

Structure and Attributes of Quality Highland Cattle

A Visual Guide by Jacob Larson

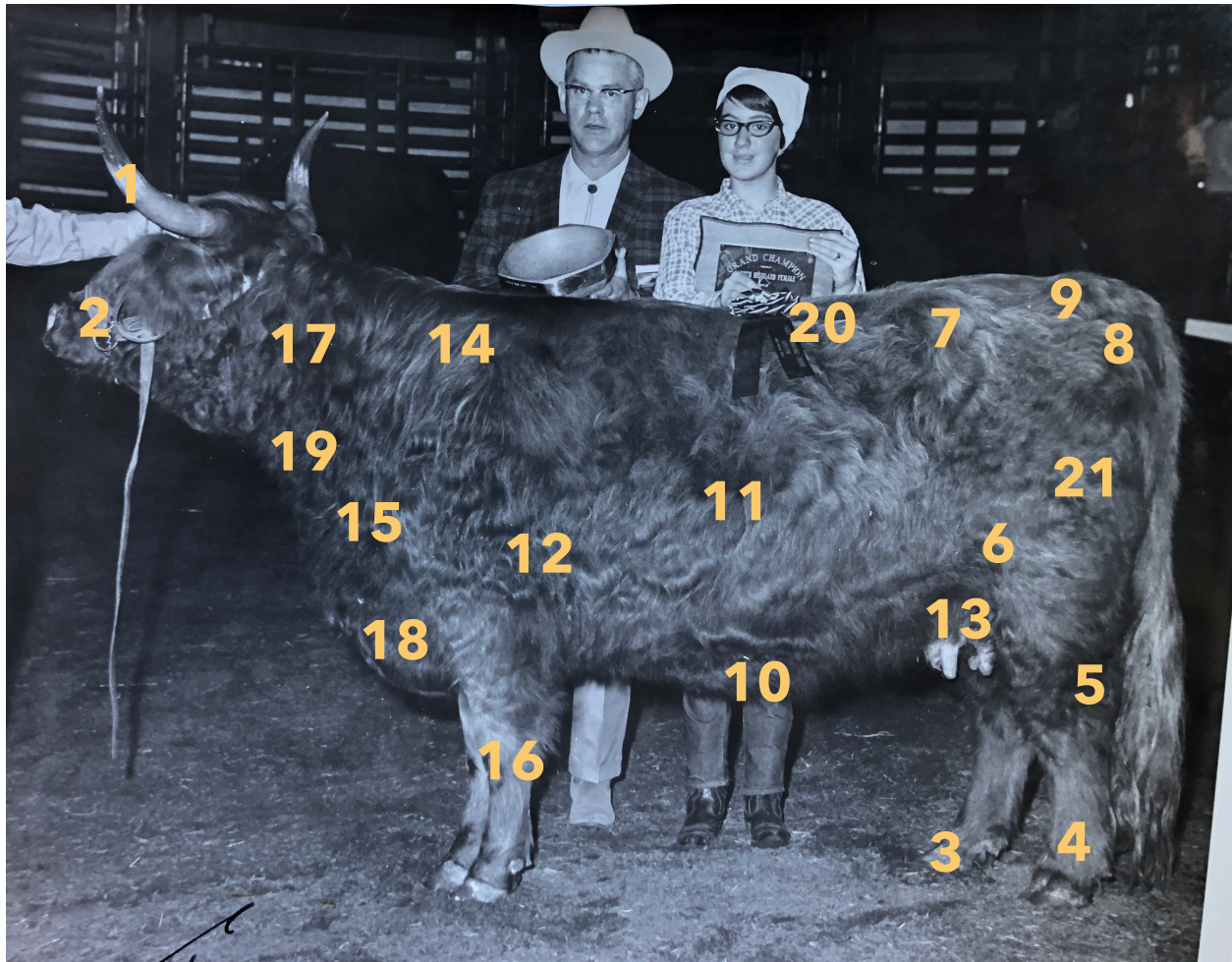
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Horns (#1)



Horns of the mature cow are widest in diameter at the base, and gradually taper along the length. The orientation of the horns should be primarily outward horizontally from the head with a gradual sweep upward to a point (See A).

Horns of a bull will be similar in orientation to cows but tend to grow more downward than females and should have a mass and diameter that is proportionate with their larger body size.

WHY: This structure (A) best enables mothers to defend their calves from predators and prevents breakage at the horn base. Horns that rise suddenly from the poll don't allow for extensive grooming maneuvers and are typically assisted with a narrow poll (See B) and those that curl downward and inward are considered more masculine and are also less useful as a tool for grooming, defending calves or foraging in woodlots. This style also present a hazard if they grow toward the animal's face (See C).

Head– Mouth (#2)



The mouth is broad with an upper lip that is slightly concave and minimally arched upward toward the center (See A) with the jaw positioned such that there is no under bite (See B).

WHY: When the lower lip is inset from the upper lip, the teeth are aligned with the upper palette (See A). This is the optimal structure for sheering grass and forage. The width and curvature of the lip also aids in efficiently directing grass into the mouth.

Head– Forelock, Hair Coat and Color (#2)



The forelock is an important and iconic feature of the Highland breed. It should fully cover a broad, flat forehead and hang down on either side to some extent. Hair on the body should be ample in the winter but easily shed to cope with summer heat. The forelock is retained in summer. Two types of hair are easily distinguished in the winter coat; A long and thicker guard hair creates an outer shell while the deeper layer is primarily composed of a shorter soft insulating coat. While hair length and volume is influenced by genetics, environmental conditions can also be a factor that governs these features.

A variety of hair textures are acceptable but the neck and front quarter of a female should be without distinct curls given that these are typically an expression of masculine hormones. Occasionally bulls will have some curling around the head and neck which is normal and considered a masculine feature. 7 colors are recognized in America and most associations world wide. These are red, yellow and white on the red scale and black, dun, and silver on the black scale. Brindle is also recognized as an official color and has many variations. See the AHCA website for color examples and an excellent article titled Color Coat Genetics written by Pat White, DVM.

WHY: Forelock and hair are an essential part of what makes Highland cattle beautiful and beauty is valuable. Few Highland owners would say that beauty wasn't one of the reasons that they chose this breed. Indeed, the recent rise of the Highland breed as one of America's favorite homestead cows has largely been fueled by their incredible shaggy looks among other attributes that make them ideal for the small scale cattle owner. In terms of functionality, these features also make the breed particularly resilient. The distinguishing forelock is a valuable natural adaptation that shields and protects the eyes from flies and harsh weather in all seasons, while hair elsewhere provides insulation and helps shed rain.

Head–Ears (#2)



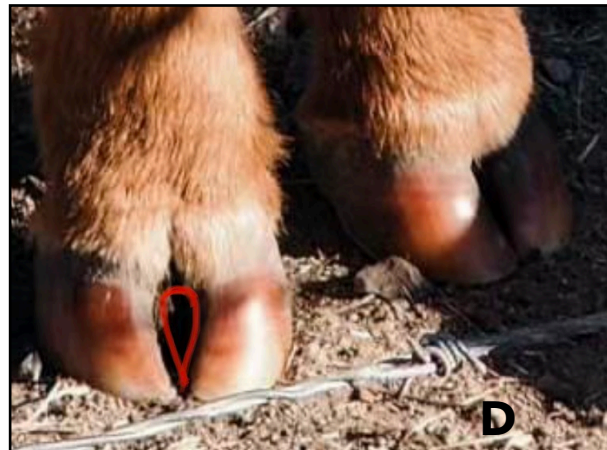
Highland ears are full and well haired (See A), but not overly large.

Crop ear is a common genetic occurrence in the breed (See B) and while full ears are preferred, using crop eared cattle in U.S. breeding programs is left to the breeder's discretion.

This condition can vary from a barely perceivable notch or tip to dramatically shortened and randomly lobed ears. Breeding two crop ear carrier parents together will typically result in a more extreme version of crop ear in the offspring (See B).

WHY: Full ears are preferred since this is the optimal structure to gather sound and allows adequate space for tags and tattoos. However, it has been argued that a Highland's ears should not be too large (but well-haired) given the risk of frost bite in the cold.

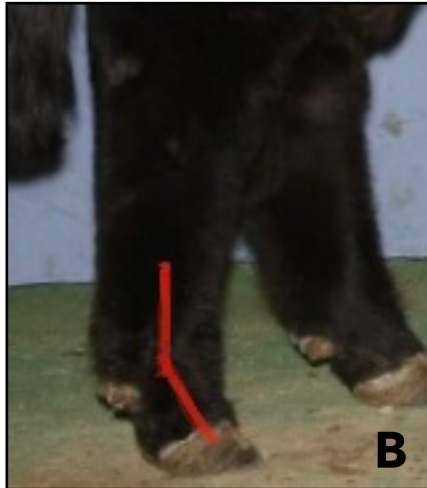
Feet (#3)



The feet must be proportionate in size to the animal's body mass and have adequate depth of heel (see C - poor heel) and an arching cleft between the claws (see D - good cleft). The texture of the hoof wall is smooth and plastic in appearance with minimal ridges or splits. The dew claws are distinctive without showing excessive growth. In no case should the feet be pointed extremely outward (See A). Toes that extend horizontally to the ground or cross over each other are a definite flaw (See C).

WHY: The foot is the foundation that must carry the mass of the animal. Therefore, it should be large enough to support the weight above it for many years and be sturdy in rough terrain. Depth of heel is important for elevating and protecting the softer tissues at the top of the foot. It also provides a steeper angle to the hoof, and therefore better ability to self-trim (see B - poor heel depth). Similarly, feet that point outward to an extreme do not wear off evenly and can result in an overgrowth of the inside claw. A solid hoof texture is important for durability in terrain that is particularly wet and/or rocky.

Pasterns (#4)

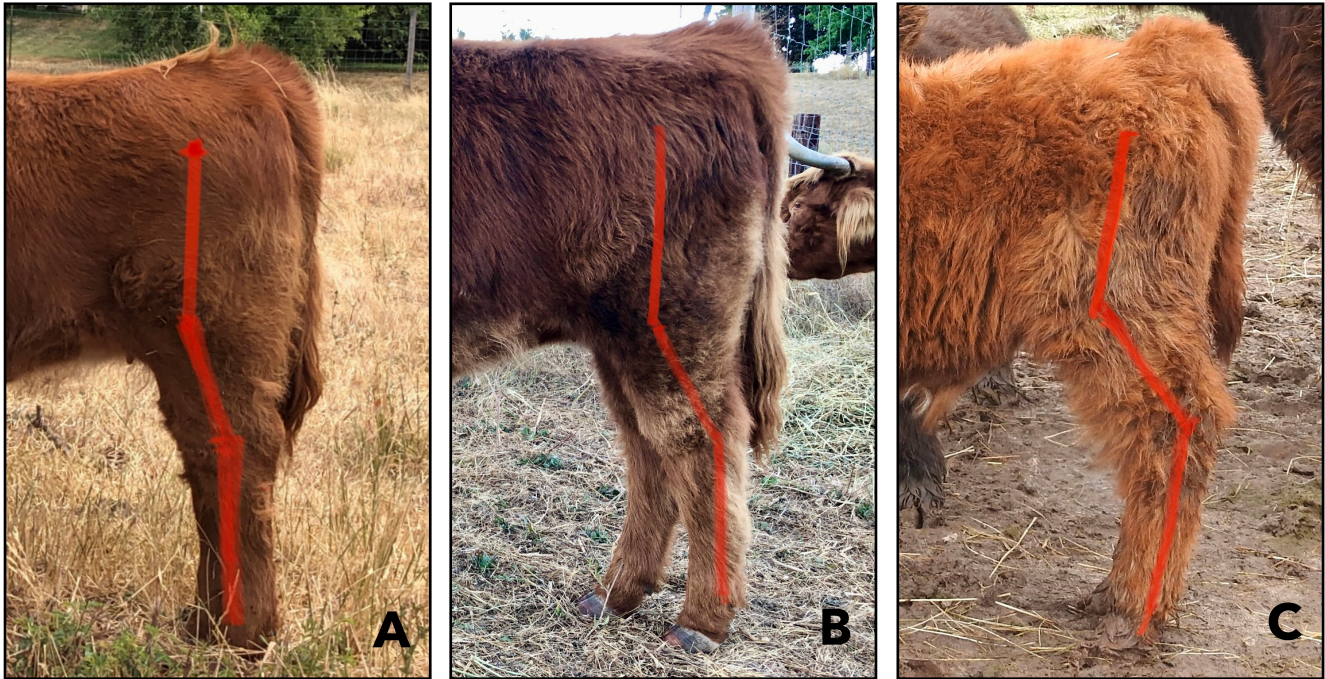


The pasterns of a Highland cow should be neither extremely upright (see C) nor laid down close to the ground (see A). While moving there should be no additional motion in the pastern except a consistent flexion with each step. In contrast, pasterns that first arch upward then and snap back down under pressure are inferior. The dewclaws on the rear (posterior) of the pastern should be present and significant but should not grow longer than about an inch.

WHY: Proper angulation in the pastern is important for shock absorption and aids in protecting the leg joints above from harsh impact. Pasterns with about 40 to 50 degrees of angle also provide stability and traction while traversing the steep pasture ground that the breed is adapted to. The steeper the pastures are the more useful/functional a low pastern becomes. Straight pasterns (and legs as well) are problematic for stability on hill country and are negatively correlated with joint durability over time. In the opposite extreme, pasterns that are too close to the ground increase the risk of impact or puncture injuries. It should be noted that older cows will have lower pasterns than young cattle due to the effects of body mass and gravity over time.

Dew claws are thought to act as breaks and joint protection on steep terrain but should not be so long that they can snag on low objects.

Hock & Stifle (#5 & #6)



Good legs are those that are proportionate in diameter to the body mass they carry and are squarely positioned under the weight of the animal. They must also have joint angles that provide long lasting mobility (B- Ideal leg angle) From the profile, the Highland leg has developed with more angle on average than many domestic cattle breeds, yet without being set to an extreme angle under the animal (C - Overly angular). From the rear view, the hock joints need to be straight in line with the body without turning inward or out. The hocks should maintain width between while standing and when walking. While in motion, each step should move the leg directly forward without swinging in or outward and the rear stride should reach nearly to the previous position of the front foot.

The joint next in sequence above the hock is the stifle. the stifle joint must be neither overly straight nor excessively angular and the stifle muscle should be well developed.

WHY: Like the pasterns, the legs need to have enough angle in each joint for proper flexion. This enables shock absorption and thus joint durability over time. This also equates to superior stability on steep ground giving the Highland cow a natural advantage over other breeds in this terrain.

Hocks (and feet) that are positioned approximately straight in the same plane as the body ensure that the cow can stand on unstable or slippery ground without the tendency for the limbs to slide outward. This also enables equal weight to be distributed to both claws of the foot and thus the foot will self trim and wear evenly.

The stifle is a joint that is often injured during breeding, sudden slipping or harsh impact. Correct angularity and a strong stifle muscle guard against injury in this region. A leg that is too straight (A) will often result in an arthritic stifle due to direct impact on that joint.

Hip (Pelvis), Pins & Tail Head (#7, #8 & #9)

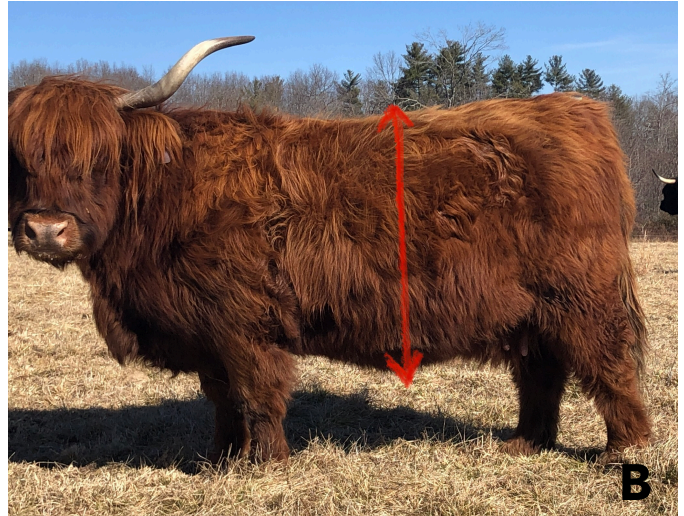


Hips of the Highland female are wide and square over the top as viewed from behind. Similarly, the pins should be set wide on either side of the vulva. From the side view there should be ample length from the hips to the pin bones under the tail head. When a line is drawn between these two points a very slight downward slope should be seen toward the pins. A correct tailhead is one that is near level or has minimal rise out of the plane of the spine.

WHY: The Highland breed is known for their calving ease and much of that reputation is due to their superior pelvic structure. The hips of a mature cow tend to appear almost disproportionately wide and the pin bones are also set wide and somewhat lower than the hips. In these positions the internal width of the birth canal is maximized and the Highland is able to calve quickly and without assistance in most cases. Current and future breeding practices should take care to preserve what nature has sculpted and optimized in terms of functionality since this design is also most profitable.

In contrast, tight, rounded hips reduce the internal space of the birth canal as do pins that are set close together. High pins crowd the tailhead internally and therefore also cause a point of restriction and reduces the beneficial arch that is easiest for the calf's body to follow. Overly sloped pins often result in an upturned vulva that can reduce breeding success in prominent cases.

Rib Depth, Mid Rib & Fore Rib (#10, #11 & #12)



When someone refers to “correct structure” many people automatically think of a straight back and good leg angles but what about the middle of the cow? What does correct structure look like in that region? For the Highland cow, optimal rib shape is deep, wide and long, while remaining proportionate to the rest of the body. Which is to say, reasonably expansive in every direction. The circumference of the cow at the navel is considered the mid rib, while the circumference just behind the shoulders is called the forerib. Both portions of the rib should be well sprung with plenty of lateral curvature. The rib should also be deep, having considerable distance from the spine to the navel or chest floor when evaluated from the side profile (B). A shallow ribbed cow should be evaluated as having a serious fault (A).

Why: What is the great need for so much rib? Well a rib that is expansive has greater capacity. Internal capacity is very related to efficiency on marginal forage and the ability to reproduce and rebreed in a timely way. This feature is much more necessary on poor quality forage since the cow needs to be able to take a large volume of fiber that is mostly cellulose and convert it to usable nutrition for her body and potentially milk for her offspring. For this reason, the Highland cow adapted to her harsh Scottish environment, with its limited resources, by developing a mid section that is wide and deep and able to hold a large amount of forage in the rumen along with her other organs. In addition, she may have a full term calf crowding all of that at times. For terminal breeds (those bred for beef production on high calorie diets) rib volume has little importance but for a highly maternal and thrifty breed like ours it is one of the most important components of her structure.

Udder (#13)

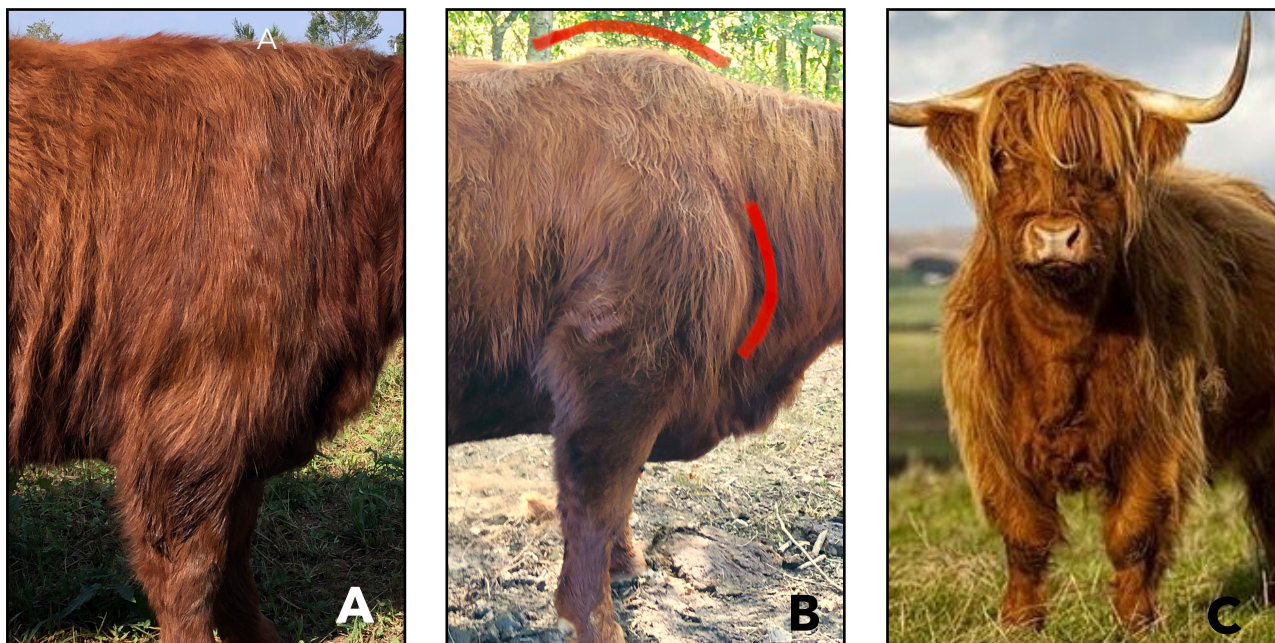


The standard udder of the Highland female is one that is set high between the legs with tight attachment and a level floor. No sagging of the rear quarters or prominent swelling of quarters toward the teats should be noticeable. The teats should not be much more than 3/4 inch diameter and these need to be positioned squarely under each quarter with several inches of space between them. Correct teat structure is evenly cylindrical and oriented nearly vertical. The length of the teats should not exceed 3 inches and closer to 2 inches is preferable. Large extra teats should be discriminated against. While the presence of small, blind teats is harmless and very common in this breed, no extras is the best policy.

WHY: As compared to standard cylindrical teats, "V" shaped and "light bulb" shaped teats will increase in width with each successive lactation and end up too large for newborn calves to get their mouth around. Newborn calves also struggle to get on to teats that are too long or too low to the ground. A low udder also has more direct exposure to bacteria thus increasing vulnerability to mastitis infections. Regarding teat placement, a set of teats that are squarely under each quarter allow more space for mammary tissue above each one. Extra teats are not usually an issue unless they are large enough to be a distraction to a newborn. That said, their occurrence is controlled by genetics and small extras can lead to larger ones among descendants along the course of a lineage.

A Highland cow's udder is one of the most important points of her anatomy. Of all the various traits that may contribute, teat and udder structure usually have the greatest influence on a cow's functionality and profitability. The quality of a brood cow is not measured so much on how good she looks standing in the pasture as it is on her ability to wean a calf half her own size, year after year, up to a ripe old age. This will not be possible if the structure of her udder and teats is not able to hold up against the volume of her milk production. It is particularly important for Highland breeders to pay attention to udder quality because our breed is long lived and has to have udders that will last nearly twice as long as many other breeds.

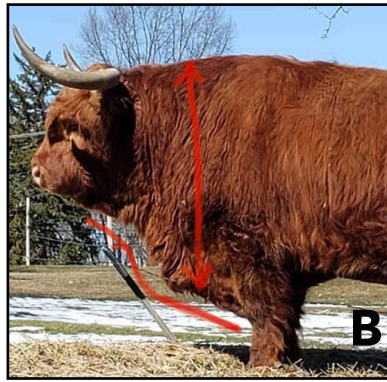
Top and Point of Shoulder, Front Legs/Knees (#14, #15 & #16)



The ideal Highland cow's shoulder transitions smoothly out of the rib and into the neck. It is seamless through the point of the shoulder but the shoulder as a whole is not flat, nor lacking adequate muscularity. When properly constructed, the point of the shoulder (joint) should blend smoothly into the neck (See A) and the top of the blades (scapula) should not be higher than the cow's topline. When viewed head on, the front legs, are positioned wide and squarely under the shoulder joints with no bend inward or outward at the knee.

Why: This region of bovine anatomy is too commonly overlooked considering the shoulder and front legs are a critical part of structural soundness. If the shoulder is open at the point and fans outward (See B) it tends to cause a weakness in the spine behind the shoulders due to improper support. The feet will also tend to point outward in the same pattern. An outward "open shoulder" also causes a greater point of friction for calves with this structure as they are passing through the birth canal. Therefore, smooth shoulders equate to calves that are easier to birth and structure that is more durable over time. In terms of muscularity, both bulls and cows should have muscle in proportion to the sexes. A bull should be thicker and masculine and a cow more refined and feminine (See C). Flat (weakly muscled) shoulders in either sex are not strong nor as valuable for beef but excessively rounded and bulging muscle in the front end presents another issue when birthing calves with that design.

The Neck, Brisket and Dewlap (#17, #18 & #19)



The neck of a Highland female differs significantly from that of a Highland bull. Sexual dimorphism is the scientific word for the physical differences between the sexes. Not all breeds of cattle express these differences as strongly as Highlands often do. As compared to females, mature males are quite a bit deeper in the brisket on average and more muscular in the front quarters. Bulls also have a distinct crest in the muscle of the neck (see C). A cow should be dramatically more refined in appearance and should not have any amount of crest or a thickly muscular neck (see A). In young stock of both sexes the neck should transition out of the shoulder smoothly and stretch toward the head with good extension and a minimum of loose skin in the dewlap (see B- too much dewlap; see C- trim but powerful male neck and shoulder).

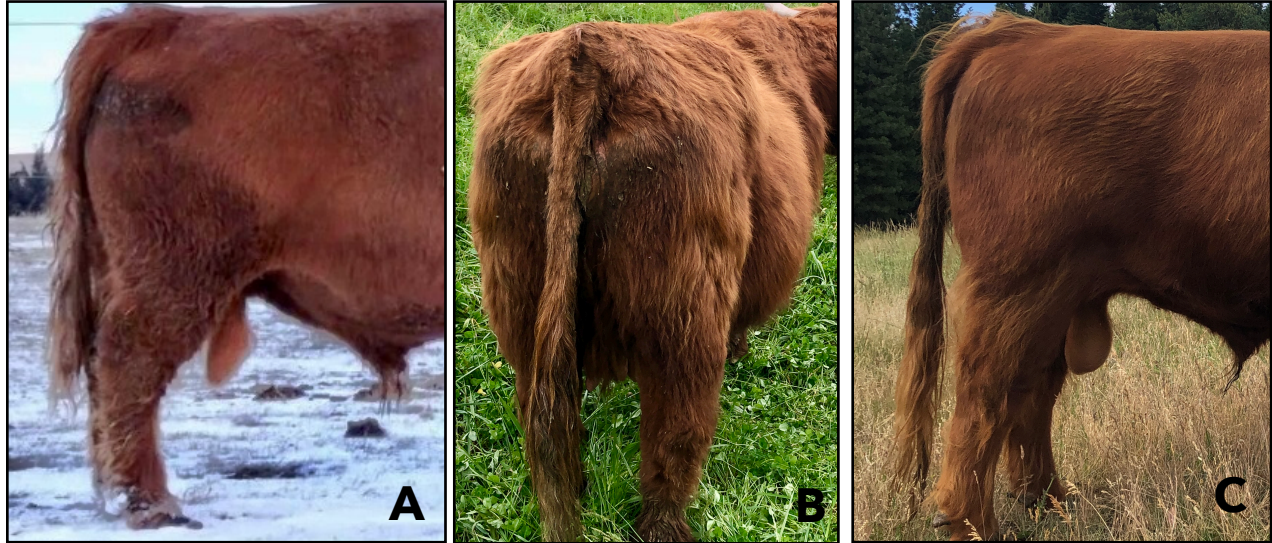
Why:

Cattle (and especially Highland cattle) primarily express sexual dimorphism (the differences between sexes) in the muscularity of the front quarters and neck and the width and set of the horns. These are the best areas to look for a strong or weak influence of the respective sex hormones. Over the many years that people have bred cattle it has been observed that bulls that are not sufficiently influenced by testosterone will tend to be more refined and cow-like in appearance and cows that have a weak influence from female hormones will tend to appear more masculine. Judges of cattle shows will often refer to a heifer's degree of femininity or a bull's masculinity, but what is really being appraised and valued is the correlated hormonal influences and thus the fertility and reproductive efficiency potentials of that animal based on these differences in body features. Thus, strong differences between the sexes in these regions of the body are preferable and should be emphasized by Highland cattle breeders.

Regarding the brisket and dewlap, some extra depth and loose skin is typical and allowable in mature bulls but should not be prominent at slaughter age. Breeders discriminate against excess in this area primarily because valuable nutrition is deposited here in the form of fat that is mostly waste and this lowers carcass yield and profitability.

See note about carcass traits in the discussion on muscularity.

Loin & Butt — Muscularity (#20 & #21)



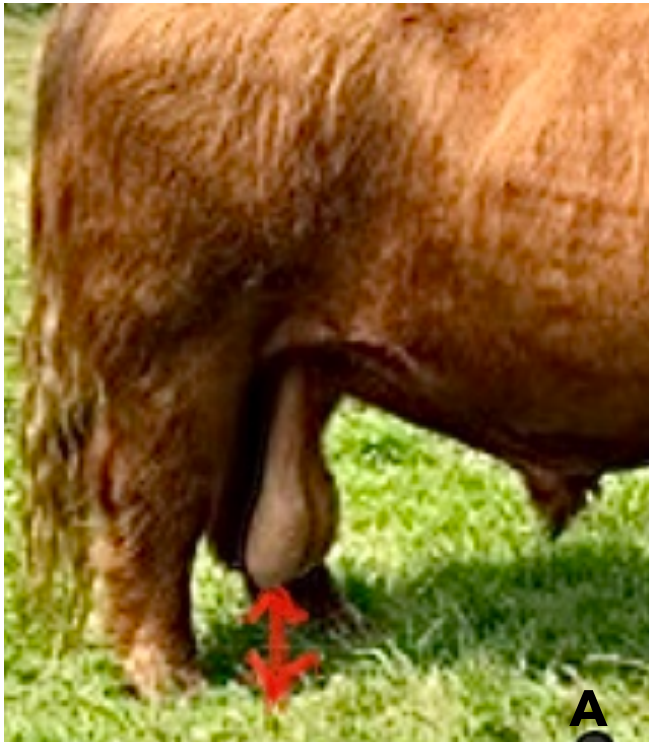
The Scottish Highland cow is not naturally bulky in terms of muscle mass. Instead a broad flat/square style of muscle is the pattern that nature dictated (See B). The loin is wide and well filled out but not overly flat or indented at the spine. The muscles of the thigh are broad from the side view, forming a wide triangle between the hip and pin bones, and extending low toward the hock (See C). From the rear view there should be ample fullness of the quarters and a square appearance more similar to a Shorthorn or Angus than the round, bulging muscle type seen in many continental/terminal breeds (See B).

Why:

The Scottish environment has given this breed the ability to make the most of marginal forage while also possessing the genetics to gain flesh rapidly when better resources are available. Muscle is wanted, however a broad, square muscle pattern seems to be most compatible with maintaining those fertility and cow/calf production efficiency traits that a Highland female naturally excels at. The goal and ultimate product of a maternal breed, such as ours, is to produce the most pounds of calf with the least financial imputes. In contrast, the goal and product of a terminal breed is to produce lots of premium beef as quickly as possible. It has been observed (and shown in studies) that a negative correlation exists between muscle mass and maternal traits such as milk production and fertility. Therefore, Highland breeders are advised to seek moderation in selection for this attribute.

Round style, bulging muscle is particularly unfeminine and tends to be associated with masculine hormones and sometimes the double muscling gene NT821, however these things are not always associated. Since maternal quality is the top priority, Highland cattle breeders place less emphasis on maximizing terminal traits (particularly muscle bulk). However, the ability to put on pounds of muscle (and some fat) on forage is a desirable attribute since the secondary product of this breed is beef. Thus, muscle should not be entirely overlooked and beef attributes such as marbling and tenderness along with a focus on minimal carcass waste are definitely compatible goals with the maternal focus of Highland cattle.

Testicles (#22)



Highland bulls must have adequate testicular development. The most foundational requirement for a bull is fertility. Every bull needs to have two uniform testicles and enough libido to do his job well. 26 cm is a minimum scrotal circumference used by many breeders as a standard size at weaning and this measurement should be over 32 cm by a year old. 40+ cm is normal for a mature bull. The testicles should hang within the scrotum near the level of the hock in mild temperatures (See B). Any twisting or uneven size is undesirable.

Why:

In larger herds, a sire may need to cover 30 to 40 cows in a breeding season. The size of a bull's testicles determines his potential volume of sperm production and therefore the number of cows he can breed in a given time frame. The level at which the testicles hang is important both for safety (when too low and in the way) and for thermoregulation, which is the primary function of the scrotum. A very narrow range of temperature is required for the development of normal sperm in the testicles, therefore the scrotum must be able to lower the testicles away from the body when hot and raise them close to the body when cold. Inadequate length of scrotum is a potential hindrance to this function. When the testicles hang lower than the hock (See A), this is considered pendulous and is a potential hazard in woodlots and rough terrain.

As a side note, there is a genetic correlation between early maturity of daughters and scrotal circumference, however, this is more relevant for commercial breeds since they are bred as yearlings.



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