

what do we mean by phenotype?

a detailed look at what makes “suri”

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We often hear judges refer to suri phenotype when giving their oral reasons for placings in the show ring. Another term – “typey” – also refers to how well the animal exemplifies suri phenotype. For the newcomer to suri alpacas, these are elusive terms. What do we mean by the term “suri phenotype?”

Phenotype can be defined as the outward appearance of an animal—the sum of all its anatomical, physiological, and behavioral characteristics. It is dictated by both genetic and environmental influences. Phenotype is in contradistinction to genotype in which only the inherited factors are considered. In short, phenotype is what you can observe about an animal, and genotype is the entire genetic code, which is invisible.

The perfect suri probably does not exist; it certainly varies in the eyes of the beholder. In order to breed towards the perfect suri, we must have a definition of suri phenotype. Six identifying traits can be used to characterize suri phenotype. These traits are: *luster*, *locks*, *absence of crimp*, *slippery handle*, *elegant profile*, and *head style*. Much variation exists within each of these six criteria, as some characteristics are given more emphasis than others in various suri breeding programs. Good health and conformation are not listed as suri phenotypic traits because these criteria should be paramount in both suri and huacaya breeding programs.

1. Luster

Luster is the hallmark of a suri, one of the distinguishing traits of suri phenotype (Fig. 1). It is luster that attracts clothing designers to suri yarn and causes it to command a premium price. A high degree of luster should be present both inside and outside of the fleece. If the locks are lifted up on a dusty alpaca, luster should be evident next to the skin (Fig. 2). Luster in suri fiber correlates to longer cuticle scale length than that found in huacaya fiber. Luster gives the suri fleece a “wet” look and “cool” slippery feel.



Fig. 1: Luster is the hallmark of a suri



Fig. 2: Even on a dusty suri, luster should be evident next to the skin.

2. Locks

Locks are synonymous with suris. The formation of locks is the second and probably most recognized characteristic of suri phenotype. Locks should be well defined to the skin, independent, and free flowing. The compact grouping of fibers into a lock gives the suri its sleek, drapery appearance. While suri breeders debate the “ideal” lock type, most agree there should be uniformity of the lock style on a single animal as well as an independence of locks. This independence of locks allows the elegant swinging of a suri’s lustrous fleece.

There are five main lock types described by suri breeders today. It is interesting to note that these are not the same lock types described in literature just a few short years ago. As suri breeding has progressed, some lock types previously recognized are now considered intermediate or “in between” a suri and huacaya fleece. An example of a lock no longer considered a primary lock is the fan-shaped lock. The five lock types now recognized by suri breeders are: tight ringlet, flat twisted, curl, pearl, and straight.



The "tight ringlet" twists from the tip of the fiber all the way to the skin.



The "flat-twisted" lock begins at the skin as a flat lock then twists.



The "curl" lock or "corkscrew" is a loosely twisted lock.



The "pearl" lock forms when several ringlets twist together and later separate.



The "straight" lock has clusters of straight fibers with little or no twist.

It is interesting to note that the five main lock types described today are not the same lock types described in literature just a few short years ago.

The first lock type is the tight ringlet. It twists from the tip of the fiber all the way to the skin. This lock type can be seen in many different diameters because narrow locks often twist together to form wide locks, especially in longer fleeces. An advantage of the tight ringlet is its tendency to stay clean and free of debris.

The flat twisted lock is a second lock type commonly seen. There are many variations within this lock type. It begins at the skin as a flat lock, which can be either straight or wavy, and then starts to twist. The level at which the lock becomes twisted is highly variable; some locks only twist near the end giving them the appearance of an almost straight lock. Those locks that form a wave at their origin are not considered crimped because the individual fibers are straight.

The third lock type is called a curl. It is a loosely twisted lock, often seen on the neck. This lock type is rarely exhibited uniformly over the entire body. One might postulate that neck wrestling or rolling loosens the twist of a ringlet to form a curl. Excessive grooming can temporarily make a curl out of a ringlet. Another name for this lock is a corkscrew.

The fourth and probably most unusual lock type is the pearl lock, named because it looks like a strand of pearls. Several ringlets are twisted together, then untwist resulting in a wave at right angles to the twist. The result is a bumpy appearance to the lock (Fig. 3). A similar effect can be achieved by braiding wet human hair and unraveling it after it is dry. A "bump" occurs at each point one lock of hair wrapped over another lock. The pearl lock is often seen in dense fleeces and is most evident in highly lustrous fleece.



Fig. 3: Pearl lock: on the left are three individual ringlets which became twisted together. On the right is a pearl lock created when the ringlets later separated.

The straight lock is the fifth and most controversial lock type. It has high luster and is characterized by clusters of straight fibers being held together with little or no twist. As in all suri locks, no crimp is present. The straight lock is usually found on a suri that has been shorn a few times rather than in a virgin fleece.

It is important to recognize that as suris age, the fleeces will change. A tight ringlet lock in a young suri may become a straight lock as she ages (Fig. 4). Some of these straight fleeces are still 22 microns at 14 years of age! Geriatric animals that maintain fineness and luster are extremely valuable regardless of the lock type, and should be identified in our herds and utilized in our breeding programs (Fig. 5).

It might be argued that a study of lock types is a study of semantics. If one eliminates the straight lock as a primary lock because it is seen in older, shorn animals, then there really is only one lock type — the twisted lock. The four main lock types described in virgin fleeces are all variations of twisted ringlets; they simply differ in the tightness and origin of the twist. For example, if a curl is twisted a few more times, it becomes a tight ringlet. Furthermore, once locks have been shorn off a suri and laid on a table, they begin to unroll, and then the four lock types look very similar, indeed!

There is no correlation between a specific lock type and fineness. Some believe tight ringlets are associated with a low coefficient of variation (CV) and/or a low standard deviation (SD). This interesting concept warrants more research and could serve as a topic for a future article.

(continued)



Fig. 4: A tight ringlet lock in a young suri may become a straight lock as she ages, yet still maintain fineness and luster. The examples at left show the same suri at 1 year and 10 years of age.

The third characteristic of suri phenotype is the absence of crimp, the zig-zag characteristic seen in huacaya fibers. Suri fiber is straight and hair-like as opposed to huacaya fiber, which is crimped. The presence of crimp in a suri suggests a huacaya influence. Many suris in the North American herd are direct imports with unknown parents. It is therefore not surprising that some suris, especially colored, have crimp. Suris which exhibit lock formation, but also show subtle crimp, can be bred to suris with straight fibers and lustrous locks to produce an improved suri progeny. Because crimp is a negative trait in the suri, crossbreeding huacayas and suris is considered counterproductive.



Crimp found in this suri's fleece suggests the presence of huacaya in its lineage.

The handle or "feel" of the fiber is the fourth trait that defines suri phenotype. Suri locks should be cool, slick, and heavy to the touch. A long, low scale of the cuticle of

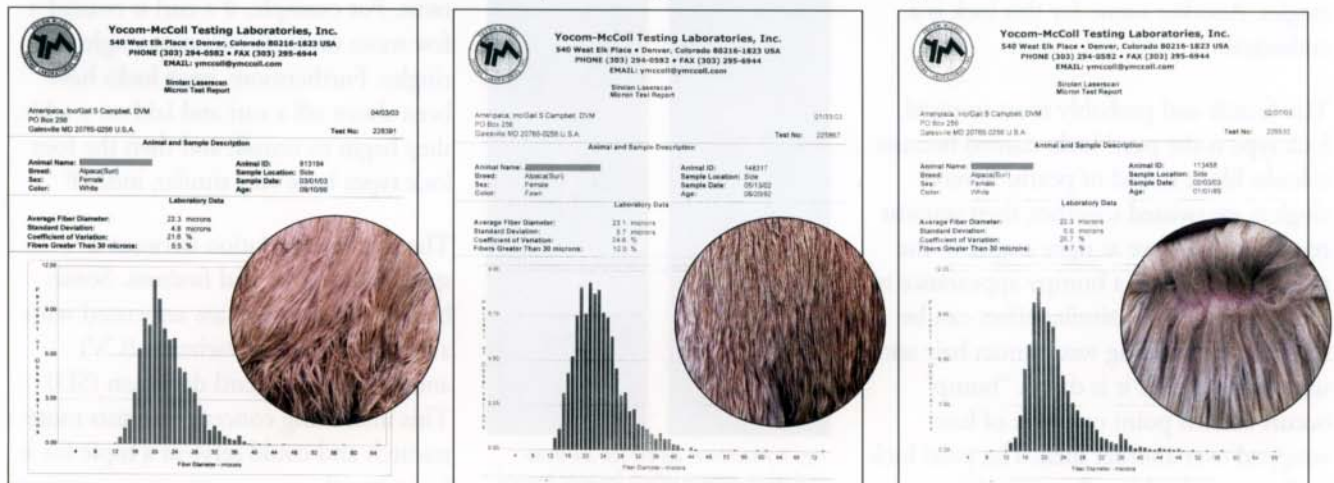
a suri fiber gives it luster, which correlates to a cool, almost damp, feel. The terms "fineness" and "handle" are important, but not interchangeable in the suri. For example, an 18 micron fleece without luster feels very soft, but warm. A 21 micron high luster fleece is very soft, cool, and slippery, and may actually feel finer than the 18 micron fleece without luster. In the suri, the baby fine classification has a higher micron than the baby fine classification in the huacaya. A 22–23 micron high luster suri fleece with tiny pencil locks will have an excellent hand.

An elegant profile is the fifth characteristic defining suri phenotype. Suris have a graceful style and carriage; they have a level topline with an upright tight-fitting neck that blends smoothly into the back. The profile of a suri appears narrow because the fleece drapes closely to the body.

The sixth and final characteristic of suri phenotype is the head style. The suri head has a topknot of independent locks that lay flat and forward, forming bangs. The locks of the head and cheeks should continue into the neck. The muzzle is slightly tapered, and the nostrils are more slit-like (as in a camel or vicuña) than in the huacaya (Fig. 6).

There are many variations of suri head styles in the North American herd, largely due to the individual preferences of breeders. Certainly, more than one head shape is consistent with suri fleece characteristics (Fig. 7). In studying heads more closely, it becomes apparent that fiber plays

Figure 5: Below are histograms from three mature females whose lock types changed with age (shown in each inset). Older animals that maintain fineness and luster are extremely valuable regardless of their current lock type.



An 8-year old suri fleece with an AFD of 22.2, 4.4 SD and 19.3% CV

An 11-year old suri fleece with an AFD of 23.1, 5.7 SD and 24.6% CV

A 14-year old suri fleece with an AFD of 22.3, 6.0 SD and 26.7% CV



Fig. 6: Suri nostrils (left) are more slit-like than in the huacaya (right)



Figure 8: Eliminating the topknot from the picture makes one realize that the head shape of contemporary huacayas and suris are much more similar that one would initially think.

a huge role in the appearance of the suri head. If the topknot is pulled back, a suri has a dramatic change in appearance. In fact, eliminating the topknot from the picture makes one realize that the head shape of contemporary huacayas and suris are much more similar that one would initially think (Fig. 8).

“In studying heads more closely, it becomes apparent that fiber plays a huge role in the appearance of the suri head.”



Figure 7: Many variations of suri head styles exist in the North American herd, largely due to the individual preferences of breeders. Certainly, more than one head shape is consistent with suri fleece characteristics.

Conclusion

The six identifying traits of suri phenotype discussed herein are guidelines and primarily refer to virgin fleeces. This article is not meant to devalue suris in the North American herd in any way. The reader must understand that there is no perfect suri. By defining suri phenotypic traits, we are setting goals for our breeding programs. It is also important to remember that many conformational issues have a low heritability, while most of the characteristics discussed pertaining to suri phenotype have a high heritability. Conformation must not be ignored; it is easier to change the fleece than the form and function of a suri. ❖