. The ears are thin and long, the eye is lively. The nose is straight and flat, the nostrils are broad and wide open. The lower jaw is faded. The neck is long and curved. Hairs are quite abundant, the throat is faded, slim, the wither is showing, the shoulder is tilted. The chest is broad and deep, the sternum rather prominent. The back is straight and short. The ribs are long and round. The cinch area is very low, the flank is full. The hips are long and faded. The rump is long, straight and slightly split, the tail is high.

The limbs are clear and clean, well vertical, the forearms are well taken out and powerful, the cannons are broad, flat and short, the pasterns are clear and strong, the feet are high and strong in the heels. The thighs are broad and well muscled, the buttocks are low, the knees are broad, square and aligned with the shoulder, the hocks are broad, not too straight and not too curved.

**c) Characteristics and use:** The Percheron can be found with a stud book in four countries: France, the United States, Canada and the United Kingdom. There are currently much more Percherons in the United States than in France. Even though most of the yearly production of these horses is sold for meat, it is not the preferred breed for meat as it is considered too fat compared to thoroughbred meat. Many Percherons are used for riding, especially in the United States.



Fig 7: Percheron harnessed. "Percheron 3 stehend rechts". Licensed under Creative Commons Attribution-Share Alike 3.0 via Wikimedia Commons - [http://commons.wikimedia.org/wiki/File:Percheron\\_3\\_stehend\\_rechts.jpg#mediaviewer/File:Percheron\\_3\\_stehend\\_rechts.jpg](http://commons.wikimedia.org/wiki/File:Percheron_3_stehend_rechts.jpg#mediaviewer/File:Percheron_3_stehend_rechts.jpg)

#### A.8. Trait Comtois

**a) Origin:** The Comtois is originating from the region of Franche-Comté. It has common ancestor with the Franche-Montagnes horse which is a light draft horse from Switzerland. It is possible that it has German origins. It has been used as war-horse during crusades and after. During the 18th century, it was used exclusively for drafting and was not ridden. During the 19th century, the breed is crossed with many other draft breeds so much that around 1850 it almost disappeared. Later the official stud book opens in 1919.

**b) Conformation:** The Comtois is 1.50 to 1.65m high and between 650 and 800 kg. The coat is preferably chestnut with white tail and mane. Large white marks on the head are not accepted. Socks are rare but light colored feathers are appreciated. The



head is square with a lively eye, small and very mobile ears. The neck is well muscled, the rump is broad with the thighs low. Articulations are strong, with tendons well detached. Feet are average with good conformation.

**c) Characteristics and use:** The Comtois is well adapted to difficult climate and can stay outdoors all year long. It is nowadays still used for drafting especially work in vineyards and tourism.



Fig 8: Comtois Source: [http://commons.wikimedia.org/wiki/File:Cheval\\_Comtois\\_2.jpg?uselang=fr](http://commons.wikimedia.org/wiki/File:Cheval_Comtois_2.jpg?uselang=fr)

### **A.9. Trait du Nord**

**a) Origin:** The trait du Nord has a common origin with the Ardennais before 1903 when a separate stud book is opened.

**b) Conformation:** The trait du Nord is a well built horse, short, powerful with an important bone and muscle mass. the coat is bay, roan, chestnut or red-roan sometimes dark grey or black. The average height is 1.72 m for males and 1.65 m for

females. The average adult weight is 1000 kg for males. the head is small, often squashed shaped, the eye is lively, the ears short, the nostrils large. The neck is of medium length, powerful, often curved, the mane is thick. The wither is covered with muscles, the back is straight and short, the rump is double and massive, the chest is broad and well muscled. The limbs are strong and bony, cannons and pasterns are short, have feathers, hooves are broad and strong.

**c) Characteristics and use:** The trait du Nord used to work in beetroot and cereal fields in the north of France. This breed has a particularly nice trot. The training of young horses is made by harnessing them next to their working mother from 18 months of age.



Fig 9: Trait du Nord. Source: « Trait-du-nord01 SDA2012 » par Eponimm — Travail personnel. Sous licence Creative Commons Attribution-Share Alike 3.0 via Wikimedia Commons - [http://commons.wikimedia.org/wiki/File:Trait-du-nord01\\_SDA2012.JPG#mediaviewer/Fichier:Trait-du-nord01\\_SDA2012.JPG](http://commons.wikimedia.org/wiki/File:Trait-du-nord01_SDA2012.JPG#mediaviewer/Fichier:Trait-du-nord01_SDA2012.JPG)

## **B. How History shaped the draft horse**

The criterias of selection on goals of production for draft horses in France have varied through times along with the history of the country and has especially undergone great changes in various directions around the industrial revolution era. To understand better how the evolution of draft horses is tangled into the history of the country let's have a chronological look on the most important milestones.

### **1. Before modern breeding**

From the Middle Ages to the beginning of the 18th century the only selection that applies to draft horses is natural just like Charles Darwin's well known theory explains. There is little selection made by men, the horses are chosen according to their adaptability of the climate and environment. Random crosses are also done with indigenous horses and horses brought by warriors and travellers. Little is known about genetics and the possibilities that careful selection of breeding animals can bring about. At this time, horses in general are not taller than 1.40 m.

The first historical data of animal selection by human is found in documents by the british sheep breeder Robert Bakewell (1725-1795). The basic principle is to cross animals within a restricted pool of individuals that have all some similar characters. This method later applied to many species and especially developed the british draft horses breeds Clydesdale, Shire and Suffolk Punch. Following the success of these projects, the method reached the countries of continental Europe and lead to the creation of Studbooks.

1826 is the time of the first Studbook to open in France (that of the english thoroughbred), many others would follow. From that time breeders have the task to select the animals that they will cross and there are records kept about the genealogy of each individual. There is now a "scientific" selection of horses and this happens right at the same time as the industrial revolution.



## **2. Changes brought about by the agricultural and industrial revolutions**

In France the industrial revolution starts quite early at the beginning of the 19th century. It is empowered by the agriculture revolution that started from the 18th century. From that time agriculture starts to become more productive regarding cultures and, thanks to careful selection of most productive reproducers, regarding animals as well. The increased productivity of agricultural activity results in less manpower needed to produce an equivalent amount of food resources. The consequence is a massive rural exodus together with the rise of industries. But progresses in industries, will, in turn achieve even more progresses in agriculture by producing new and innovative agricultural machines. These machines being made mostly out of metal, they become heavier and need more powerful animals to draft them across the fields.

In 1852, a census of drafting animals reveal that most of them are cattle with nearly 3 billions heads in the whole country whereas the number of drafting horses doesn't reach 2 billions. To be complete, let's mention that mules and donkeys are also used for this type of work, but their number is not significant.

Cattle become useless when it comes to the new, more difficult-to-draft, machines. Even horses need to be of a quite strong and powerful nature to be able to work correctly with these machines. At that time the selection of draft horses is therefore directed toward this aim: producing strong and powerful horses. The average height of horses will increase by 20 cm in less than 100 years.

## **3. The golden age of the draft horse**

In 1870 the average weight of selected draft horses is already about 600 kg, by 1935 this would increase by 150 to 200 kg. The beginning of the 20th century is the golden age for draft horses, their use is the most widespread and they are the most well adapted, via human selection, to their drafting work.

It was also around this time that the tractor was invented. In France it became popular only after the second world war when farmers whose horses were requested by the army during the war had to choose between getting the new tractor or buying new horses. Draft horses became less and less used. In order to offer a new selling opportunity to breeders, it became widespread to use horses for their meat.

#### **4. Reconversion into meat producing animals**

The consumption of horse meat has been legalised in France in 1866. Before that it was forbidden in the whole Europe for religious reasons but was already consumed illegally by poor people during times of starvation.

In 1978, the French State decided to rename the group of “draft horses” into “heavy horses”. This decided of the fate of those horses that really became food production animals. As a consequence, the selection criteria changed towards an even heavier horse, since the meat was sold according to weight. The horse as a slaughterhouse animal allowed the number of heads to stay relatively high, therefore did not cause a too drastic shrinkage of the genetic pool. But at the same time the morphology of those horses was influenced by the desire to make them the heaviest that was possible. And selection was directed towards quality of the carcass rather than working quality of the living horse.

Of the 16 200 draft foals that are born every year in France, 80% are bred for meat production. But even though this is the case, France’s consumption of horse meat is not satisfied by its own production: indeed 80% of horse meat eaten in France is imported.

#### **5. Upgraded status of the draft horse**

With the evolution of animal rights and society in general, hippophagia becomes less actual and the horse (of all breeds) is now a hobby animal. In 1994, the French State decides to go back to the name “draft horses” instead of “heavy horses”. New usages start for draft horses thanks to creative people that wished to safeguard the breeds as living memories of the past. The shape of the horse changes direction once more to go back to a leaner, more elegant horse. But it has to be noted that 80% of draft horses born in France today will still be used for meat production.

#### **6. Draft Horse in the city: the example of Lampertheim**

Lampertheim is a small town of about 3000 residents located 8 km north from Strasbourg, France. Since 2005 the town owns a horse that is used for a variety of tasks that were previously realised using motor vehicles. The type of work required a draft horse, the Ardennais breed was chosen because it was the traditional breed that was used for farm work in this area of France before the generalisation of



tractors.

The horse as well as the carriage it uses were bought by the town in order to replace an old van. The town was looking for an environment-friendly vehicle and found itself bothered by the high price of big electrical vehicles. That's when it started looking into draft horses. When the decision was taken to invest in this project, the town hall established a list of criteria for the ideal horse and submitted it to the union of draft horse breeders from Alsace. It is interesting to note that they could offer only 3 horses that would enter into the criterias for a working horse: the big majority of horses that were being produced were intended for slaughterhouse and therefore were not of a good conformation to do any good quality work. Quadrille is the young mare that they finally selected and they bought her when she was only 2 and a half years old. She was therefore too young to do real heavy work and needed to be broken and trained. The first part of the training was the habituation to the city and its dynamics, the main road has indeed a rate of frequentation of 11 000 vehicles a day, among them big trucks, busses and cars.

The main request by the town was a horse that was able to work but be very safe at the same time. Having a horse should not mean increase danger for the citizens in any way, therefore the calmness and cold bloodedness of the horse was of utmost importance.

Nowadays Quadrille works an average of 5 days a week and 6 hours a day. She does many tasks and the surprise is that the town hall keeps finding new tasks to do with the horse that were not thought about when the project was started. Some examples of Quadrille's work includes watering the plants and flowers of the city (for which she has to draft a 1000 L water container), transporting children from the kindergarten to the canteen, collecting wastes from the city garbage bins, taking out fallen tree trunks from the river, mowing the grass that grows next to the cycle-way,... and many other things.

The town does not regret it's investment and would advise other cities to follow their example.

Another element that the town did not anticipate was that the horse is a source of social interaction between the town workers and the citizens. They reported indeed that citizen talked to them much more frequently when they were accompanied by the horse.



Fig 10: Quadrille the Ardennais horse being used for watering the town's flowers.  
Source: own picture.

## **C. Today's state of draft horse breeding in France**

### **C.1. Genetic diseases found to affect draft horses breeds**

#### **C.1.a) Epidermolysis bullosa**

Epidermolysis bullosa is an inherited disease found in many species including humans and draft horses. It is characterised by skin fragility with blisters or multifocal absence of skin. It is particularly found on the limbs resulting in loss of the hooves but also on mucous membranes. Affected foals die rapidly or are euthanized. The Trait Breton and Trait Comtois have been found to be affected. The skin shows histologically a disjunction of the epidermis from the underlying dermis. A recessive mode of inheritance has been observed. It is supposed that the origin is a single insertion mutation: the insertion of a cytosine base resulted in a frameshift that terminated the coding prematurely. The mutation presumably occurred in an individual that can be found as ancestor of both draft breeds. A genotyping method using hair or blood samples has been made available for breeders, this way the mating between carriers can be avoided and the eradication of the mutation could also be decided by the breed associations.

#### **C.1.b) Ocular anomalies in Comtois**

According to some genetic studies (Depecker et al.), the silver mutation influencing coat color (PMEL17) is also responsible for multiple congenital ocular anomalies (MCOA) when horses are homozygous silver and for cysts of the ciliary bodies when horses are heterozygous silver. MCOA include iridal hypoplasia, cataract, cornea globosa and lens luxation.

The silver mutation results in a dilution of hair coat. When silver is applied to bay genotype, it results in a bay or light bay coat with flaxen mane and tail. When silver is applied to black genotype it results in a chocolate coat with flaxen mane and tail. The diluted coats (therefore the silver mutation) is very widespread and very appreciated in Comtois horses. Unfortunately they condemn these horses to MCOA or cysts. However the impact on vision is not always significant: cysts are believed to not impair functional vision. It is not infrequent to see blind newborn foals in the Comtois breed. It is advised to mate heterozygous horses only to non-carrier homozygous horses. This way there would still be the phenotypic appearance of the dilution gene

but the ocular anomaly would be less severe with almost no visual impairment.

### **C.1.c) Polysaccharides storage myopathy in Cob Normand**

Polysaccharide storage myopathy (PSSM) is a disease found in a few breeds of horses, namely quarter horses and some draft horses. According to recent studies (Herszberg et al), the occurrence of this disease is highly linked with the presence of a mutation in the skeletal muscle glycogen synthase gene (GYS1). This was already known in the quarter horse breed but has now been confirmed as well in the Cob Normand breed. It seems that a homozygous mutant allele also correlates with a higher severity of the disease although this is not the rule, and it should be noted that the severity is also under direct influence of environmental factors.

The mutation has been traced back to one of the 10 founder stallions of the Cob Normand breed.

### **C.2. Populations status**

Production according to breeds. Let's look at a census of breeding mares and stallion made in 2012 as well as the number of notified birth in each breed for the year 2011.

<b>Breed</b>	<b>Mares</b>	<b>Stallions</b>	<b>Foals</b>
<b>Ardennais</b>	1487	205	659
<b>Auxois</b>	275	26	120
<b>Boulonnais</b>	415	53	198
<b>Breton</b>	6104	706	3497
<b>Cob Normand</b>	477	56	319
<b>Comtois</b>	7525	974	4117
<b>Percheron</b>	2297	179	1110
<b>Poitevin</b>	227	33	71
<b>Trait du Nord</b>	170	14	109

Table 1: population of breeding draft horses during the year 2012 and production results of year 2011.

The FAO beside its numerous tasks is keeping record of the endangerment status of domestic breeds. According to their definition a breed is marked endangered when the number of breeding females is between 100 and 1000 and the number of breeding males is between 5 and 20. Following this definition we can state that the

Auxois, the Boulonnais, the Cob Normand, the Mulassier Poitevin and the Trait du Nord are endangered breeds.

If a breed were to become a “critical” status, it would mean that there are less than 100 breeding females or less than 5 breeding males or an overall population of less than 120.

### **C.3. General selection criteria of draft horses**

Regarding the selection of draft horses, there are three criteria that have different significance for the selection of reproducers:

- the most important is the way the given horse resembles to the virtual picture of the ideal horse for the given breed. The morphology, gaits, character and aptitude are judged.
- the next criteria is the ability to reproduction: libido, fertility, character and maternal skills
- and whenever possible, the quality of the production is also taken into account.

The criteria according to which are selected individual horses are:

- fertility
- quality of semen
- resistance of semen to freezing
- quality of the milk
- ease of delivery
- character
- circumference of the cannon
- average daily weight gain
- carcass yield
- quality of the meat
- height
- coat
- conformation
- gaits
- strength (for traction)

- balance of the trot and aptitude to drafting
- aptitude to mountain area

The preferred criteria must always be adapted to the market because this is the biggest economic actor that will determine the success or failure of a breed.

Nowadays draft horses are mainly used as leisure horses and can participate in competitions. However there are two different types of competitions that can be noted: the ones which involve mainly traction and require a strong work at walk and the driving competitions which are done at a trot. The ideal conformation for those competitions is quite different and although one given horse could do well in both types, the training is very different. As an example we could use the position of the neck: for pure traction a horizontal position is ideal whereas for driving at a trot the neck should be at a 45° angle with the body.

#### **4. Genetic diversity and contribution to horse gene pool of french draft horses.**

A study published in 2009 by Leroy et al. on 11 microsatellite markers tried to evaluate the genetic diversity of many horses bred in France, including all 9 draft horse breeds. The elements that retained our attention were as follows:

- The Aulois is not significantly differentiated from Trait du Nord.
- The Ardennais, Aulois and Trait du Nord belong to a single cluster, which means they are quite genetically similar.
- The Mulassier Poitevin has a low within breed diversity but a high contribution to the between breed diversity.
- Ardennais have a low diversity.
- The Boulonnais and Mulassier Poitevin have the highest cryopreservation potential.
- According to the authors, conservation priorities should regard (among the draft horses) the Boulonnais and the Mulassier Poitevin.

#### **5. Real life example: meeting with an Ardennais breeder.**

In order to see for myself what breeding draft horses is like, far away from the internet websites and official descriptions, I went to meet an owner of 2 Ardennais



mare, one of them accompanied by its foal. This person was currently in possession of 3 horses (two mares and one colt). According to France Trait, the average number of breeding mares owned by one breeder is 2.4. Earlier this year, Mr Ernwein had to send another mare to the slaughterhouse because of chronic proliferative lymphoedema, therefore, between 2 and 3 mares is the average size of draft horse breeding places so I could consider all data obtained there as significant for an example of breeding place.

The farm is located in Gottesheim, a village in Alsace approximately 30 km North-West from Strasbourg. The farmer used to have cattle as well, but is now retired. He considers horse breeding as a hobby, especially on the financial aspect. The registration to the breed association, the identification of foals, the registration to breed shows are obligatory expenses which, when weighed against the revenue from a sold foal do not make the activity economically worth it. In his opinion, breeding draft horses is an activity which will become more and more rare. Unfortunately less breeders means less horses, and less horses will mean less diversity among the breed, which may lead to a collapse of the breed by effect of consanguinity.

As for the method of breeding, only natural breeding is used. There is a union of breeders that bought an Ardennais stallion. This stallion can now be rent by various breeders. They bring the stallion to the mares and leave it there a few days, then check by echography on the 16th day if the mare is pregnant. The fact that only few stallions are located nearby limits the choice of selection. More emphasis is put on the fact that a given stallion is easily available, rather than the careful study of the characteristics of several stallions in order to find the most adapted to every given mare. However all breeding horses are still registered as Ardennais.

The fate of the foal that was born in March will be the slaughterhouse in November, at 7 months (before weaning), except if an individual wishes to buy it as a leisure horse.

This breeder does not especially select his horses for any precise usage. The default plan is to send weanlings at the slaughterhouse.





Fig 11: Aline, mare Ardennais. Source: own picture

### **6. Breeding programs for the preservation of draft horses**

No elaborate breeding program has been created for any of the breeds but their preservation is maintained by the following measures:

A horse can be officially declared to belong to a specific breed only if both parents are officially declared of that said breed. There is an exception to that: one parent can be of another breed but considered good enough to produce in another breed. This happens many times in case of low population breeds and only between breeds that are evolutionarily related. For example an Ardennais can be judged “Auxois maker”, which means if bred to an Auxois, the progeny can be officially declared as Auxois. For this, the Ardennais in this case must be seen by official judges who will decide about the ability to be registered as “Auxois maker”. Auxois makers can be Ardennais or Trait du Nord.

If the father is officially registered in the breed, but not the mother, the foals can be submitted to an official judgement (during a show), after two years of age and if it

corresponds to the phenotype of the given breed.

According to the Ardennais stud book:

To be automatically registered as Ardennais on the basis of ascendance, a foal needs to be born from a registered mating of a stallion approved for Ardennais production (which is an Ardennais himself or registered as “Ardennais maker”). The birth of the foal needs to be declared to the Haras Nationaux in the 15 days following the birth. The signalement of the foal needs to be registered with its mother before the 31st of December of its birth year. The name of the foal has to start with the official year letter (E for 2014). The foal also needs to be registered to the central file of equids and therefore received its matriculation documents.

Horses can also be registered as Ardennais on an initial registration basis. For this, they need to be more than 2 years old and be presented on an official breed show. Their father must be an Ardennais, they need to have a certificate of origin “Trait”. Females must not have the possibility to be registered on the basis of ascendance to any other stud book. Males need to have 3 out of 4 parents that are Ardennais.

### III. Discussion

Each of the 9 french draft horse breeds have their own particularities and are valued by passionate people who wish to preserve their favorite breed. For each breed there are reasonable arguments in favor of preservation. But does this mean that all breeds should actually be preserved?

In most situations, breeding draft horses is not an economically viable venture. Most draft horse breeders are doing this activity as a hobby, for the love of the breed. It is exceptional that people live only from the breeding of draft horses. Therefore we can affirm that without interest in a breed, the given breed would soon disappear. Since the economic situation is not favorable to the breeding of draft horses one can start to wonder how long leisure breeding will persist and is it not going to be threatened by harsher global and national economics.

In order to reasonably chose to maintain a breed, this breed needs to bring something specific to the overall breed population: let it be a special skill, a special look, a special possible use or bring a genetic distance compared to other breeds (like the Boulonnais and Poitevin according to Leroy et al.).

On the other hand, once we would decide to give up on a breed and not maintain it, letting it go extinct by itself, this would be irreversible. Only with very devoted efforts can we revive a breed that has gone extinct or nearly so. The real question is: how important would be the impact on biodiversity on the extinction of a man made breed? One should not forget indeed that those breeds are not natural in the sense that they do not result from natural selection but from human selection. Would it be a big loss of genetic heritage if a domestic breed would go extinct?

We have to remember that many domestic breeds went extinct over the years (especially before current breeding methods were applied). For example, the Bidet is an extinct breed that contributed to the creation of the Breton horse.

Nowadays some breeds are very closely related: for example the Auxois, Ardennais and Trait du Nord. We could suggest to fuse those breeds into one by allowing crosses between each other, therefore strengthening the total population of the new breed since all breeding places of any of these three breeds would now produce the same breed. We wouldn't lose too much in biodiversity since there is already not much diversity across those breeds. This suggestion is supported by the fact that even today, there are crosses between these breeds by stallions certified as

“maker” of another breed.

Some breeds like the Breton, Comtois, Percheron and maybe Ardennais, have a population that is not directly threatened of medium term extinction, so the question of preservation do not really concern them. The matter needs to be examined however for breeds that have lower population. As mentioned before, the Auxois and Trait du Nord are very close to the Ardennais, so they do not justify to be preserved. On the contrary, the Poitevin and Boulonnais that are genetically far from the other breeds, should benefit from more attention and a preservation program should focus on them.



## **Conclusion**

French draft breeds have faced a dramatic drop in their population that negatively correlated mainly to the democratisation of the motorised tractor. In order to attempt a preservation of those breeds that are the result of many centuries of evolution and selection, a reorientation towards food producing animals has been tried. Unfortunately this project does not meet the expected success as the public opinion tends to see the horse as a companion animal and do not want to eat this type of animals. This change of status of the horse may however be beneficial to the draft horse: indeed the use of horses in leisure activities is developing. The biggest strength of the draft horse in this area is its temperament: most draft horses are much calmer than warmblood, therefore can be used by less experimented riders. Some certifications for leisure horses are developing in France and draft horses have been known to do very well in those: the use as leisure horse could be the way to save draft breeds on the long term.

It has to be noted though that maintaining the 9 breeds as they are may be more difficult than fusing a few breeds together. For the benefit of the whole draft horse population, it might be better to give up on a few breeds in order to ensure the maintenance of others.

## **Acknowledgment**

I would like to thank all the people who helped and supported me during the completion of this project:

Prof. László Zöldág for his supervision and guidance,

Mrs Annick Poinsignon for her useful information

Mr Jean Ernwein for his precious expert information,

My family and friends for their moral support.

## References

**Ref. 1:** MAVRE M.: Attelages et attelées. Un siècle d'utilisation du cheval de trait. Editions France Agricole

**Ref. 2:** ALLE G.: Le Breton. Editions Castor et Pollux

**Ref. 3:** BOUGRAIN DUBOURG A.: Le Trait Poitevin. Editions Castor et Pollux

**Ref. 4:** Depecker, M., Ségard, E. & Cadoré, J.-L., 2013. Phenotypic description of multiple congenital ocular anomalies in Comtois horses. *Equine Veterinary Education*, 25.

**Ref. 5:** Herszberg, B. et al., 2009. A GYS1 gene mutation is highly associated with polysaccharide storage myopathy in Cob Normand draught horses. *Animal genetics*, 40(1), p.94–6.

**Ref. 6:** Milenkovic, D. et al., 2003. A mutation in the LAMC2 gene causes the Herlitz junctional epidermolysis bullosa (H-JEB) in two French draft horse breeds. *Genetics, selection, evolution : GSE*, 35(2), p.249–56.

**Ref. 7:** Leroy, G. et al., 2009. Genetic diversity of a large set of horse breeds raised in France assessed by microsatellite polymorphism. *Genetics, selection, evolution : GSE*, 41, p.5.

**Ref. 8:** Les Haras Nationaux <http://www.haras-nationaux.fr/>

**Ref. 9:** France Trait <http://www.france-trait.fr/>

**Ref. 10:** Union des Eleveurs de Chevaux de Race Ardennaise  
<http://www.cheval-ardennais.fr/>

**Ref. 11:** Syndicat d'Elevage du Cheval de Trait Auxois [www.traitauxois.com](http://www.traitauxois.com)

**Ref. 12:** Syndicat Hippique Boulonnais [www.le-boulonnais.com](http://www.le-boulonnais.com)

**Ref. 13:** Syndicat des Eleveurs du Cheval Breton [www.cheval-breton.fr](http://www.cheval-breton.fr)

**Ref. 14:** Syndicat des Eleveurs et Utilisateurs de Chevaux Cob Normand  
[www.cobnormand.com](http://www.cobnormand.com)

**Ref 15:** Association Nationale du Cheval de Trait Comtois [www.chevalcomtois.com](http://www.chevalcomtois.com)

**Ref. 16:** Société Hippique Percheronne de France [www.percheron-france.org](http://www.percheron-france.org)

**Ref. 17:** Association des Races Mulassières du Poitou  
[www.racesmulassieresdupoitou.com](http://www.racesmulassieresdupoitou.com)

**Ref. 18:** Syndicat d'Élevage du Cheval "Trait du Nord" [www.le-cheval-trait-du-nord.fr](http://www.le-cheval-trait-du-nord.fr)



## **HuVetA - SZIA**

### **AGREEMENT OF ELECTRONIC PUBLISHING AND DECLARATION REGARDING COPYRIGHT \***

**Name:** Sarah FLORENCE

**Contact information (e-mail):** sarah.florence88@gmail.com

**Title of document (to upload):** Genetic endangerment and sustainability of French Draft Horses.

**Publication data of document:** FACULTY OF VETERINARY SCIENCE

Institute for Animal breeding, Nutrition and Laboratory Animal Science

Department for Veterinary Genetics and Animal Breeding

Budapest 2014

**Number of files submitted:** .

One pdf file

With the acceptance of the present agreement the author or the holder of copyright offers non-exclusive rights for HuVetA and SZIA to archive the above document (including its abstract) converted into PDF format protected against copying without changing its content in order to preserve it and ensure access to it.

The author accepts that HuVetA and SZIA store more than one copy (accessible only for the administrators of HuVetA and SZIA) of the document provided by you exclusively for the purposes of ensuring safe storage and recovery if necessary.

You also declare that the provided document is your own work and/or you are entitled to give the permissions included in the present agreement. You also declare that the document is an original one and you do not know about it violating the copyright of anyone else. If the document has a part which you are not the copyright owner of, you have to remark that you got unlimited permission from the copyright owner to give permission for the use of the document according to the present agreement, and the name of the original author is clearly indicated by the parts the copyright of which belong to a third person.

The copyright owner defines the conditions of access as follows (**indicate your choice by putting an X in the proper box**):

I give permission to make the document stored in HuVetA/SZIA accessible on the internet without any limitation for everyone,

I give permission to make the document accessible only within the intranet (IP range) of the Szent István University,

I give permission to make the document accessible only on one single dedicated computer at the Veterinary Science Library,

I give permission only to upload the bibliographic data and abstract of the document (with unlimited access on the internet to these data only),

---

\* The present declaration is based on the rector's order number 5/2011. regarding the database of scientific publications written at the Szent Istvan University.

Please, also **make declaration regarding the in-house use of the document** by writing an X into the box:

I give permission for the in-house reading of the printed version of my document in the library.

If the preparation of the document to be uploaded was supported or sponsored by a firm or an organization, I declare that I am entitled to sign the present agreement regarding the document.

The operators of HuVetA/SZIA do not assume any legal responsibility towards the author or copyright holders or organizations for the case if a user would use the material uploaded with permission to HuVetA or SZIA in an unlawful way.

Budapest, 14 September 2014

Sarah FLORENCE

signature

author/copyright owner

---

***HuVetA Magyar Állatorvos-tudományi Archívum – Hungarian Veterinary Archive*** is an online veterinary repository operated by the Veterinary Science Library, Archives and Museum the aim of which is to collect, organize, store, make searchable and accessible, and provide services of the documents of Hungarian veterinary science and history, making an electronic knowledge base in harmony with legal regulations.

*HuVetA uses modern technology to provide easy searchability (also by search engines) and the access to the full text of the document if possible. By these HuVetA aims at*

- *increasing the acknowledgement of Hungarian veterinary science in Hungary and internationally;*
- *increasing the number of citations given for the publications of Hungarian veterinarians and by these increasing the impact factor of Hungarian veterinary journals;*
- *presenting the knowledge base of the Faculty of Veterinary Science, Szent István University and that of the partners in a concentrated form in*

*order to increase respect for Hungarian veterinary science and the competitiveness of these organizations;*

- *enhancing professional relations and cooperation;*
- *supporting open access.*

**SZIA Szent István Archive** *is the online repository of scientific publications written at the Szent István University.*