Texas A&M AgriLife Extension

Wild Pig Newsletter

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Wild Pigs and Mast Crops

By: Shelby McCay, Student Technician - Texas A&M Natural Resources Institute

Wild pigs (*Sus scrofa*) are considered opportunistic omnivores – meaning they will consume both plant and animal food sources available to them throughout the year. The vast majority of a wild pigs diet consists of plant materials (Figure 1), and an important, seasonal food source for wild pigs are mast crops (acorns, fruits or beans). Common mast producing species in Texas include oaks, hickories, honey mesquite, prickly pear cactus and persimmon. This article will highlight the research that has been conducted on wild pig competition with native wildlife for mast, the effects mast has on wild pig population trends and how wild pigs' consumption of mast can influence forest composition.

(Continued on page 2)

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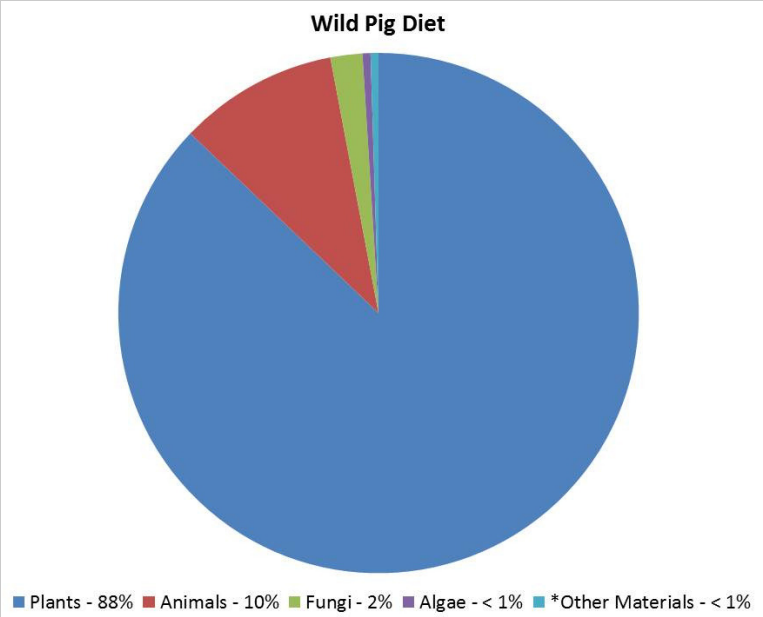

Figure 1. Wild pig diet composition[6]. *Other materials may include debris, garbage, lichen, rocks/gravel, soil/sand, etc.

Consumption of Mast and Competition with Wildlife

Mast crops represent a high-quality food source for wildlife and are consumed by many native Texas species including white-tailed deer, wild turkeys, collared peccaries and multiple small mammal species, including squirrels and rodents. Honey mesquite pods contain high concentrations of carbohydrates, some protein and several minerals, including sodium, calcium, iron, and zinc[9]. Acorns of both white and red-oak species (Figure 2) are high in fat and carbohydrates, and contain some vitamins and minerals, including calcium and phosphorus[8, 15]. Acorns of the red-oak group have a high concentration of phenolics and tannins[15], which are compounds that can reduce palatability to wildlife.

Due to the variable environments and unpredictable levels of rainfall in Texas, mast crop production can vary widely between individual plants, species and years. For example, acorns from trees in the red-oak group are considered semi-annual producers since they take approximately 15 months (two growing seasons) to mature, whereas acorns in the white-oak group are considered annual producers since they only take approximately 3 months to mature (one growing season)[12]. These crops are often available in large quantities for limited periods of time, mainly in the fall and winter months. Because mast crops often are distributed unevenly across the landscape, there is potential for competition among various species of wildlife for these resources[5].

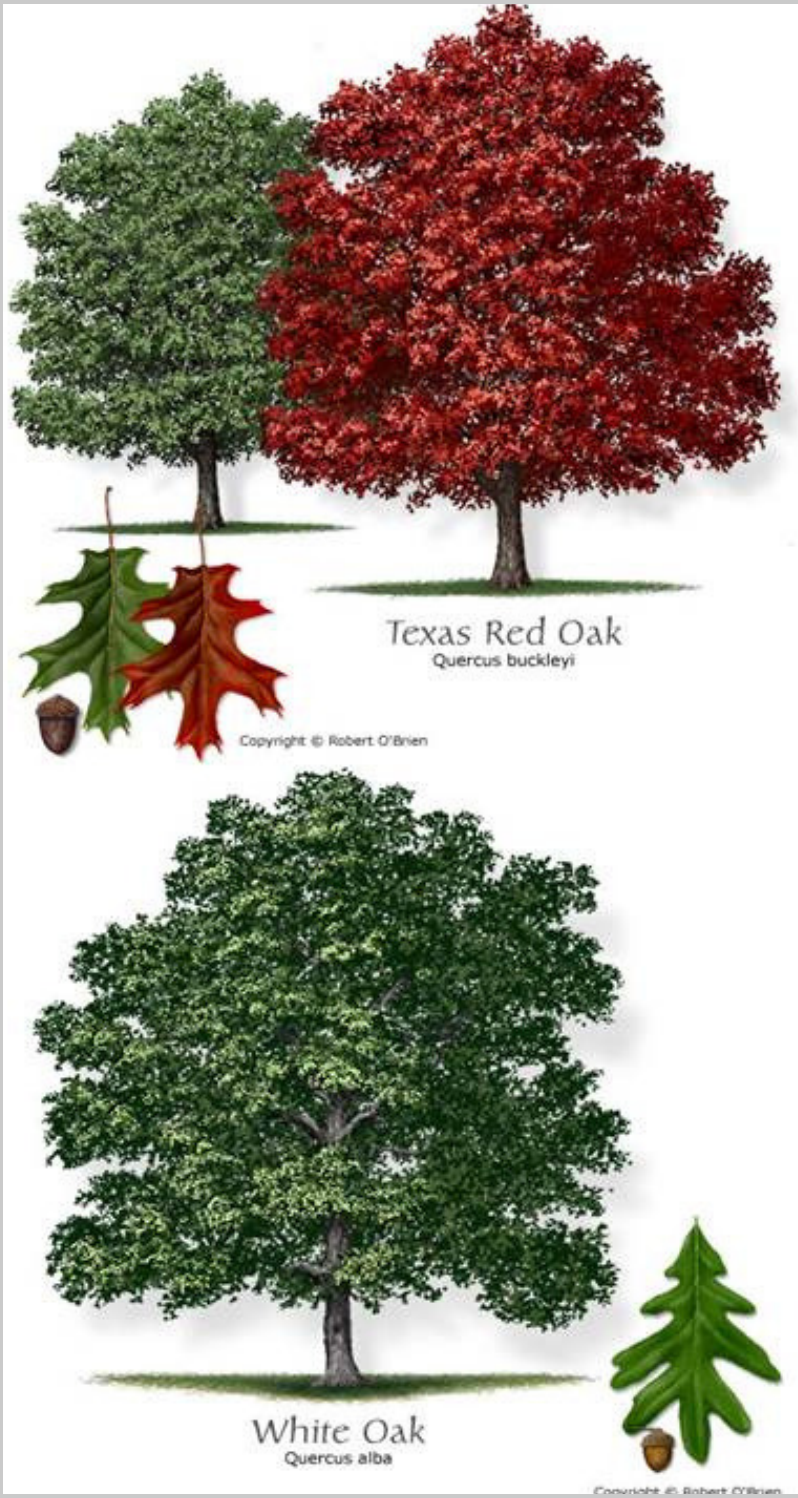

Figure 2. Red Oak species vs. White Oak species. Red oaks generally have pointed tips on their leaves and white oaks generally have more rounded tips on their leaves. Click the images above to learn more. (Images Credit: Robert O'Brien, Texas A&M Forest Service)

To test this hypothesis, researchers at the Caesar Kleberg Wildlife Research Institute conducted an experiment to compare levels of mast intake between multiple native wildlife species (white-tailed deer, wild turkeys, collared peccaries, raccoons) and wild pigs by offering these various mast crops and measuring the rate of intake and

total amount consumed by each species. Results of the study found that wild pigs can consume mast at an equal or higher rate than native species when consuming mesquite pods and live oak acorns, and had the capability of eating the relatively larger, astringent, red oak acorns that were rejected by raccoons and wild turkeys. The rates of intake and the ability of wild pigs to displace native wildlife species from feeding sites[2] suggests that wild pigs can compete effectively with wildlife for mast crops[5].

As stated above, wild pigs are opportunistic omnivores and are able to readily shift their diet between browse, mast and animal food sources throughout the year. Many native wildlife species, on the other hand, are very specialized in their diets and are unable to shift to new food sources when their usual ones run out. During productive years, this is generally not an issue, but in years where resources are scarce wild pigs can exhaust food supplies required by native wildlife, leaving these species with few options to survive.

Wild Pig Population Dynamics and Mast Intake

Mast crops are an important component in population dynamics of many species, including white-tailed deer, small mammals and wild pigs[1, 11, 13, 18]. The growth rate of wild pig populations has been shown to be correlated to the seasonal availability of mast producing tree species[3], and the yield of both previous and current mast crops influences the timing of reproduction and the proportion of reproducing sows in a given year[14].

A European research team conducted a long-term monitoring study of two populations of wild pigs, one on a 14,800 acre fenced preserve in Italy with low levels of mast crop production and low hunting pressure and the other on a 27,200 acre forest in France with high levels of mast crop production and high hunting pressure to assess how mast crops affect the reproductive output of sows[7]. Results of the study found that in both populations, abundant mast crop availability increased body mass, and reproduction. Abundant mast crop availability also led to direct increase in fertility, indicating that wild pig sows adjust their reproductive output to track resource availability[7]. Thus, sows born in years with high mast crop production should be heavier the next breeding season and potentially have higher fertility levels and larger litter sizes than sows born in years with low mast crop production[7].

Acorns contain high amounts of fat and carbohydrates and are important source of mast for native wildlife and wild pigs. (Image Credit: Texas A&M AgriLife Extension Service)

Prickly pear cacti produce mast, called tunas, which are readily consumed by many species of wildlife and wild pigs. (Image Credit: Texas A&M AgriLife Extension Service)

Honey mesquite beans pods contain high concentrations of carbohydrates, some protein and several minerals, including sodium, calcium, iron, and zinc. (Image Credit: Texas A&M AgriLife Extension Service)

Acorns also contain the essential amino acid lysine, which is a primary determinant of milk production in domestic sows [19]. Lysine concentrations in sow diets greatly influence offspring growth rates[19]. Therefore, litters born in a productive acorn crop year will have increased growth and future reproductive capability over litters born in unproductive years[7].

Forest Dynamics

Wild pigs may impact the diversity of tree species found in forests through their consumption of mast crops and their destructive rooting behavior. Since seed number and seed size are generally negatively correlated[10], mast producing species may be more sensitive to consumption by wild pigs simply because they are unable to produce as many seeds as small-seeded species such as grasses[16]. Rooting behavior can increase abundance of small-seeded and invasive species such as Chinese Tallow (*Triadica sebifera)* by creating favorable soil conditions and reducing competition from large-seeded species[16].

In order to investigate this further, a study was conducted by researchers from Rice University and Texas A&M University over 7 years using exclusion plots in select areas of the Big Thicket National Preserve in Texas[16]. Results of the study found that mast producing species (hickory, oak, and tupelo) responded positively to wild pig exclusion and there was increased the diversity of woody plants in the forest understory, especially mast crop producing species, in exclusion plots versus non-exclusion plots[16]. In the non-exclusion plots, tree diversity was lower due to Chinese Tallow invasions, which were more than twice as abundant as in exclusion plots[16]. Increased wild pig management activities may be desirable in forests where mast producing species are the predominant part of the plant community and invasive plant species are present.

Conclusion

Overall, the relationship between native wildlife, wild pigs and mast crop species has been shown to be complex and incredibly interconnected. Wild pigs can effectively compete with native wildlife for these resources and exploit mast crops that many species find unpalatable, increasing their competitive advantage through increased fertility and reproduction. Exotic, invasive wild pigs also have the potential to change the species composition and diversity of forests through their consumption of mast crops, destruction of habitat and proliferation of invasive plant species. Continued wild pig control and damage abatement efforts remain imperative to keep both native wildlife and plant communities healthy and functioning.

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Winners Announced for Wild Pig Photo and Video Contest

The Texas A&M Natural Resources Institute recently conducted a contest in search of the best wild pig pictures and videos out there. We asked, and you delivered! Submissions were accepted through our social media channels, email and google drive accounts. Prizes were as follows:

1st place - A thumb drive loaded with AgriLife Extension's full wildlife and fisheries publication pack
2nd place - A hard copy of AgriLife's Extension's wild pig publication pack
3rd place - A thumb drive loaded with AgriLife Extension's wild pig publication pack

Winners are featured on the next page!

1st Place - Bobby Walker

Look familiar? Bobby Walker's outstanding daytime picture of this mature boar is so good it not only took first place, it made the cover of this edition of the Wild Pig Newsletter!

2nd Place - Mike Connell

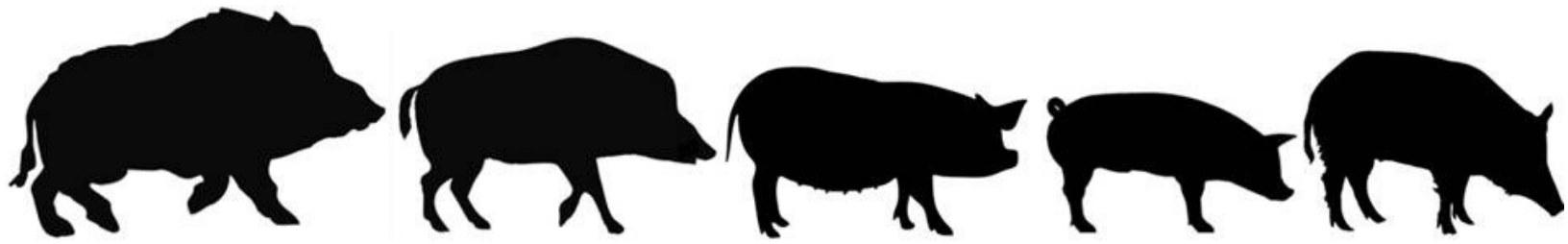
This track showing a splayed cloven hoof as well as one of two dew claws is a classic example of the identifiers of a wild pig track.

3rd Place - Ken Siekiera

Any guesses on how much this huge boar might weigh? We're not sure, but this night time trail cam picture took third place in the contest!

Google Drive

Want to share a wild pig pic or video of your own? Just click either link to the left or email us at nriwildpigs@gmail.com. You may just see your submission featured by the Texas A&M Natural Resources Institute!



On the Origin of (the Wild Pig) Species

By: Josh Helcel, Extension Associate
Texas A&M Natural Resources Institute

Nearly 160 years ago Charles Darwin published his "On the Origin of Species," a work that would become the cornerstone of evolutionary biology. The books' 502 pages outlined the scientific theory of natural selection and species diversity through evolution across successive generations[2]. In contrast, this article may at best become the cornerstone of someone's leisure reading for about 5 minutes and 2 seconds. However, if you've ever wondered where wild pigs (*Sus scrofa*) came from, why there are so many different names for them and how man has influenced nearly everything about them, well then what follows may be worth your 5 minutes.

History of Wild Pigs

In order to understand how wild pigs became what they are today, look no further than the history of the domestic dog (*Canis familiaris*). Science generally accepts that sometime between 10,000 - 33,000 years ago humans in Asia domesticated the wolf (*Canis lupus*) [1, 4, 7]. In whatever time frame it actually occurred, people transformed wolves into Labradors, Poodles and even Chihuahuas through selective breeding and trait selection over successive generations (Figure 1) [1, 7]. Such transformation within dog breeds continues to occur in modern times, take for example the Labradoodle or Boerboel. While this example is admittedly a little extreme and extends somewhat beyond what occurred in wild pigs, it is a good portrayal of how desirable traits can be selected for over time. However, just as Chihuahuas were derived from the wolf, domestic pigs were derived from the Eurasian boar (Figure 2).

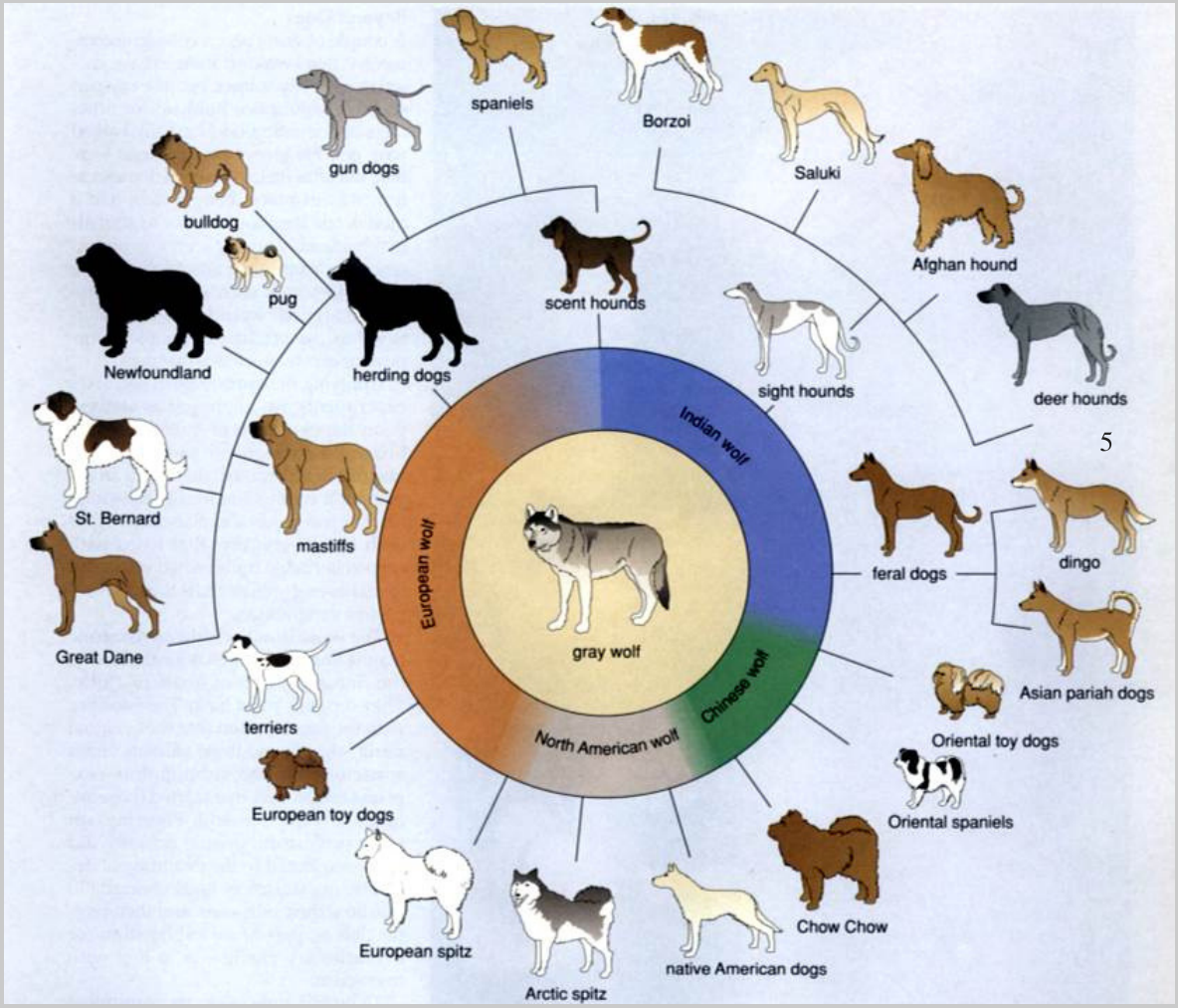


Figure 1. Just as the lineages of domestic dogs can be traced back to the wolf, domestic pig lineages can be traced back to the Eurasian boar. (Image Credit: Clutton-Brock and Jewell 1993 in Morey 1994)

Figure 2. The domestication of the Eurasian or "Russian" boar (pictured above) resulted in hundreds of breeds of domestic pigs.

A vast zooarcheological record indicates that the Eurasian or "Russian" boar was first domesticated approximately 9,000 years ago in what is now Eastern Turkey[4]. More recent phylogeographical evidence suggests that the domestication of this species occurred at multiple times and in multiple locations across Asia, Southeast Asia, India, Europe and Africa[5]. Domestication simply offered a much safer and more efficient alternative to chasing wild boar around the woods with a spear. Thus began the radical transformation of the Eurasian boar into the domestic farm pig (*Sus scrofa domesticus*) (Figure 3). Nowhere would such change become more evident than in Europe[5], and it would be Europeans who would ultimately deliver the domestic farm pig to the New World.

Figure 3. Charles Darwin's depiction of a Eurasian boar (top) and a Yorkshire Large Breed (bottom) in his "The Variation of Animal and Plants and Under Domestication" is a good example of the dramatic transformation that occurred during the domestication process[3]. (Image credit: Charles Darwin)

From Eurasian Boar to Domestic Farm Pig

For the purposes of this article, there is no need to delve into the complexities of genetic heritable traits, domestic reversion, Darwin's "domestication syndrome[8]," or exactly everything that had to happen for a 400 lb. Eurasian boar to turn into a pink, flop eared Landrace. Truth be told I don't think I could do so intelligibly anyhow. But this did occur, obviously, and today there are literally hundreds of breeds of domestic pigs of all sizes and colors. The more important aspect, with regards to today's wild pigs, is how this process may have aided their intelligence, reproductive capacity and potential overall survivorship. The reason for this is that wild pigs today are the direct beneficiaries of many of the adaptations and advantages incurred through the domestication process (Figure 4).

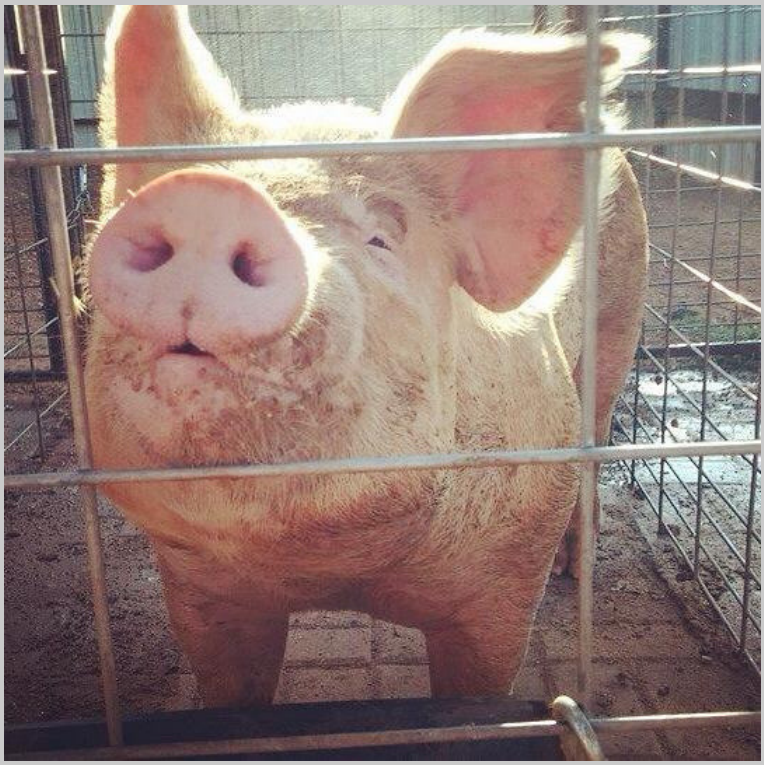


Figure 4. Traits including high animal gain, intelligence and extreme fecundity make domestic pigs excellent farm animals, but also contribute significantly to the continued success of wild pigs. (Image Credit: Texas A&M AgriLife Extension Service)

If I am a producer a few of the traits that I would like my farm pigs to exhibit are efficient animal gain, intelligence, and most importantly the production of as many offspring as possible as quickly as possible. It is no coincidence that the aforementioned were historically among the most selected for traits in all breeds of domestic pigs. These and a variety of other characteristics would ultimately transfer directly into wild populations. For example,

wild pig sows today can begin breeding as early as 6 months of age, produce 2 litters every 12-15 months, and have increasingly larger litter sizes with age (4-6 per litter initially, up to 10-13 per litter later in life)[6]. It doesn't help that they are also among the most adaptable and intelligent animals on the planet.

Why Not All Wild Pigs Are Feral Hogs

Now equipped with the desirable farm animal traits listed above, domestic pigs were initially brought to North America in 1539 by Hernando de Soto, a Spanish explorer and conquistador, as a reliable food source for early European settlers. These animals were allowed to range freely, and eventually established the initial populations of "feral hogs." In the early 1930's Eurasian boar were released onto hunting preserves in Texas[6], where some eventually escaped and interbred with true "feral hogs" - those originating strictly of domestic stock. Today, there are potentially 3 types of wild pigs that occur in Texas and North America. There are domestic pigs that have gone feral (feral hogs), hybrids between Eurasian boar and feral hogs, and Eurasian boar (Figure 5). However, few if any true Eurasian boar still free range in Texas or North America due to the rapid dilution of their bloodlines through the near constant breeding practices of wild pigs[6]. All 3 types can collectively be referred to as wild pigs, whereas only domestic pigs that have gone feral can accurately be referred to as feral hogs.

Figure 5. Interbreeding among the many breeds of domestic pigs that have gone wild (feral hogs) and Eurasian boar resulted in the dramatic variations now found in wild pigs today.

Conclusion

The wild pigs on the landscape today are well equipped to enact a tremendous scale of agricultural, water quality, native species and habitat damage. By selecting for traits such as high animal gain, extreme fecundity, intelligence and others through the domestication of the Eurasian boar, man produced an efficient and productive farm animal. However, by transporting and releasing both domestic pigs and Eurasian boar on new landscapes, these animals hybridized and subsequently created a prolific and destructive, exotic invasive species. The Eurasian boar was already an enduring and adaptable species even before humans domesticated, transported and hybridized it. However, it is important to acknowledge the contributions of man to the many issues we face today concerning wild pigs.

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