

One-sided focus since the introduction of genomics

# Phenotype of bulls is still important

The introduction of genomics has led to a rat race between various breeding organizations around the world that seems to revolve exclusively around the very highest indexes. The physique of animals used for breeding seems less and less important. Melkvee discussed this issue with three aAa approved analyzers.

## Any structural defect in an animal is actually a genetic defect

expression of its genes – toward a focus on genomic markers and index rankings. Martin asserts that, “A cow’s genomic superiority is useless if she herself has major physical flaws and structural imbalance.” It is precisely the latter that often escapes notice due to one-sided selection. He points out that while “sickle” rear legs were a problem in the past, for example, the balance has now tipped in the other direction. “Many cattle suffer from extremely posty rear legs with very little flex or shock absorption in the hocks. Likewise, generations of selection for high foot angle have resulted in an excessively steep foot angle which interferes with the cushioning effect of the pasterns and causes undue stress on the joints.” According to Martin, “Much genetic progress has been made in raising the rear udder, strengthening the central ligament to sustain higher production and centering the teats for

ease of machine milking and less teat injury. Today, that progress is once again threatened by the industry’s fixation on extreme linear traits resulting in an extremely high rear udder that disconnects with the fore udder (rear tilt) and teats that have become too close and short for proper milk out. Since the linear system used to correlate stature with good udders and type traits, many cattle today are too tall. They lack width of chest and must compensate by turning out their front feet which makes toes ware unevenly.”

**'Think of the human physique'**  
Martin points out that the physical appearance of a bull is indeed important and therefore strongly disapproves of the heavy digital editing of bull photos. “The idea that a bull’s physique and appearance have no value nor are indicators to his success as a sire is laughable. Think about human families. Some children resemble their father, some favor their mother’s side. In a family of six children each is a unique blend, but to a stranger’s eye it is easy to notice the inherited traits of both dad and mom in each individual child. Like begets like.” “You don’t expect a lot of black offspring from white bulls and vice versa,” responds aAa analyzer Jan Schilder to Jared Martin’s comparison. Schilder echos Martin’s concern. “Some animals with the very highest genomics, especially for conformation, can be so extremely built that as a result they can no longer function normally.” The one-sided focus is also reflected in the aAa numbers of young bulls. The majority start with aAa 2, 3 and 4 in no particular order. “It’s not that they aren’t good, you need those kinds of bulls but not in the extreme form. And

you can wonder how many you need,” says Schilder. The fact that the aAa numbers mentioned are more common is, according to Schilder, due to how the linear system works and is used for selection. “If high rear udders and long legs are greatly valued, you see a lot of aAa 2 (Tall). With aAa 3 (Open) you create space for the udder and aAa 4 (Strong) indicates more chest capacity, which promotes overall health. An animal’s aAa numbers usually contain a kind of balance between round and sharp. This is necessary to keep the animal functional.” It should be noted that aAa 1 (Dairy), 2 (Tall) and 3 (Open) represent sharp qualities and aAa 4 (Strong), 5 (Smooth) and 6 (Style) represent round qualities. Schilder indicates that in countries with true grazing systems, such as Ireland and New Zealand, many bulls have aAa 5 (Smooth) in their first digits. “You see fewer 234 kind of bulls there.”

**Structural defects**  
“Structural defects in animals, and certainly in bulls, should simply not be tolerated. Any structural defect is actually a genetic defect. An animal with a structural defect will never reach full maturity,” asserts analyzer Schilder. Not that the reverse is true. “The best constructed bulls do not produce only good cows but, on the other hand, a poorly constructed bull seldom produces a good cow.” He continues, “Function follows form or construction, which is always true in nature, even in dairy cattle. The first questions people should ask themselves in breeding are, ‘What are the functions of all parts of the animal?’ and, ‘What are the influences of the body parts on each other?’ This is not considered in the linear system, nor are the head, neck,



The excellent Wilhelmina 112 owned by Fedde and Wilma van der Meer from Nieuw-Buinen (DR) won the final of “The Best Farmer’s Cow” in 2016. She is a Kian (aAa 156) × Addison (aAa 423) and achieved a lifetime production of 127,302 kg of milk with 5.42 % fat and 3.83 % protein.

loin, hips, thurls and pin bones,” says Schilder. “In addition, physical form has a direct influence on internal functioning. Think of a feminine body shape, hormone balance, rib curvature, eating capacity and space for the organs. The upper half of the cow determines what the lower half looks like. A cow can never stand wider on the ground than her body is built, and the udder can never be wider than the pelvis.”

**aAa and breeding values**  
Not that aAa analyzers are negative about linear. “Breeding values and aAa numbers

are two fundamentally different things,” says Maurice Kaul. “Breeding values say something about the genetic level of animals and above-average daughters are created by matching them based on aAa numbers. You use breeding values to select bulls that meet your breeding objectives.” Kaul mentions the bulls Kian, Canvas and Talent, all of which could be used on the same kind of cows yet were clearly different in hereditary ability. “You used Kian for the components, Canvas for the milk and Talent for show.” Kaul stresses that he is not negative about genomics. “Technology offers good things as a tool – as a means, not as an end. In many

AI companies, however, it has been elevated to the goal and the aim is to create high numbers.” He states that there is actually not much difference between genomic bulls and daughter-tested bulls. “It’s just that the breeding values of the latter are a bit more reliable.” In herds where an analyzer comes for the first time, aAa 5 (Smooth) is usually most needed. “This is what the population needs most: body width, eating capacity, cushioning and muscle. You often find cows that have difficulty getting up and lack width.” Problems that Kaul often encounters are straight legs, slow milking speed and too little





CRV bull Delta Vineyard actually scores too low with 209 NVI points but was allowed to stay because he is aAa 165.

femininity: “straight legs because as the legs get longer the hock narrows. Animals with a lower body build and round construction are often undervalued.”

### Bars not to the right

“With the one-sided focus on genomics, geneticists ignore the basics of nature. You do have a responsibility; the goal must be a normally formed animal. For a functional, problem-free cow the goal is to avoid extremes, the bars must be in the middle.” Kaul is referring to the breeding values of linear traits, which he believes should ideally be around the average of 100. “It often starts to go wrong at school, where it is taught that the bars should go as far to the right as possible. But in bulls with proven longevity, (the bars) are not to the right.” He points out that this statement does not hold true when the goal is to breed a show cow. Kaul explains how the term ‘dairy’ (aAa 1) is often misused. “It is used to describe cows that are too big, too narrow and too thin, cows with too little eating capacity who lack aAa 5 (Smooth). Cows don’t have to be big; they function better when everything is in proportion.” He points out that the agricultural industry is under a magnifying glass. “We need to breed cows that can achieve high production in a healthy way. With high-yielding cows that can maintain condition, you keep public support.”

### Variation in the Netherlands

Analyzer Marcel Verboom also points out that linear and aAa are two different things. “They are not in competition with each other; they look at different things and have different goals.” He illustrates this with an example: “The bull Heihoeve Arnold (aAa 615), based on more than 10,000 daughters, scores 88 for pelvic position and 92 for pelvic width. Yet he still scores 108 for daughter fertility

and 100 for calving ease.” Verboom explains, “The daughters’ pin bones may not be wide, and they have lower loins and higher tailheads due to lack of aAa 2 (Tall) and 3 (Open). However, the thurl is placed centrally. Linear only looks at pelvic angle and width, but that is not the whole story. As a result, the bull is not used by many based on his low breeding values for pelvic angle and width, but he could do good work on a considerable number of cows based on his high breeding values for components, fertility and longevity,” said the analyzer. Verboom agrees that the majority of Holstein bulls worldwide now fall into the aAa group 234, but he says that there is nevertheless an

ample variation in aAa numbers especially among breeding organizations active in the Netherlands. He points out that, especially in the Netherlands, bulls with a slightly lower genomic index sometimes get a chance if they have less common aAa numbers.

**Text:** Anne Hiemstra  
**Image:** Van der Meer family, Alex Arkink, Alger Meekma

@ If you have any question of remark, please contact the editors by mailing at [redactie@melkvee.nl](mailto:redactie@melkvee.nl) or call the phone number +31 314 62 64 38



Heihoeve Arnold scores 88 for pelvic position and 92 for pelvic width and yet sires fertile daughters.