

MEET YOUR MULE'S WILD ASS COUSINS

By Dr. Bill Lance



Snyder Reunion 2008 / photo by Greg Tyre

Remember your last big family reunion? Everyone was gathered at the grandparents having a great time looking at old family photo's, catching up on the latest family gossip, and commenting on how wonderful it was to be part of a famous family with a great heritage. Just when everyone was busting their buttons with pride, up drove two dusty, dirty station wagons with cracked windows and mismatched painted fenders. The doors flew open and out came people looking and sounding like aliens from another planet. Grandma fainted dead away when the driver marched up to the front porch and announced that they were long-lost cousins coming to get reacquainted with their distant relatives.

After a few minutes, we all realized that one of them actually resembled Aunt Carol, and another looked something like Cousin Wayne. Then we heard a voice that sounded so much like Uncle Rufus that we thought he had come back from the dead.

Well, this could be your mule's family reunion when all of their "wild ass" cousins show up. We all know that your mule's daddy was a donkey and mama was a horse (unless you are riding a hinney). But where in the world did that donkey come from and who were his ancestors? What were their names, where did they live, and what did they contribute to the genetic gumbo of your mule's daddy? And by the way, could we learn something that could explain what makes your mule so special. We are going to do a very high level review of your mule's family tree.

The first branch on our mules sire's family tree reaches into northern Africa and has three wonderful representatives. These are the African Wild Asses consisting of the

Atlas Wild Ass (*Equus africanus atlanticus*), Nubian Wild Ass (*Equus africanus africanus*) and the Somali Wild Ass (*Equus africanus somaliensis*). The historical distribution of these three subspecies, are depicted in Map #1. According to a recent study of the ancient DNA of the African Wild Asses, it is believed that the Atlas Wild Ass was confined to the northwest portion of the African continent and probably became extinct in early historical times. Since that one is gone, we will confine our family discussion to those that are left, the Nubian wild ass and the Somali Wild Ass.

The recently published DNA evidence re-

veals that the Nubian wild ass is now considered to be the closest relative to our donkey (Kimura et al, *Ancient DNA from Nubian and Somali wild ass provides insight into donkey ancestry and domestication, Proc R. Soc. B vol 278 no 1702, 50-57, 2011*). It is believed to have been domesticated almost 6,000 years ago in northern Africa. One of the needs for domestication of the Nubian wild ass by the nomadic tribes of northern Africa is thought to be the climate becoming more arid. This forced the movement of their herds more often to find graze and the wild asses were the closest



thing available to try to domesticate. The domestication process is thought to be based on first utilizing the wild donkey as a source of food, then capturing young foals and maintaining them as a later food source, and eventually rearing them to be pack and riding animals. I am sure it was a process filled with lots of train wrecks, bruises and broken bones. But when you find an animal that can carry heavy loads, is easy to maintain, and also good to eat when needed, it's worth the effort. The wild ass was so prized and respected that in ancient times the sultans of the area decreed that should a man kill a wild ass, his hand was to be cut off. Just remember that should you ever be tempted to mistreat some of his descendants in your care.

As the distribution map for this species indicates this area is characterized by a arid to semi arid climate, high temperatures, lots of steep terrain, and not a lot to eat. The fact that the Nubian wild ass adapted to surviving and thriving in this area does a lot to explain our domestic donkey's ability to be maintained on less forage, withstand high temperatures, and navigate rough terrain. We can be thankful for that genetic contribution to our mules in the pasture.

Unfortunately the Nubian wild ass is now considered extinct in the wild. It was last seen in the Red Sea Hills of Sudan late in the 20th century. It is my guess that if you look at a photograph of a domestic donkey in use in northern Africa, you may be looking at something that may resemble the Nubian wild ass.



*A print from the mid 1880's depicting a local resident of northern Africa riding what may represent the color and body type of the now extinct Nubian wild ass (*Equus africanus africanus*). (Photo from the National Library of Congress collection).*



*Left: The Somali Wild Ass (*Equus africanus somaliensis*), the jewel of the desert. These three at the San Diego Wild Animal Park represent the hope for the survival of this species. (Photo courtesy San Diego Wild Animal Park, used with permission)*

The Somali wild ass (*Equus africanus somaliensis*) is the next branch of our donkeys family tree. This animal has a stunning and almost regal appearance.

Again, according to the recent DNA evidence previously cited their contribution to our donkey's heritage is the subject of discussion. Some researchers believe it is a descendant of a now extinct cousin that once roamed northern Africa and what now is the country of Yemen. That argument is going to go on for a while. Regardless, the Somali

wild ass occupied the most severe regions of the Horn of Northeastern Africa comprising the current counties of Somalia, Ethiopia, and Eritrea. (See Map #1)

This area is famous for what it does not have; things like grass, forage and water. The Somali wild ass is famous for its speed (clocked at better than 30 mph) and ability to climb steep mountains. In the areas where it still survives in the wild, it is mostly seen as a solitary animal or groups of two or three. It is thought that less than 100 of these magnificent animals survive today in the wild. Fortunately, through the efforts of public and private conservation organizations like the San Diego Wild Animal Park and the White Oak Conservation Center, this species may survive for our children to marvel at.

The other branches of our mule's family tree are represented by the Asiatic wild asses (*Equus hemionus*) and historically reaches across the Arabian peninsula, through central Asia, into Mongolia, Manchuria and parts of China. Map #2 depicts the historical and present ranges of the Asiatic wild asses. Here we have more branches than on the African limb, but more distantly connected according to the taxonomist and lack of direct DNA evidence.



Map #2. The historical distribution of the Asiatic Wild Asses and the current remnant populations. (From Moehlman, Patricia D. (ed.). (2002). *Equids: Zebras, Asses and Horses. Status Survey and Conservation Action Plan. IUCN/SSC Equid Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 190 pp.*)

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The leaves on this branch are represented by the Onager, Kiang, Kulan, and the Khur. Looking at the real estate represented by the historical range of the Asiatic Asses, (refer to map) you can appreciate that any possible genetic contribution from these cousins just enhanced the ability of the donkey to survive predators, a low grocery diet, and long dry hot spells. In their native habitat, Asiatic wild asses are known to dig holes as deep as two feet or more to reach water in dry riverbeds, and in winter live only on water available in the snow. Their African cousins rarely had to deal with snow.

Let's look at these distant cousins a little closer. First let's look at how many branches are on this distant limb. The family members still with us are the Persian Onager (*Equus hemionus onager*), Kulan (*Equus hemionus kulan*), three subspecies of Kiang (*Equus kiang*, *Equus kiang holderi*, and *Equus kiang polyodon*), Dziggetai of Mongolia (*Equus hemionus hemionus*) and the Indian wild Ass (*Equus hemionus khur*) also called the Khur. We have already lost one branch of this limb, the Syrian Wild Ass (*Equus hemionus hemippus*) which is now extinct. This most probably was the wild donkey referred to in the old testament book of Psalms (Chapter 104 verse 11) and over 100 other biblical references to the "wild ass" as its historical distribution was Palestine, Syria, and the Arabia/Iraq region.

A quick look at their historical distribution map tells you that this is a tough limb on the family tree. These animals lived or currently live in high, harsh, and dry, climates ranging to sweltering heat to freezing cold. Those still surviving in their original habitat, live on the edges of any available forage or water sources. They have to compete with any domestic livestock plus survive the pressure of hunting for meat by the local populations. Like their African cousin, they are thought to be good to eat.

These Asiatic Asses are generally larger than the African wild asses and are more horse like in appearance. They can weight over 600 lbs and stand greater than 14 hands at the shoulder. The first time that I saw a Kulan, I was convinced that I was looking at a wild mule.

The remaining herds of Kiang of the Tibetan steppes and Kulan in the high Gobi desert survive winters in harsh environments that defy description. They travel long distances in winter between available graze and snow banks for moisture. Kiang in captivity, are known for their aggressive behavior and uncanny vocalizations. My



*The Kulan (*Equus hemionus kulan*) in its native habitat in Mongolia. (Photo courtesy Dr. Chris Walzer, Vienna University of Veterinary Medicine, used with permission)*



*A Kiang "molly" and her foal, (*Equus kiang holderi*) (Photo courtesy Dr. Jeff Zuba, San Diego Wild Animal Park, used with permission)*

first Kiang encounter was at the San Diego Wild Animal Park while conducting some anesthesia studies on other species.

There was this sound of something crashing against a fence and a squalling like I had never heard. When I asked the veterinarian I was working with about it, his statement was, "Oh, that's just our Kiang doing his normal thing." When I looked in the direction of the sound, here was this magnificent animal just having his daily rage and reminding us that we were invading his day.

The Onager and Kulan are being disputed

as to whether they are one subspecies or separate subspecies. We will leave that fight to the zoologist, but what is known is that these wild asses are quite similar in appearance. In truth, when you are looking at this group, you find gradations in coloration depending on if they are in winter coat or shed out into a summer coat that often make it difficult for me to tell them apart.

Regardless, the bottom line is that these Asiatic wild asses are a treasure to be preserved. At this time the remaining wild free ranging herds are rapidly dwindling due to



An Onager (*Equus hemionus onager*) and her foal demonstrating that traveling gait that allows them to cover long distances in search of grazing and water in their native habitat.

(Photo courtesy of Dr. Jeff Zuba, San Diego Wild Animal Park, used with permission)

loss of habitat, competition with domestic livestock, and poaching for meat by the indigenous populations (I did mention that

they are good eating didn't I). The good news is that this group is being maintained and propagated in captivity by leading in-

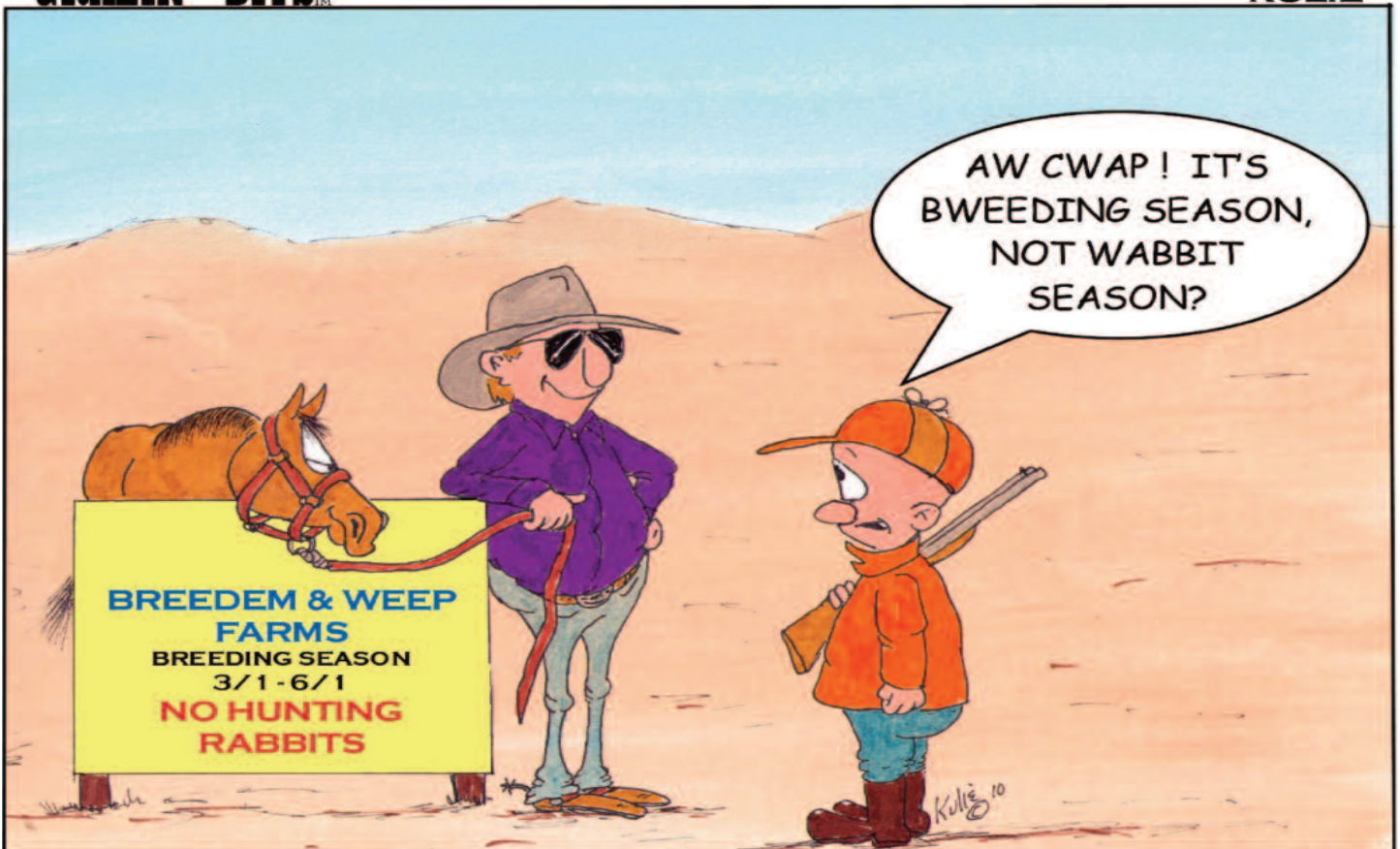
stitutions such as the San Diego Wild Animal Park, Saint Louis Zoo, and the White Oak Conservation Center. These institutions are the lifeboats for the survival of the species. Should you visit any of these, make sure to see them, and put an extra donation in the pot for their care.

Now, let's look at our mules mama's side of the family; the horse or in Latin: *Equus caballus* or *Equus fergus* depending on how your taxonomic pole is bent). In this discussion we will use the most current designation of the species which I believe is *Equus caballus*. The source for much of my information in the section that follows comes from the publication *Equus caballus, Horse*, written by Deb Bennett and Robert Hoffman and originally published in *Mammalian Species* No 628 p 1-14, 1999.

Our North American plains once supported the ancestors of our current horse till the late Pleistocene period, at which time they along with most of our other large grazing migrating mammals suddenly disappeared. Only those in Euro-Asia survived to provide the genetic pool for what we know as the horse today. According to current information available from the field of mammalogy, the horse as it is today comes to us from three divergent lines of domesti-

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cation. The first comes as the tarpan (*Equus caballus fergus*) from the steppes of eastern Europe, the second as the warmblood (*Equus caballus moshbachensis*) from central Europe and the third (referred to as the Afro-Turkic) coming from northern Africa and the Middle East. Its scientific name of *Equus caballus algerius* or *pompelli* is in dispute among folks that argue about such things. The real tragedy is that none of the wild representatives of this branch have survived. Another treasure lost.

Like the asses, the horse limb of our mule's family tree has a second branch Asiatic/North American branch with three subspecies: the Beringian horse (*Equus caballus alaskai*), the American Periglacial horse (*Equus caballus mexicanus*) and the Mongolian wild horse (*Equus caballus przewalski*) commonly known as the Przewalski wild horse or Takhi in its native Mongolia. The Beringian and American Periglacial horse disappeared during the late Pleistocene but the Przewalski survives today and has something to tell us about our

mule, it's mother and possibly all equids.

The Przewalski horse is a study in bone, muscle, and endurance. Their stout body conformation, strong head and neck, plus a hair coat that ensures survival in a tough winter, speak to their heritage from their ancient ancestors. They are the only thing we have to look at that may resemble the horse that once ran free on the plains of North American 10,000 years ago.

The Przewalski wild horse (locally known as the Takhi in Mongolia) has only survived due to its conservation by zoos and institutions, predominately in Europe and here in the United States. The last wild Takhi were seen in the 1960's in Mongolia and was later declared extinct in the wild. Following Mongolia's independence in 1990, a plan was made to reintroduce this magnificent animal back into its native habitat. The Takhi were released back into the wild in Mongolia through the combined efforts of the International Takhi Group and the University of Veterinary Medicine in Vienna. Today, over 150 now run free in the

over 1,100 square miles of the reserve in the Gobi desert of Mongolia.

It is a controlled study of this species, utilizing satellite tracking collars and internal body system monitors, that leads me to the one point I want to make about our mules mama and our mule. In a population of Przewalski horses in a reserve in Austria, seven free ranging individuals were implanted with subcutaneous body temperature and heart rate monitors and recordings made every two minutes for over a year. Dietary intake was monitored and body condition noted during the one-year study. The take home bottom line "AH HA" of this study is that these animals demonstrated a marked lowering of heart rate, metabolic rate, body movement and body temperature as they approached the season of extreme low temperatures and limited forage. In the author's own words "The seasonal changes in physiological and behavioral parameters found in Przewalski horses are evidently under endogenous (self) control, preparing them well in advance for predictable sea-



A Przewalski horse, on a reserve in the United States. Conservation and captive propagation in zoos and preserves was vital to the reintroduction of this species to Mongolia in the 1990's (Photo by Dr. William Lance)

sonal changes of climate and the availability and quality of food” (slightly paraphrased by this author) (Arnold, W., Ruf, R, and Kuntz, R. 2006. *Seasonal adjustment of energy budget in a large wild mammal, the Przewalski horse (Equus ferus przewalskii)* *J of Exp Biol.* 209, 4566-4573.) In the broadest sense, these animals go into a mild form of standing hibernation.

What this study tells me is that our mule’s aunts and uncles, and I suspect our mule, have internal control mechanisms to regulate body metabolism and activity during harsh conditions in ways that defy our understanding and certainly our current feeding and care practices. What other things are they not telling us?

In conclusion, when you survey our mule’s history, the mysteries of its ancestors, both known and unknown, you realize that they have a treasure of information they are not sharing with us. They are an open book that we have to become smart enough and sensitive enough to read.

The next time you see your mule running free across the pasture, kicking for the sky, trying to bite the one in front, and then running up to you with a snort and a defiant toss of the head with a little fire in the eye, they could be showing you that there still a

lot of that “wild ass cousin” in there.

We will stop the family reunion here and wait until next time to explore the donkey’s

journey from its first domestication from the African wild ass to its dispersal through the Middle East, Europe, and Asia.

Acknowledgements. The author wishes to thank Dr. Jeff Zuba (San Diego Wild Animal Park), Dr Randy Rieches (San Diego Wild Animal Park), Dr. Chris Walzer (University of Veterinary Medicine, Vienna), and the San Diego Wild Animal Park Public Relations Department for sharing their expertise and for the generous permission to use photographs. Most of all, thanks to you who introduced me to mules and continue to share your knowledge of the mystery and wonder of the mule with me. You know who you are.



Author, Dr. Bill Lance and his favorite mule “Josie” in the West Elk Wilderness

