CHAPTER 2

EVOLUTIONARY HIGHLIGHTS OF TODAY'S HORSE

ZOOLOGICAL CLASSIFICATION

Special characteristics of the horse may be better understood by briefly studying the horses' zoological classification. All domestic horse breeds are of the same Species, ***Equus caballus***. Horses (domestic and wild), zebras, and asses (donkeys) of today are Genus ***Equus***.

Family ***Equidae*** includes not only today's Species of Genus ***Equus***, but also their ancestors. ***Equidae*** are described as mono-gastric (non-ruminant) with a large cecum (the first portion of the large intestine), 36 to 40 well-distinguishable teeth (incisors, canines, premolars, and molars), a cylindrical body with a medium-long neck that permits the mouth to reach the grass, and one toe per foot covered by a hoof.

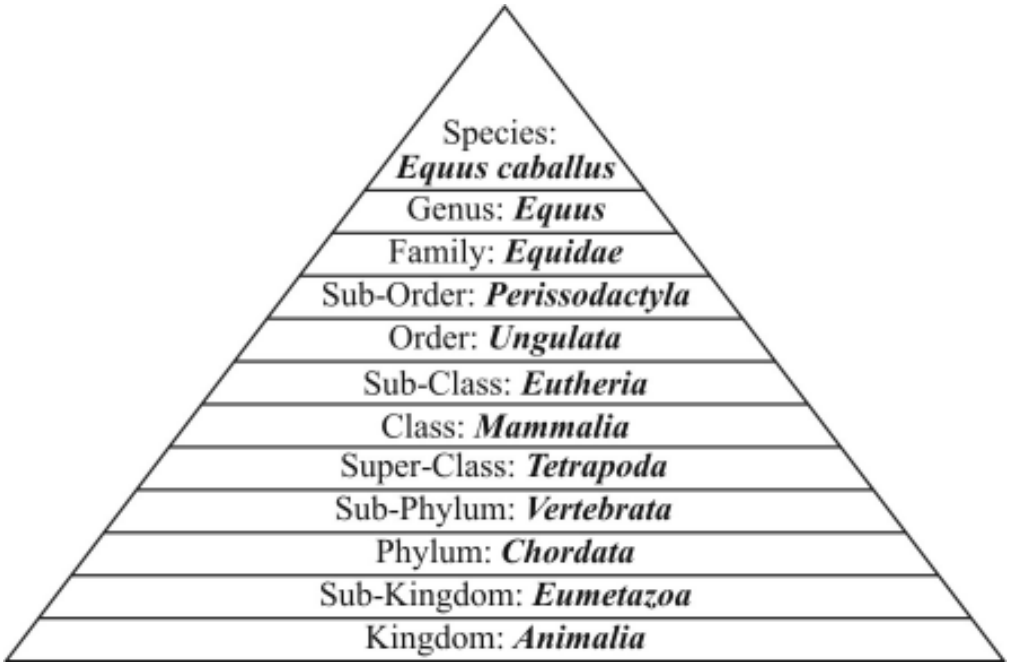
Equidae are included in Sub-Order ***Perissodactyla***; they have an odd number of toes on their feet (one or three toes per foot) and each toe is covered by a hard, keratinized structure (hoof). ***Perissodactyla*** are part of Order ***Ungulata***, described as herbivores with big, flat premolars and molars adequate for chewing roughage, and long legs ending in hooves.

All ***Ungulata*** are included in Sub-Class ***Eutheria***, that develop placenta for the fetus during pregnancy, Class ***Mammalia***, that lactate their offspring after birth, and Super-Class ***Tetrapoda***, that have four legs for locomotion.

Class ***Tetrapoda*** are included in Sub-Phylum ***Vertebrata***, described as animals with a spinal column, and Phylum ***Chordata***, with a bilateral symmetry and a central nerve cord.

Chordata are part of Sub-Kingdom ***Eumetazoa*** (all animals except sponges) and Kingdom ***Animalia*** (all animals).

The following chart summarizes the zoological classification of the horse:



EVOLUTION OF THE HORSE

Domestic horses, like most plant and animal species of today, have had many evolutionary changes that are widely substantiated through scientific research of fossils. Horses began to evolve during "the Age of Mammals" (also known as Cenozoic Age).

The horse's evolution began approximately 60 million years ago (Eocene Epoch) from the ancient ***Eohippus***, whose size is commonly compared to that of a fox (about 12 to 16 inches in height and 14 to 25 lbs.). The front feet ended in four toes, and the hind feet in three toes, all slightly inclined toward the front. Although the toes did not have nails, they had little digital pads that were in contact with the ground, plus a bigger pad behind the toes. ***Eohippus*** lived in areas around rivers and in forests and jungles, where it ate the tender leaves of plants that it could reach from the ground; thus, its teeth were small. Although it was prey for predators, this species survived 20 million years by having a camouflaged coat that was brown with darker bands, so it could blend with plants, soil, and shade.

From ***Eohippus***, many species evolved in different directions until Genus ***Equus*** appeared. The most recognized species are described below:

Mesohippus replaced ***Eohhippus*** 25 - 40 million years ago (Oligocene Epoch). Its main evolutionary changes included: increased size (approximately 22 inches in height), each foot ending in three toes that supported its body weight evenly, and teeth that became slightly larger (like a pig's teeth), in order to eat leaves from a wider variety of plants on the forest floor.

After several climatic changes, about 10 - 25 million years ago (Miocene Epoch), large areas of jungle turned into prairies covered by different kinds of grasses and bushes. As the habitat changed, ***Merychippus***

evolved. This new species increased in size (to about 35 inches in height) and had longer legs to run faster; thus, its neck was longer to reach plants (grass) on the ground. Its feet ended in three toes, but the central one was longer than the other two and supported its weight. Its coat turned to brown with yellowish areas for camouflage in the tall grasses. Its teeth became bigger and flatter to cut and chew grasses and other kinds of plants on the prairie.

Pliohippus existed about two to six million years ago (Pliocene Epoch). The main changes included increased size (to about 42 inches in height, similar to a pony), longer and thicker legs, a neck that continued to get longer, and feet ending in only one toe, covered by a hoof (like a modern horse).

Several species of Family ***Equidae*** appeared about two million years ago (Pleistocene Epoch), living in prairies and steppes of North America, Asia, Europe, and Africa. These species, that were between 40 and 58 inches in height, were the origin of all species of Genus ***Equus*** (horses, zebras, asses, and tarpans). The legs and neck of this Family became longer. Coats of the different species had a wide variety of colors including white, beige, yellow, and brown, with or without dark brown/black bands, tails, and manes. Because their diets were based primarily on grasses, their incisor teeth became "nipper" shaped in order to cut the grass. The premolars/molars became bigger and flatter for properly chewing fibrous roughage.

Note: The severe climatic conditions in North America during the Ice Age, about 10,000 years ago, dramatically diminished areas with grass, causing ***Equidae*** to become extinct on the American continent.

The current domestic horse breeds (***Equus caballus***), with 64 chromosomes, are the result of crossing, at minimum, three horse-type species of Family ***Equidae***:

- The "Nordic" horse-type from Northwest Europe: This subspecies had the thickest body and leg bones and the biggest hooves and head. Additionally, because the horse used to live in very cold areas, the coat became very thick. Abundant, long hair appeared on the fetlocks, which may also have covered the hooves. This is the origin of today's "draft" horse breeds.

- The "Arab" horse-type from the Middle East: This subspecies had the most refined conformation with thin leg bones, high tail, and concave (known as "dished") face. It was light and a very fast runner. This is the origin of the Arabian horse.

- The "Barb" horse-type from Southern Asia and Northern Africa: This subspecies was a little less refined than the "Arab" type, but still light and fast. It was very resistant to heat and unfavorable conditions. This produced the Barb horse breed. Many specimens of this breed were taken to Spain by the North African warriors (Moors) during the several invasions from the eighth to fifteenth centuries. Later, the Barb horse became the foundation of most horse breeds on the American Continent.

Other ***Equidae*** species from Central Europe, Western and Central Asia, the Middle East, and Northern Africa later produced asses; others from Eastern Asia produced Przewalski horses (tarpans); and others from Africa developed zebras (see descriptions under "Other equine species").

SIGNIFICANCE OF EVOLUTION FOR TODAY'S HORSE

- The horse's height and weight increased tremendously, in direct proportion to the abundance of plants available to eat and the need to escape from predators, when the horse changed from living in the forest to the open space of the prairie. Thus, leg bones became longer, stronger, and thicker. Additionally, toes per foot decreased from four to one and were protected by a hoof in order to run faster. That is why today's horse needs to run by itself everyday, either in a pasture or paddock, to be physically and mentally healthy.

- While the legs became longer during each evolutionary stage, the horse's neck also needed to become longer so that its lips and incisors could reach plants on the ground.

- Front teeth (incisors) became nipper-shaped in order to cut selected blades of grass. Back teeth (premolars and molars) became harder, flatter, and bigger in order to chew the fibrous grass properly. Although the horse is a non-ruminant animal, its digestive system is well adapted to process nutrients from fibrous plants (grass) in the same way as ruminants (such as cows), except that the horse's digestive system is less efficient. Therefore, no matter the breed, horses must eat a substantial amount of roughage every day to fulfill their needs.

OTHER EQUINE SPECIES

Besides horses, Genus ***Equus*** includes other species:

- A donkey, ***Equus asinus***, also known as a burro or ass, is an equine species known for its longer ears, strength, and resistance to adverse conditions. Although a donkey has 62 chromosomes, two chromosomes less than a horse, these two equine species (donkey and horse) are crossed to produce strong hybrids for work.

  A "mule" is the result of breeding a jack (male donkey) and a mare (female horse). A "hinny" is obtained from breeding a stallion (male horse) and a jennet (female donkey). Although both gender hybrids have normal sexual behavior, they are considered sterile; therefore, male mules and hinnies should be gelded. Rarely, female mules may conceive and foal a normal offspring.

  Note: Breeding Paso Fino mules for show, trail riding, and work is very popular in Colombia.

- The three subspecies of zebras, ***Equus zebra*** (known as "mountain" zebra), ***Equus grevyi*** (known as "Grevy's zebra"), and ***Equus burchelli*** (known as "common" or "plain" zebra), live wild in different areas of the African continent. However, some zebras are housed in zoos and farms, and they reproduce there. The three subspecies differ from each other by their size, black and white stripe pattern, and their ear size and shape. Additionally, they have a different number of chromosomes (32, 44, and 46 respectively).

- The "Przewalski" horse, ***Equus Przewalskii***, also called "tarpan," is from Eastern Asia. Few animals of this horse subspecies with 66 chromosomes still exist in Mongolia and zoos. Its head is big in proportion to the body, and its looks are very primitive. It has a dark, short mane, not abundant dark tail, yellowish coat, and dark dorsal stripe.

ORIGINS OF THE PASO FINO HORSES

As explained above, all ***Equidae*** were extinct from the Americas about 10,000 years ago. The first horses to come back to the American continent were the approximately 25 animals brought by Christopher Columbus on his second trip. These horses landed at the end of 1493 on "Dominica" island, today the Dominican Republic. These were of the Barb breed, apparently multi-gaited (trot and/or pace and/or gallop) because of the previous interbreeding and natural selection in North Africa and the Iberian Peninsula. These first 25 horses, and others brought on future trips, produced offspring that, during the first two decades of the sixteenth century, were spread throughout the areas where Spaniards expanded their territory in the New World: islands such as Puerto Rico, Cuba, and Jamaica; Mexico (in Central America); and Colombia and Peru (in South America).

Fantasma de Aristocratica (Vigilante de Casta x Aparecida de MED), a beautiful Paso Fino colt at 17 months of age. Owner Mildred Arent, Criadero Aristocratica, Ocala, FL. Photo by Olga García.

It is important to note that, because there were no horses in the Americas when the Conquistadors arrived, most natives assumed that such a splendid duo of horse and rider were actual gods; thus, horses played a very important role in Spanish colonization efforts. Horses gave the Spaniards a significant military advantage by allowing them to conquer the different tribes that, in most cases, outnumbered them. In addition, horses gave

the Conquistadors the necessary mobility to colonize the vast territories of the South American Andes. These brave horses needed to be relatively small, very athletic and full of energy to be able to perform, and even survive long journeys.

Within the last five centuries, these horses have evolved into the Paso Fino horses and many other breeds, such as the Peruvian Paso, the three Colombian diagonal Paso horse breeds, and the Argentinean Criollo, among others. This evolution occurred as part of a complex process that included the following:

- Natural selection caused by living and working in a completely different topography, as well as a new climate and different types of grasses
- Several crosses with some Iberian horse breeds, such as the Andalusian, Lusitano, and the already extinct Spanish Jennet
- Human selection and training

The great Paso Fino breed, with an evenly alternated movement among the four hooves, emerged over 200 years ago after repeatedly crossing the pacing group of horses of the Barb breed (two-beat, laterally-gaited horses) with some of the Iberian horse breeds (Andalusian, Lusitano, and Spanish Jennet), and being selected for working and traveling many hours daily over mountainous terrains while maintaining a smooth gait. The two most well-known groups of Paso Fino horses were developed in Colombia and Puerto Rico. Other smaller, important groups were developed in Cuba and the Dominican Republic.

One of the most recent important influences of the Iberian horse breeds on Colombian horses is Danesa, who was born in 1950. This mare was the product of crossing a Colombian Paso Fino mare, named Diana, with a Lusitano stallion owned by the female horseback bullfighter, Conchita Cintrón. Danesa, who performed Trote and Galope, was bred with different Colombian stallions (who performed Paso Fino, Trocha, Trote and Galope, or Trocha and Galope), and produced at least ten outstanding quality offspring of different gaits, most of which were multi-champions in Colombian horse shows. Those were Dalila, Danes, Dante, Don Danilo (who was able to perform Paso Fino, Trote, Trocha, and Galope gaits), Fantasía, Pacheco, Reliquia, Rosalinda, Tango, and Tormento. Their offspring are now part of the Colombian horse bloodlines.

The first Paso Fino horses introduced in the United States (in 1950) came from Puerto Rico. Later, more Paso Finos came from Colombia, Venezuela, and the Dominican Republic. Since then, the population of the Paso Fino horse breed has been growing steadily in the States.

Currently, the Paso Fino sport is very important in the countries with horse associations/federations affiliated with *CONFEPASO* (*Confederación Internacional de Caballos de Paso*, which may be translated into English as *International Confederation of Paso Horse Breeders*): Aruba, Canada, Colombia, Curacao, Dominican Republic, Germany, Panama, Puerto Rico, Switzerland, United States, and Venezuela. Paso Finos are also becoming more important in Ecuador, Spain, and the United Kingdom.

Note: The *Paso Fino Horse Association, Inc.*, which is affiliated with *CONFEPASO,* promotes and regulates Paso Fino horses in the United States.