Antelope Creek

Fred C. Homeyer
Box 47
Robert Lee, TX 76945-9403
915-453-2863

WHAT BOER GOATS TELL US

by
Dr. Fred C. Homeyer
South African Boer Goat Breeder and Judge
Antelope Creek Ranch
Robert Lee, Texas
2010

3/10 "Twenty years from now you will be more disappointed by the things that you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore, dream, discover." author Mark Twain.

"No other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought, as agriculture." Abraham Lincoln, September 30, 1859

In one of the seminars that I have given around the country I open the seminar with the statement "Boer goats tell us what they are if we will just learn to listen to them and hear what they are saying." The Boer goat tells us what they are through their structural confirmation, through their skeletal dimension, through their muscularity and through their physical bearing or attitude. The best ones have a bearing or attitude as if to say "I am the most beautiful goat in the world and you have the privilege of looking at me!" This property is called Eye of the Eagle in South Africa and Aristocratic Bearing in Australia. I am sure you have seen a Boer goat with this property. In the show ring it is the goat that "shows itself".

What this article will endeavor to accomplish is to assist the reader in formulating a breeding strategy for Boer goats that will improve the breed through a study of the South African Boer Breed Standards, and careful observation of the physical properties and traits of the Boer goats that are available to him including a study of the genetic background of these animals

as well. Through observation of these properties and traits and study of the information presented in this article the reader should be able to make predictions and extrapolations as to the qualities and properties of the offspring or progeny from matings performed in the Boer goat herd. While this article discusses phenotype properties, genetics and recognition of genotype contributions in the animal should also be considered in a breeding program.

Since I began writing this article several years ago I have discovered the writings of the famous South African Animal Scientist Dr. Jan Bonsma. I have also discovered the website: www.bovineengineering.com produced by Mr. Gerald Fry from Arkansas. Through their writings, both of these gentlemen are having a profound impact on me and my study of the Boer goat. While their writings concern cattle, primarily beef cattle, I am convinced through my personal observations and development of empirical hypotheses that I have made during almost 20 years of observing Boer goats in the pasture and the show ring that there may be a strong correlation between all breeds of animals and how they cope with environmental issues in their struggle to survive and reproduce. Throughout this article I will be sharing some of the knowledge gleaned from these two men.

I have developed several seminars about South African Boer goats that I have presented in various countries worldwide. In each seminar the first slide that I put on the screen says, "The goats tells us what they are, we just have to learn to understand what they are telling us.

The first set of breed standards for the South African Boer goat was established around 1959 by the South African Boer Breeders Society. The primary reasons for establishing breed standards were to assist the Boer goat breeders in setting goals and guidelines to maintain and improve the breed and to provide for uniformity in production.

I first encountered the South African Boer Goat Breed Standards at an ABGA judging school in 1997. After reviewing the standards several times and reflecting upon their meaning it occurred to me that what the South Africans had done was a work of genius. On a single sheet of paper they had set forth all the physical characteristics necessary for an efficient goat meat production system in the pasture. They described a goat that had survivability, adaptability, a calm disposition, fertility, good mothering ability, and made a living under harsh conditions with low quality food. I realized that each of the physical properties set forth in the standards contributed to one of the desirable properties mentioned above. I have also observed that the Boer goat can be described through a

combination of ratios, proportions and angles some of which will be presented in this article.

The standards described a robust animal that was healthy and thrifty. The animal had medium bone and a lot of meat on the carcass. The Boer goat was intended to be the meat goat of the world and has gained wide acceptance all over the world as just such an animal.

Recently a new publication has come from South Africa that enhances a discussion of the standards in that this book details what undesirable characteristics can be expected when an animal has certain undesirable traits. The experience that the South Africans have had raising Boer goats for perhaps a hundred years or more can provide us with insights to improve the Boer goat in the U.S.

The calm disposition of the Boer goat is reflected in the gentle brown eye and the soft pendulous ear. An animal with a calm disposition is easy to handle and manage. A goat with a wild eye and/or stiff protruding ears will be wild and hard to manage. The rounded dark horns with adequate separation also contribute to a calm disposition and a buck that will not break the legs of other bucks when sparing and won't get their horns caught in a tree and hang themselves. Flat or bladed horns that flare rapidly from the body indicate a wild animal that is hard to handle. Horns that are too tight on the neck will rub the neck and can cause skin irritation, sores and infections. In addition horns that are too upright predict a rounded bulging forehead and a concave nose bridge that may result in an underdeveloped lower jaw. A flat sharp-edged horn is usually too heavy and the points of the horn bend outwards. The forehead is usually too prominent with a hollow between the eyes. Does with this type of horn tend to be too masculine in appearance and the buck's horns tend to be too close together.

Soft pendulous ears that flow down the side of the head are desirable. An animal that has short, stiff protruding ears may produce an animal that is wild and difficult to maintain. A folded ear with the fold coming from the head is undesirable and can cause an unhealthy situation. If the animal is dipped for external parasites such as lice or mites the South Africans feel that this type of folded ear can hold moisture and create an environment for bacteria and infection. A flipped ear or one that is folded at the tip of the ear is not considered a cull fault because it can be fixed by cutting the ligament at the fold or pulling the ear straight shortly after birth. Both types of folded ears can be highly inheritable according to discussions that I have had with Professor Wolfgang Holtz who heads a genetic research group in northern Germany. Professor

Holtz is the man responsible for bring the Boer goat to Germany from Namibia in 1980.

The wide set eyes, strong nostrils and powerful under jaw insure that the animal will be wide in the shoulders and wide in the loin and possess a powerful presence. The width between the eyes is directly proportional to the width in the shoulders and the width in the loin.

A long powerful head with a Roman nose or oval shape from the tip of the horns to the muzzle is an indication of breed character. Dr. Jan Bonsma was a professor of animal science at the University of Pretoria, Republic of South Africa. Over a 20 year period he developed a breed of cattle in South Africa called Bonsmara. The name of the breed is a combination of his name and the Mara Research Station where the cattle were first bred. Dr. Bonsma has written several books and numerous articles concerning the interaction of various species of animals with their environment. The Bonsmara breed is noted for their functionality and their ability to thrive in a subtropical desert climate while producing fast growing calves and tender red meat. Bonsma discovered that one of the physical adaptations to a hot desert climate was the Roman nose. The extra space in the nasal area of the skill provide extra room where the air can cool the blood before it enters the brain. In this way the animal can better handle the heat and reduce panting which increases energy and ultimately increases heat. The Roman nose can be seen in many species of African animals including Afrikaner cattle, gemsbuck, dama gazelles and of course the Boer goat.

Professor Bonsma realized that the most important factors influencing cost of production are:

1. Fertility - (high calving percentage).
2. Low mortality - (adaptability).
3. Heavy weaning weight - (good milk production).
4. Rapid growth and low food-weight gain ratio.
5. Good conformation - (a high amount of quality meat).
6. Animals with a placid (calm) temperament which make management easy.
7. Longevity

As I read more of Bonsma's writings I am amazed at how similar the South African Boer goat and the Bonsmara breed of cattle become. When he developed the new cattle breed over a 20 year time period he found that the composite of 5/8 Afrikaner and 3/8 British beef breed (3/16 Hereford for meat and 3/16 Shorthorn for milk production) was the best combination for being heat tolerant, function efficiently and survive under hot desert conditions. Many of his considerations were the same as

the original South African breeders were in developing the South African Boer goat.

Before 1940 it was thought that tropical degeneration of the British breeds of cattle was caused by malnutrition as the protein content of natural pastures in the Southern hemisphere is low, reaching critically low levels during the late summer and early winter. Dr. Bonsma began a large scale nutritional experiment at the Messina Livestock Research Station in 1937 using a large group of heifers of different British beef breeds. Through this experiment Bonsma discovered that malnutrition was not the problem because there were several heifers that thrived much better than others. Careful observation found that those animals that showed the least climatic stress (heat stress) thrived best. Those animals that showed signs of stress on hot days had a very high respiratory rate, they panted, their tongues hung out and they dribbled profusely.

Because Bonsma wanted to measure every aspect of the livestock that he worked with, he made numerous observations on the animals in his experiment. These included regular weighing, 14 different body measurements, body temperature, pulse and respiratory rates, hair count per square centimeter and tick counts. Hair diameters were measured and complete hair coats of different types of cattle were shorn off, weighed and put through a felting machine.

These elaborate tests proved beyond doubt that the hide and coats of cattle played a tremendous role in the process of heat dissipation, which is of the utmost importance for the animal to maintain its thermal equilibrium in the environment. He found that "animals that suffer from hyperthermia have increased respiratory and pulse rates with concomitant metabolic, physiological and endocrinological disturbances."

Bonsma discovered that animals with a respiratory type of body conformation, a wide-forehead and convex facial profile were much better adapted to the tropics and sub-tropics than those with a digestive type of body confirmation and a dished forehead and profile.

"It has been shown in several critical experiments, and it is only logical, that the larger the surface area of the nasal sinuses, the greater is the surface area available for evaporative cooling during panting." Excess panting takes more energy and generates more heat in the long run.

It would seem reasonable to assume that cattle with broad heads and a convex profile (Roman nose) would be able to cool their brain tissue more effectively than those with narrow heads and a concave profile. Afrikaner cattle are extremely well adapted to hot and arid conditions. That they also have relative large, broad heads with a convex Roman profile appears

to be of great importance to their physiological adaptation, and not merely a fancy point dreamed up by breeders. (All of the discussion presented above about Bonsmara was taken from extracts of "Genesis of the Bonsmara" by Jan Bonsma.)

I have included this discussion to show that there seems to be a correlation between many breeds of animals that have been developed over time to thrive in harsh, hot desert climates, particularly Africa. The Roman nose of the South African Boer goat was not an accident rather it was a adaptation over many years of indigenous breeds that make up the modern Boer goats. The Roman nose is a way for the Boer goat to dissipate heat and live comfortably in hot climates without excessive respiration and panting. I suspect that the skin and hair coat as well as the numerous folds of skin down the neck of Boer bucks also contributes to their functionality and survivability related to heat tolerance. Bonsma noted that animals adapted to hot desert climates usually had a dark (usually red) hide that had sleek short haircoat and the skin had high vascularity and very active sebaceous glands. He noted that the color of the hide was seldom black as black absorbs too much heat.

Continuing from "Genesis of the Bonsmara", "thanks to Bonsma's unique method of scale photography, the Bonsmara is the only breed in the world that can boast a pictorial genealogy from the very beginning of the breeding work until the new breed was established. It is also unique in that every mating was based on scientific data, where the concept of "Man Must Measure" (Bonsma's famous book written in 1983 entitled, "Lifestock Production - Man Must Measure") was always taken into consideration."

It interesting to note that the Bonsmara breed association in South Africa prohibits showing animals in the show ring, rather they let the production data of the individual animals speak for the animal and the skill of the individual breeders. An animals does not get entered into the registry unless production data set forth in the breed standards are met. A producer will not be admitted into membership in the association until he has registered at least 30 head of cattle. Bonsma felt that it was more important for producers to compete among themselves using production data of their cattle instead of parading pretty animals around a show ring. Perhaps we could learn something from his philosophy considering what has happened to the Boer goat breed as a result of the show ring and emphasis on non-productive and non-functional traits found in show winners.

Since a goat does not have teeth in the upper jaw it is imperative that the teeth in the lower jaw match perfectly with the pad of the upper jaw. Since the primary diet of the Boer

goat is leaves, twigs and weeds (they are browsers and eat primarily a meter and above the ground as opposed to grazers such as sheep and cattle that eat primarily a meter down to the ground) the teeth and pad must match in order for the animal to cut the weeds, leaves and twigs that consist of 80% or more of their diet in the pasture. Raising the goat in a pasture is desirable as the trace minerals in the browse help the goat get a more balanced and healthy diet. Too much separation between the teeth and upper jaw pad in either direction (underbite or overbite) produces an animal that cannot eat properly in the veldt or pasture. The breed standards allow for a 5 mm separation between the teeth and the pad of the upper jaw with the lower jaw teeth extended out past the upper jaw (underbite or overshot jaw) when the animal is 24 months or older in the ABGA standard and a 6 mm separation when the goat is 36 month old in the South African standard. In both cases 5mm or 6 mm is about the diameter of a cigarette filter or a pencil eraser. Prior to 24 months or 36 months in each respective case the jaws must match perfectly. (I saw a young buck dismissed from the ring at the National Show in Sydney, Australia a couple of years ago that had less than 1/64" space in the teeth and jaw separation - the standard says the jaws must match and even 1/64" is a separation. It was a shame to see this buck dismissed as I felt he had the potential to be the champion if his jaw had not been misplaced.)

It is important that the body depth have balance. If the body depth is too shallow the chest becomes smaller and the flank becomes higher. If the body depth is too deep the neck will be too thick and the flank will be lower. Does with these characteristics are less fertile and poor breeders. When the body depth is cylindrical or too shallow the chest is weaker, the curve below the shoulder is too sharp and in many cases the goat has a serious devil’s grip. Also the legs are thinner, the back is slightly concave, the buttock is weaker and in some cases the muzzle is pointed which may result in parrot mouth or overbite in the jaw.

It has been observed by measuring many Boer goats that the ideal angle that the neck coming out of the topline is approximately 40 degrees. From 30 to 50 degrees seems to be normal. When the neck comes out of the topline at too severe an angle this affects the skeleton by changing the angle of attachment of the scapula to the humerous that forms the point of the shoulder and the humerous to ulna attachment that creates the point of the elbow. In many cases an extreme angle in neck affects the point of the elbow with the elbows bowed out like a bulldog in a configuration called hyperextended scapula or extruded scapula. Goats with this malady may have difficulty

walking around the pasture at 3 years of age or older and as a result the hyperextended scapula should be considered as a structural defect. Hyperextended scapula is also seen in some cases where the width of the chest floor is extremely wide in young animals. It should be noted that through numerous observations and measurements the ideal angle at the point of the shoulder where the scapula connects with the humerous is approximately 137 degrees. A greater angle than this will result in an animal where the skeleton in the front end assembly is too straight, the muscles are stretched too severely and the front end cannot handle the continual shock to the body as the goat walks around the pasture over time. Too great an angle in the front end assembly is similar to posted legs in the rear end where the back legs cannot absorb the shock of walking over time and the goat breaks down. The proper angle to the hock as observed through number measurements seems to be approximately 160 degrees. A greater angle in the hock is exhibited by posted legs where the angle of the hock approaches 180 degrees.

The legs to body ratio in immature or young animals should be 50 - 50 and in mature animals the ratio should be 60% body to 40% legs. Goats that are too cylindrical in the body may be too high in the chest floor and the legs to body ratio may still be 50-50 at two to three years of age.

The shape of the rump is important when considering the reproductive ability of the doe. If the rump is too steep the doe will have birthing problems as the kids cannot exit the birth canal successfully resulting in death of the kid and possibly death of the doe. A buck with a steep rump may put this steep rump on his doe kids resulting in birthing problems in the herd in subsequent years. It should be remembered that the buck is one-half of every kid in the herd while the doe is only one-half of her kids. A steep rump seems to be highly inheritable. When the rump is sloping the tail is lower in the back, the back is hollow and the buttocks are flatter. An animal with a sloping rump often has either a hollow or flat head.

When the rump is too short the buttock becomes round like that of a pig, the hock straight like that of a chicken and the back is too straight. (Taken from the South African publication, "A Study of the SA Boer Goat" or "'n Studie van die SA Boerbok" 2006.)

"When the buttock muscling is too short the flank becomes higher, the hock straighter and the front leg muscles disappear. When the goat is flat chested the neck is also thinner. A goat that is too heavy chested lacks angularity. The chest will be lower and more prominent, the stomach line will be straighter and the neck considerably thicker. The doe is less fertile than

a more angular animal. When the chest is too sharp and too shallow the curve of the stomach line tends to go upwards, the chest is smaller, the neck is thinner and the front leg muscle disappears.

When the neck of the doe is too fleshy and too masculine and there is too much dewlap around the throat, the doe is usually less fertile and will have weaker mothering characteristics than a more angular doe.

If the legs of the doe are too think this indicates a tendency toward masculinity and reproductive problems. Also this may result in lack of muscling on the front leg and a flat thigh on the hind legs. These characteristics are undesirable because they result in lower production of meat." (Taken from the South African publication, "A Study of the SA Boer Goat" or "'n Studie van die SA Boerbok" 2006.)

The requirement that the doe must have kidded or be visibly pregnant by 24 months is in the standard to insure that the goat is fertile and reproducing the species. An animal that cannot reproduce is of little value other than the meat it carries on its' carcass. A doe with a well defined wedge that reflects in the underline of the body being deeper in the rear than in the front is a sign of fertility and indicates a capacity to carry kids.

The shape of the testicles (two equal size testicles in a single sac of adequate circumference) with no more than a two inch split insures that the reproductive organs of the male will have proper structure and that the male should be highly fertile. Perhaps some day a correlation may be made between the shape of the testicles and the shape of the udders on the doe kids the buck produces. (When I first wrote this statement I was not familiar with research performed by some cattle breeders in this regard.) According the Mr. Gerald Fry mentioned earlier in this article "the cow with the perfectly shaped tight udder should produce the bull calf with perfectly shaped "football" type of testicles that have no split and no twist at the points of the testes. This bull with ideally shaped testicles produces female calves with ideal udders. If the teats on the bull are on the neck of the scrotum the shape of the udder of his female calves will have teats facing forward on the udder and the cow will have very low milk production." (Taken from a discussion found on the website: www.bovineengineering.com).

The shape of the udder on the Boer goat being tight near the body with a teat structure with no more than two functional teats per side of the udder provides a situation where the newborn kids can effectively suck and survive. If a teat is split the split must be at least 50% split for ABGA so that the

baby can nurse. If the teat is large with two orifices it may be so large that the newborn cannot get the teat in its mouth. If the udder is too pendulous and hangs near the ground a newborn kid will have difficulty getting its first drink. Until the kid is several days old it will not be athletic enough to nurse on a large pendulous udder. The udder cannot have multiple nonfunctional teats that distract a new born and provide no nutrition. One of the more dangerous teat configurations in my opinion is a long (about one to one and one half inches) nonfunctional teat that is about eye level of the kid. The kid will latch onto this teat and suck until it is exhausted and eventually dies due to getting no milk. The South African Standard requires that the teats be totally separated with no more than one non-functional teat located high, middle or low on a functional teat. The proper teat requirement contributes to survivability of offspring. (The South African Boer goat breeders must know the importance of testicle shape on the Boer buck as all of the South African judges that I have observed will not tolerate any twist or split in the testicles. They must know that irregularities in the testicles have a bearing on the udder of the doe kids produced by the buck.) An old timer once told me that a buck with split testicles would produce doe kids with pendulous, lopsided udders. He just might be right as this has been empirically observed in my personal experience.

Strong, powerful legs that properly support the body under all four corners are necessary in the Boer goat so that the animal can get around the pasture and eat. Legs that are cow hocked, bandy or crooked will not function properly over time and the goat will break down. Legs that are too straight in the rear (posty legs) or too much angle (sycle hock) will create animals that break down in the pasture over time. Structural correctness set forth in the standards produces a goat that is mobile and adaptable to various range conditions. The pastern is the area between the dew claw and the hock on the lower leg of the animal. Pasterns that are too straight or too slanted indicates that the animal will eventually break down and not be able to move around effectively.

The breed standard suggests a medium size goat. Goats that grow to be too large are functionally ineffective as they may be unable to maintain themselves in a pasture setting. They are also prone to leg problems such as weak pasterns and may also develop a hollow back.

A round barrel with well sprung ribs are necessary for a healthy goat to carry considerable meat and have capacity for rapid growth. A goat with a big foreleg will typically be an

animal that carries a lot of meat and muscle. The circumference of the foreleg is sometimes regarded as in indicator or predictor of mass and muscle as the goat matures. A goat that is too broad in the shoulders may produce kids that create difficult birthing. A goat that is too narrow in the back end will lack the desirable amount of meat.

Having dark pigment on the hairless parts of the body, that is, around the eyes, nose, udder and under the tail insures a goat that will not be prone to skin cancer. In the semi-arid desert climate of South Africa the sun can be very hot and without pigment the goat could readily get skin cancer. The climate in Texas is particularly good for raising Boer goats as much of the terrain is similar to that found in South Africa. South Africa is the same distance south of the equator as Texas is north of the equator and both of these areas of the world are places where the clouds have given up most of their moisture and as a result have a semi-arid desert climate. It should be noted that Australia is approximately on the same latitude south of the equator as South Africa. That is why the Boer goat thrives in Australia as well. Boer goats are highly adaptable as they can survive at sea level in the desert and even at 12,000 feet in the mountains and snow in Europe.

It is desirable to have Boer goats with a long face from horn set to muzzle as this distance is directly proportional to the distance from the hook to pin bones or the rump and also directly proportional to the longisimus dorsi muscle that runs down the length of the back. A goat with a long rump cannot have a short body. A short rumped goat will have a pig like butt where the muscle only comes down a short distance on the back leg. This may not be desirable.

The loose pleated skin on the front of the South African Boer goat provides a larger skin surface to cool the body in a radiator type fashion. The newer style American Boer goat with very tight skin on the front many not cool the body as efficiently and it remains to be seen if this deviation from the South African standard produces the desired effects that were anticipated by this change. It has also been shown that males that are very tall with long legs and long necks usually lack masculinity and may not produce adequate qualities of viable sperm to effectively breed a herd of females. Proper glandular function is necessary to produce males with enough masculinity (testosterone) to be herd sires. According to Bonsma proper glandular function begins in the developing embryo.

A wide chest floor and a long canon bone may be good predictors of growth capacity. Care should be taken not to have too much width in the chest floor as scapula problems and front end assembly problems can arise where the shoulders do not tie

in correctly with the body creating a bull dog like appearance. This is sometimes called extruded scapula or hyperextended scapula. Structural weakness eventually produces an animal that breaks down under pasture conditions.

Good skeletal dimension with a large skull is desirable in order to produce a skeleton that supports lots of meat and muscle. A large amount of muscle or meat is what makes the Boer goat desirable in the first place.

The standard that requires bucks to be masculine and does to be feminine provides for animals that fulfil their part of the procreation process and have the necessary glandular function to do so. Bucks that are too feminine may tend to produce ultra-fragile does with very light bone that may not have survivability in a pasture environment. Does that are too masculine, that is, too short in the neck, flat in the face or too deep in the body may be hard to breed and will probably lack good mothering skills. The long graceful neck and feminine head of the Boer doe would indicate that she can be readily bred and will be able to mother and raise multiple kids. A doe that produces and raises multiple kids per breeding is ultimately a greater red meat producer than a doe that raises only a single kid per breeding.

In South Africa when the goats are gathered up from the mountains perhaps twice a year; if the doe is not trailing twin kids by her side she is sold for meat. Good maternal traits with multiple kid production annually is a very desirable property. In South Africa it is all about efficient meat production and commercial viability of the animal. Eventually this will be the case in the United States as well. (Please note the earlier discussion of Dr. Bonsma's writings.)

So there you have a discussion of why certain desirable physical traits are necessary in the South African Boer goat in order to insure a goat that has survivability, adaptability, fertility, a calm disposition, good mothering ability and can make a living under harsh conditions with low quality food. When raised according to the South African Standards the Boer goat truly is an efficient meat production system in the pasture that is the meat goat of the world.

References:

"Breed Standards of the Improved Boer Goat", American Boer Goat Association.

"A Study of the SA Boer Goat or 'n Studie van die SA Boerbok", South African Boer Breeders Association, Middelberg Eastern Cape, South Africa, 2006.

"Selection and Evaluation", a paper by Preston R. Faris, Preston's Perspective Agri-Resource Consulting and Dr. Frank Craddock, Texas Cooperative Extension.

Extracts from "The Genesis of the Bonsmara", by Jan Bonsma.

"www.bovineengineering.com" developed by Mr. Gerald Fry of Arkansas.

History of the Bonsmara Breed of Cattle - taken from the website: http://www.herdbook.co.zm/Breeds/Bonsmara.htm

Http://herdbook.co.zm/Breeds/Bonsmara.htmCasey, N.H. and Van Niekerk, W.A., 1988. The Boer Goat I. Origin, Adaptability, Performance Testing, Reproduction and Milk Production. Small Ruminant Research, Volume I, Issue 3, pp. 291 - 302. Department of Livestock Science, Faculty of Agriculture, University of Pretoria. (21 May 1988)

Pinkerton, Frank, "Recommendations for Goat Industry Development", Meat Goat Production Handbook, www.sa-boergoat.com.

Bonsma, Jan C., "The Importance of Performance and Progeny Testing in Breeding Better Stud Stock", Bonsma Lectures 1979, Agriservices Foundation, Inc., Clovis, California.

Supplementary Materials:

A comment on the future of the Boer goat in the world and particularly the United States would seem to be in order at this point. The abstract of an article that appeared in Volume I, Issue 3 of the Small Ruminant presents a short history and facts about the Boer goat as well as what is needed now to see the Boer goat industry grow in the future. Note that development of production data through performance testing and how it will relate to commercialization of the breed in the future is paramount. I would like to share this abstract with you now.

ABSTRACT

"Boer goats evolved in Southern Africa from indigenous African and introduced European stock. Breed standards of the Boer Goat Breeder's Association (of South Africa) stipulate color to be white with red head and blaze, pigmented skin and good, functional conformation. Boer goats are hardy, graze a wide

spectrum of plants, grasses and shrubs, effectively combating bush encroachment, have low water turnover rates and low internal parasite infestation. Does are early breeders, polyoestrous and may be synchronized with intravaginal progestogen or PMSG. A 70% kidding rate is reported with AI. Anaplasma ovis infection of does, transmitted transplacentally to the fetus causes abortions and neo-natal mortalities. Milk yield averages 1.5 to 2.5 kg/day with 43 g/kg protein and 77 g/kg fat contents. Libido and semen quality of bucks varies seasonally. Performance testing aims to measure dam's characteristics pre- and post-weaning, feed efficiency of kids under standardized conditions, and qualitative and quantitative carcass evaluation of sire's progeny. The future of Boer goats lies in performance testing for economically important traits."

An additional excerpt from this article relating to performance testing appears below. It would seem that performance testing of the Boer goat has already begun but there is a long way to go.

"Performance testing of Boer goats started in 1970 under the (South African) National Mutton Sheep and Goat Performance and Progeny Testing Scheme. This is the second phase in the development of the Boer goat breed. The first phase was the adoption of breed standards which developed uniformity of type, color, hair and body conformation. It also united breeders with a common purpose and identity. Performance testing was first viewed with trepidation until the merits were demonstrated and then acceptance began to gain momentum. Hofmeyr (1978) maintained that stud breeders will continue to be an influential group in any effort to breed and improve livestock. Breeding goals must include putting higher emphasis on reproductive rates, reducing the number of traits selected for by excluding those of doubtful importance, and maintaining effective herd sizes and composition.

The Boer Goat Performance Testing Scheme provides for performance testing and selection of goats, specifically for meat production, according to the following five phases of determination:

A. Dam's characteristics, her milk production and growth rate of her kid(s) up to weaning age.

B. Post-weaning growth rate of the kid(s) as measured at various ages.

C. Efficiency of feed conversion and body weight of male kids under standardized conditions at a central testing station.

D. Post-weaning growth rate of male kids under standardized conditions.

1) on a farm under supervision and direction of the Animal and Dairy Science Research Institute, Irene, R.S.A. and

(2) at a central location of a co-operative institution, also under the auspices of the Institute.

E. Qualitative and quantitative carcass evaluation of a buck's progeny."

Frank Pinkerton in his article "Recommendations For Goat Industry Development" states that "University research and extension programs in production, processing and marketing of goat meat are scarce and should be implemented and sustained to assist in rapid, orderly industry development."

In his lecture "The Importance of Performance and Progeny Testing in Breeding Stud Stock", Bonsma states "The objective of the stud breeder should be to supply efficient and more productive seedstock to the commercial producer. Selection is the mightiest tool in the hands of the breeder to change the hereditary makeup of his cattle. Selection must obviously be directed at those few traits which have the greatest influence on the efficiency of production. Unfortunately, breeders of registered livestock have tended at times to deviate from this objective through excessive emphasis on characteristics often unrelated and sometimes antagonistic to efficient production. Unquestionably, the implementation of improved selection procedures for directing breed improvement towards economic characteristics is the key to breeding better stud stock. The performance that commercial breeders are interested in has become reasonably well defined from the results of recent studies. Regular reproduction, nursing ability, growth characteristics, economy of gain and quality of end product is the combination required; in other words, we select for functional efficiency in all our domestic animals."

History of the Bonsmara Cattle Breed as presented on the website:www.herdbook.co.zm. provides an excellent section on history of the Bonsmara. (I am including a brief history of the Bonsmara breed so that the reader can appreciate the correlation

and commonality between Bonsmara cattle and South African Boer Goats.

History of the Bonsmara Breed

The majority of breeds in the world have their origin in crossbreeding - the Bonsmara however, is the only breed that had its origin in scientific crossbreeding, based on traits of economic importance.

The Bonsmara breed was developed in South Africa where the need for a beef breed that would do well in the subtropical savannah regions had been identified in the 1930's. The breed was named Bonsmara after the late Professor Bonsma, who conceived the scientific experiments that led to the development of the breed at the Mara Research Station. From the earliest crossbreeding results it became evident that the development of the Bonsmara should proceed on a 5/8 Afrikaner and 3/8 Exotic (Shorthorn/Hereford) breeding mixture - The Adaptability of the Afrikaner, the meat production of the Hereford and the milk production of the Shorthorn breeds were successfully combined. The breed, that today is the forerunner in the stud and commercial beef industries in South Africa, is a functional, productive, well-adapted breed - the Bonsmara.

Bonsmara SA was founded in 1964 and within 20 years has become the biggest of all beef and dual-purpose breeds in South Africa. Strict adherence to minimum breed standards based on functional efficiency and compulsory participation in the National Beef Cattle Performance Testing Scheme (man must measure!) for all animals has ensured that the Bonsmara is one of the most efficient producers of good quality beef off natural veld as well as feedlots.

Because of its adaptability in basically all environmental conditions, growth efficiency, beef and carcass characteristics, the breed has gained much ground and today proliferates throughout South Africa. Bonsmara can also be found in Zimbabwe, Botswana, Namibia, Mozambique, Uganda, Kenya, Nigeria and Zambia on the African continent, while the breed is also popular in Argentina, Uruguay, Paraguay, Brazil, Mexico, the USA (Texas), Canada and Australia.

A database of approximately one and a half million performance tested animals recorded since 1937 provides the Bonsmara breed with the largest beef cattle data set to calculate breeding values. The open upgrading system also ensures one of the largest beef cattle gene pools in the world.

The Bonsmara is a medium framed, smooth coated, heat and tick tolerant beef breed. It is uniform red-brown to light brown in color and has the typical frame of an efficient sub-tropical

breed. A slightly sloping rump ensures that it is also an easy calver.

Over the years the Bonsmara has distinguised itself as an “easy care’ breed with the following positive attributes:

Very well adapted to most climatic conditions; bushveld, savannah and sourveld environments.

Very fertile with sort inter-calving periods.

Early maturity.

Low birth weights and therefore easy calving with high re-conception rates.

Well developed udders with adequate milk to wean a strong calf.

Good growth ability. Bonsmara bulls may thus be used to good effect in a crossbreeding program.

Advantageous feed conversion ratio.

Excellent carcass and meat qualities; its meat is of high quality - tender, tasty and succulent. In a crossbreeding program the Bonsmara improves the quality of the meat of the breed with which it is crossed, especially as regards tenderness.”

I think that you might appreciate being able to read an excerpt from the very informative book, “Livestock Production - A Global Approach” by Jan Bonsma in which he explains and discusses his “Man Must Measure” concept of livestock production. I hope you enjoy this information as much as I have and will see its relevance to the South African Boer Goat.

“Man Must Measure”

The Bonsmara is the only breed in the world that can boast a pictorial genealogy from the very start of the breeding work until the Bonsmara breed was established. It is also the only breed in the world where every mating was based on scientific data, where the concept Man Must Measure was always taken into consideration; nothing was based on guesswork or on worthless antiquated show standards. The scientific data used in the breeding work were based on climatological data and adaptability measured in terms of performance testing. The data included 14

body measurements taken quarterly and monthly weights and average daily gains were recorded.

The concept Man Must Measure included:

1. Measurement of adaptability based on all the available data on the foundation animals in terms of body temperature, respiration and pulse rate, tick count, hide thickness, hair count per square centimeter and the most composite measurement for adaptability, namely average daily gain (mass for age), fertility, milk production, low mortality and ultimately longevity. No heritable defects were tolerated, nor inferiority in function of any organ that results in lower resistance to stress or disease. No locus minoris resistentia was tolerated.

2. Measurement of growth by monthly mass determination.

3. Milk production was determined by measuring the calf's growth and weaning mass and also by measuring the actual milk intake of the calf, by weighing it before and after suckling. That is how it was established that an average of 6 kg milk production a day over a 205-day lactation period is the optimum for a ranch cow.

4. Fertility was measured by keeping a recording sheet for every female kept in the herd and any cow that skipped two calves in eight years was slaughtered.

5. Body conformation was based on subjective evaluation by careful observation, but in the case of our experimental animals fourteen body measurements were taken on each animal from birth to maturity or until it was eliminated from the herd. The records and data taken from 4 and the handling and measuring of thousands of animals under 5 years enabled us to formulate the concept of judging livestock for functional efficiency.

6. Temperament was measured by doing tractability tests on free-grazing animals. This was done by approaching animals in the veld and determining how near a man could walk to the grazing animal before the animal would walk away. The behaviour of the animals in the measure pen where they were intimately handled gave a very good indication of an animal's temperment.

7. Longevity was a measurement very much neglected in the past. Most commercial cattle producers used to cull their brood cows at the age of eight or ten years. In the breed creation work cows were kept in the herd as long as they could produce a good calf annually and did not lose too much condition (more than 20 per cent of their mass at the time of calving). The young cows often

lost less than 10 per cent of their mass during the suckling period. If an animal could satisfy these standards of longevity she cannot have a locus minoris resistentia and must therefore be functionally efficient."

(The above section is taken from "Livestock Production - A Global Approach" by Jan Bonsma.)

Finally I would like to share one final bit of wisdom from Dr. Bonsma. This is part of his discussion of judging an animal for functional efficiency.

"Judging For Functional Efficiency" - by Prof. Jan Bonsma, Head Dept. Of Animal Productions, University of Pretoria, Pretoria, South Africa (an excerpt)

"At the moment of conception, the complete genetic potential of the animal is fixed. What the animal ultimately is depends on the interaction of genetics and the total environment.

The genes of an animal determine how the endocrine glands (pituitary, thyroid and adrenal glands, the testes, and ovaries) will function.

The function of these endocrine glands in turn affect the morphology of the animal. If some of the endocrine glands function improperly, this hormone imbalance will be reflected in the morphology of the animal and its body conformation will be altered.

The pituitary secrets gonadatropins, which influence the sex glands - the testes and ovaries. The testes and ovaries in turn secrete hormones that influence the secondary sex characteristics of the animal. Thus, the alteration of any of the glands or hormone functions will be reflected in the morphology (body conformation) of the animal.

For example, the male sex hormones have a direct influence on the masculinity of the head. In the human this masculinity is expressed by a beard, receding of the hairline, and baldness; in the bull it is expressed by coarser hair on the head and neck, and a special pattern of hair on the neck, upper shank region, lower midrib region and on the lower thigh. Sex hormones also have a direct influence on the sound the animal makes. When an animal bellows, an experienced cattleman will tell you if it is a bull, steer, or a cow bellowing.

Since the male hormones cause an outward visual expression of masculinity, any imbalance or impairment of secretion of the

hormones will cause the bull to lack the appearance of a normal male. The same is true for the female.

The male and female sex hormones have a direct bearing on total growth.

Bone growth is stopped when the cartilage sections of the bones (epiphysis) ossify or turn into bone. The time of ossification depends on the hormone balance. The secretion of the sex hormones - estrogen in the female, testosterone in the male - causes the bones to ossify, and thus stops overall growth. If ossification is delayed the animal continues to grow taller, hence the objection to very tall animals (excessive height indicates a lack of sex hormone, thus, excessive height may be an indicator of low fertility). An animal should be large lying down, but should not be large and long legged (indicative of sex hormone imbalance and low fertility) when standing.

The basis of the approach to judging livestock for functional efficiency is: a bull should look like a bull, a steer like a steer, and a cow like a cow. A bull should NOT look like a steer, and neither should a cow. If you have ever seen a 5-6 year old steer you will realize that a steer does not look like a bull at all.

IN CONCLUSION -

It is my hope and wish that you can take the information presented in the article and use it to help formulate your Boer goat breeding program in such a way that your efforts will improve the breed over time and contribute to the growth and commercialization of the Boer goat breed around the world.

ABOUT THE AUTHOR - BRIEF RESUME FOR DR. FRED C. HOMEYER

Dr. Fred C. Homeyer is a retired Professor of Computer Science from Angelo State University in San Angelo, Texas. He owns and operates Antelope Creek Ranch in Robert Lee, Texas where he raises 1,500 head of South African Boer goats. He has been active in the Boer goat industry for 20 years and served two terms as the Director at Large in the American Boer Goat Association. He lacked one course attending Medical School and also majored in Pharmacology before obtaining advanced degrees in Mathematics and Computer Science. Goat health, nutrition and maintenance are keen interests and he continues to study the techniques of liner measurement, prediction and extrapolation of

physical traits in Boer goats. Dr. Homeyer is internationally recognized for his expertise and knowledge of Boer goats. He has traveled around the world numerous times presenting seminars, farm tours and herd evaluations as well as judging shows. He has written over 450 articles that have been published in 32 magazines around the world, given over 100 seminars on goats and goat raising and has judged over 16,000 animals in 130 shows worldwide including 29 national shows in 15 foreign countries (Brazil, Austria, Germany, the Netherlands, Dominican Republic, Jamaica, Barbados, Mexico, Canada and Bermuda) Dr. Homeyer has judged Boer goats from coast to coast in the United States as well including shows in 31 different states. Dr. Homeyer holds Boer Goat judging certifications from American Boer Goat Association, United States Boer Goat Association, International Boer Goat Association and ABCBoer (Brazilian Boer Goat Association) where he has been declared "An international judge for Brazil qualified to judge all shows in the country including the national show.") He has met many of the famous South African Boer goat breeders while attending two World Championships in South Africa. He has traveled to South Africa twice, to Brazil nine times and to Australia six times in his quest to observe the best Boer goats in the world. Dr. Homeyer is the only American to have judged Boer goats in Australia (Queensland Royal Show in Brisbane, Australia in 2006 and 2008) and is the only American to have presented educational programs about Boer goats with a South African Boer goat breeder. In 2009 he gave a Breeders Workshop and Level I South African Judging School in Australia with the South African who judged the Sydney Royal Easter Show (Australian National Boer Goat Show). Dr. Homeyer can give reasons for placing goats in the show ring in English, German, Spanish and Portuguese. For over twenty years, Dr. Homeyer has strived to be a positive ambassador for the Boer goat everywhere he travels in the world.

You may contact, Dr. Fred C. Homeyer, at Antelope Creek Ranch, Box 47, Robert Lee, TX 76945: Ph:(325)-453-2863 Email: ancreek@wcc.net, website:www.antelopecreek.com