

The origin of the arabian horse



The Origin of the Arabian Horse - a scientific Approach

There are many romantic stories about the origin of the Arabian breed that have been handed down to us through oral tradition in Arabia. Because of a more scientific approach by westerners a discussion developed in the 19th and 20th century in Europe and America: Did there exist a wild Arabian prototype domesticated in Arabia or did the horse come to the Bedouins from outside? Mutlak El Batal, the Mutair Bedouin and right hand of Lady Blunt at Sheikh Obeyd gave the Bedouin tradition to us of wild ancestors in Arabia. But most scientists have answered this question since differently: the horse came to Arabia from outside.

Nonetheless many lovers of the Arabian breed still reflect on the fact that it is unique in many aspects like its character and looks. It has been formed by the Bedouins in their land, the *badiya*, the steppe and desert land of Arabia. Also one theory has science given us Arabian horse enthusiasts, that of a multicentric domestication of the horse with different prototypes, one of them the Pro-Arabian. But no archeological findings on the history of horse domestication in Arabia could be found, except for the recent findings at al Maqar in Saudi Arabia, that are spectacular but not yet finally agreed with by science (see later). This concept of an own "Arabian" or oriental origin has been challenged by new results of genetic research done during the last years. Based on the maternal DNA found in the mitochondrium of each cell, many facts came to the light that force us to think over our concepts on the origin of the Arabian horse.

mtDNA

In the central focus of modern genetics is the information written on DNA (desoxy ribonuclear acid), the double helix based on the sequence of pairs of bases. This information or DNA code is nearly consistent except for very little variation (mutations) and handed down generation after generation. The DNA is equivalent with the chromosomes inside the nucleus of the cell. But when the gametes (egg and sperm) come together the maternal and paternal genetic information is recombined so that - genetically spoken - a totally new organism is coming in existence. Only the Y chromosome in males stays the same. In horses only one type of Y chromosome was discovered in all breeds. So one founder stallion (or only a small number of the same origin) for all existing domesticated horses is most likely. On the other hand the maternal origin can be traced through another kind of DNA: the mtDNA (or mDNA).

The mitochondrial DNA in all cells, male and female, always comes from the mother. This mtDNA is located in the mitochondria of the cell, i.e. outside of the nucleus within the cell body. The mitochondria are like little organs inside the cell producing energy. As the sperm is free of mitochondria, they all come from the egg or mother. Thus, by analysing mtDNA the maternal lineage of populations can be traced. This has been done for humans but also for horses. Here are some findings:

- In all horse breeds 77 different haplotypes have yet been found.
- In Arabians 38 different haplotypes have been found. In some breeds this number is much less or similar (Thoroughbreds 17, Lipizans 37). Newest tests have shown 55 different haplotypes in Arabians in Syria (Khanshour).
- Different haplotypes can share one or more identical sequences, that is they are more or less similar.
- Arabians have a greater genetic diversity than most other breeds. Out of a random sample 5 % of the Arabians from different lines have the same haplotype compared to 15 % with the Thoroughbreds and 23 % with Shetland ponies or 24 % with Fulani horses (Africa).
- A high variation in prehistoric, domesticated and non domesticated horses is evident by mtDNA findings.

Glazewska, a biologist from Poland, compared mtDNA of Arabians to other breeds and to samples of archeological sites. She found out that the Arabian breed is heterogenous and that the diversity among particular sequences grouped into ten haplotypes is significant. A set of identical or similar sequences was found by comparing Arabian sequences to those from archeological sites and present day horses of different breeds. These results permitted her to formulate the hypothesis that the Arabian horse breed was created from many different breeds and populations. In her words: "So the concept of breed purity might refer, at most, to the present population with a history that does not exceed two hundred years". This is hard for the concept of *asil* breeding and therefore we should undertake a closer look on Glazewska's work and other scientific findings.

- First of all we have to remember that mtDNA findings reach back far in history. The 2012 study by Warmuth et al. about domestication combining archeology, mtDNA and Y chromosomal DNA supports that domestication of horses occurred once, in the western part of the Eurasian steppe. Also several (or better many) repeated introgression events must have occurred later by adding new wild mares but no more stallions into the domesticated herds.
- The genetic similarity between Arabian sequences and those found in archeological samples in Kazakstan, 3rd century BC, is noteworthy (six out of eight sequences in 13 horses in Kazakstan are identical to Arabians, Glazewska)
- Also a high similarity is found to archeological samples from Sweden, Estonia, England and Inner Mongolia and China
- With breeds of today a high similarity is found with Akhal Teke, Barb, Guan Mountain (an isolated population), Konik, German and Polish Draft horses and also Shire horses, but none with Exmoor Ponies.

All the results of modern genetic research only give us a hypothesis of how horse breeds developed in the past. The above mentioned scientific paper by Glazewska has the title "*Speculations* on the origin of the Arabian horse breed". We have to hold on to the fact that we cannot solve questions on the origin of breeds by means of genetic research. For example we see the strong similarity between Arabian and Achal Teke haplotyps seen in the large number of 11 common or very similar lines. But we just see a close relationship between both breeds. The Achal Teke is believed to be very old, but we cannot distinguish if both share the same origin, or if the Arabian has come from the Achal Teke or vice versa. This is because mtDNA results reach back from today to thousands of years. Also the genetic makeup of the horse is diversified from the very beginning of domestication.

On the other hand mtDNA can serve as a tool to solve open pedigree questions. This could be done by Bowling et al. in the Egyptian mare Yemama, where we had two different statement regarding her origin. By mtDNA testing of modern descendants it was shown, that Lady Anne Blunt's information as Saqlawi Jedran Ibn Sudan is correct and not the Kuhailan Jellabi strain that was in the official papers.

Also, mtDNA tests cannot find out if a root-mare of unknown origin was *asil* or not.

We see furthermore that mtDNA findings and traditional strain affiliation often do not correlate. For example the Krush lines of Dafina (from the Nejd) and the Davenport mare Werdi (Syria) are different (A 16 and A 22).

Also the two Egyptian Dahman Shahwan lines (El Dahmah and Bint el Bahreyn) have two different haplotypes.

In the most common haplotype A01 we find such different root-mares as Rodania (Koheilan Ajuz Ibn Rodan), Venus (Hadban Enzahi) and the Saqlawiahs Urfah, Wadduda, Roga El Beda, but also a Manaqiah mare, Nourah.

What can be said on this findings? There is often no correspondence between genetic research and oral tradition of the Bedouins as handed down to us. Many questions remain, especially for those breeders, who based their breeding concepts on strain breeding.

For the author the above findings do correlate well with his understanding of the history and today's presentation of the Arabian breed:

- The Arabian horse bred by the Bedouins has never been presented us with a uniform picture but as a breed of high diversity. This is clearly demonstrated by the great number of different strains (female lines) from many different Bedouin tribes and the variable phenotypes in the foundation horses of the modern breed to be seen on historic photographs.
- The thesis that the Arabian breed is not older than 200 years made by the geneticists can be agreed with. The reason for this is simple: the understanding of the term breed in the eyes of Westerners. A breed is defined as a subpopulation by scientists. A breed is formed by men, i.e. the breeders, and by the environment. In case of "western" breeds selection is mostly done by the humane factor. By this genetic variation becomes less by time as does variation in phenotype. This is seen in the Arabian horse when it left his home, the steppe and desert of Arabia and the Bedouins, and was bred as "refugee" (see The Egyptian Alternative by Philippe Paraskevas, a most interesting and thought provoking book) in the hands of westerners in a different environment. The breed changed from "war horse to show horse". The ideal Arabian came into focus, a totally different concept to the way Bedouins bred their horses in the past.
- The Arabian breed was created, or in other words selection occurred, by two main factors. First and most important: the environment of steppe and desert. Second the role of the Bedouin, for the author only of secondary importance. This is not to disregard his influence in shaping his horse, not at all. But the men of the desert had to cope with their environment. Therefore, breeding decisions had to be in concordance with the desert and the Bedouin way of life. The horse had to be useful for raids and war. Beauty was of no importance and neither any other single trait except for character. So both selectional forces (environment and breeder) worked into one direction. The result was the world famous warhorse with its unique character. Bedouins never had a picture of an ideal Arabian in mind when making decisions in breeding their horses. No, they used every single mare that survived the harsh conditions of desert life. Only with the stallions selection was done. The best they kept, all the rest were sold at the markets. No wonder a large number of female lines as indicated by mtDNA results can be found today. This relative high variation corresponds with the high variation to be seen in the wild or prehistoric ancestors of the domestic horses.
- The purity of the Arabians that is questioned in the scientific paper cannot be demonstrated by genetic research. Purity depends on its definition or concept. If you define purity as uniformity or less heterogeneity you may support the results of Glazewska. But with the Arabian horse as bred by the Bedouins this seems to the author a wrong concept. Edouard al Dahdah speaks of a **socio-cultural concept** of the breed. The question of purity or *asil* status is solved thus: the *asil* Arabian horse is defined as the horse of the Bedouins of Arabia. No more and no less.

To sum it up: The identity of the Arabian breed is characterized by

- closeness to the wild or prehistoric ancestors indicated by nearly identical mtDNA and similar heterogeneity
- and at the same time high domestication demonstrated in the unique man-loving character.

From the book **BEDOUIN HERITAGE - THE WORLD OF THE ARABIAN HORSE** by Dr. Matthias Oster

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