Breeding for balance with aAa analysis

Progressive Dairyman **Intern Michael Cox**

Everything in life is a balance; even too much of a good thing can be bad. When breeding cows, farmers often tip the balance in favor of high yields and components, but a growing number of dairymen are using aAa analysis to not only improve the structural balance of their cows but also their bank account balance.

Founded in 1950 by Bill Weeks, a prominent Holstein cattle breeder and classification inspector, aAa analysis is a breeding tool that analyzes the structural make-up of cows and aims to breed healthier, balanced cows with improved longevity.

As shown in **Figure 1**, page 58, aAa analysis defines a cow's structure under six categories. It relies purely on the physical attributes of the animal; no genetic merit is taken into consideration. The analysis aims to strike a balance between enough "roundness" to live and enough "sharpness" to milk high yields. From the six categories, the analysis assesses the qualities a cow lacks, in order of severity. For example, a cow analyzed 4, 6, 2 is weak in the categories of "Strong," "Style" and "Tall." Cows are ranked on the qualities they lack, while bulls are ranked on the attributes they will bring to a mating. Therefore, a 4,6,2 cow should be mated to a 4,6,2 bull.

Bill Weeks claimed that lack of a quality in one area of a cow can lead to poor performance in other areas, naming this the "relationship of parts." The relationship of parts is a key aspect of aAa, as it not only tells the farmer what is wrong with the cow, but why. For example, a low-hanging udder may be a cow's main problem, but the source of the problem may be a lack of width in the pelvis, which is forcing the udder down or forward. This lack of width may stem from the very start of the cow with a narrow muzzle, narrow chest and flat ribs. aAa analyzers like Lee Bingham can identify the "why" of the problem.

How it works

"The process is quite simple," Bingham, who has worked as an aAa-approved analyzer in the Idaho region for several years, says. "I arrive on-farm and observe each cow individually. Sometimes all the cows will be locked into headlocks so I can take out each cow and look at her individually. I write down her three traits that need improvement, and after that it's up to the farmer to use this information.

"We want to build a cow from front to back," Bingham says. "The 'will to milk' starts with a long, broad refined head and neck, a wide chest with sprung ribs leading to high and wide hips, a good square leg stance and strong erect pasterns. Regardless of breed or system, that's the ideal cow in a nutshell."

Misconceptions

Genomic and genetic selection has developed advances in production. This is generally well understood; however, there are some misconceptions about aAa among farmers, says Mary Weeks Dransfield, daughter of Bill Weeks and current owner of aAa Analysis. "Firstly, aAa is not a form of evaluation," Dransfield claims, "PTAs and linear evaluation can be used to determine if an animal is 'good,' but aAa shows how good animals are different. aAa does not evaluate a problem but states it

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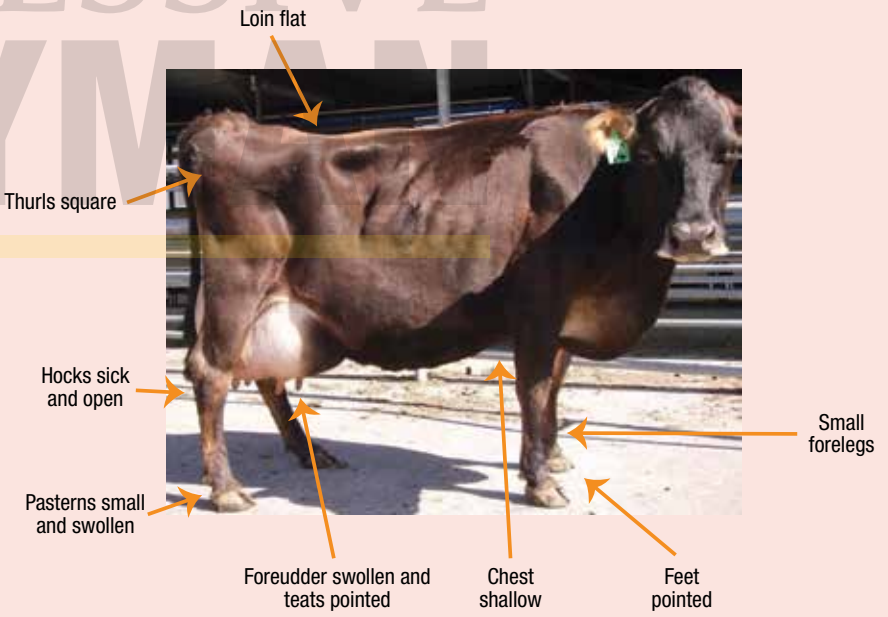
aAa analysis example for a 4,6,2 cow by Mary Weeks Dransfield

This cow's functional problems are lameness and high SCC. Her daughter will function better than she does if the sire brings aAa qualities 4 - Strong, 6 - Strong, 2 - Tall to the mating.



A cow with aAa quality 4

When I look at this cow, I see her small forelegs, shallow chest, swollen front udder, pointed teats, sick hocks, swollen pasterns and pointed feet. She needs a bull who brings aAa quality 4 (Strong). A bull with aAa quality 4 (Strong) will sire large forelegs, a deep chest, a healthy front udder, plumb teats, healthy hocks, healthy pasterns and short feet.

With a deeper chest, this cow's daughter will have plenty of room for her heart and lungs to take in air and pump blood to all areas of her body, supporting a healthy immune system and allowing her to grow larger and be more vigorous than her dam – who has a great will to milk but lacks the physical health and vigor to support her natural production potential.

A cow with aAa quality 6

This cow has a flat loin, square thurls, open hocks and small pasterns, so she needs a bull who brings aAa quality 6 (Style). A bull with aAa quality 6 (Style) will sire an arched loin, central thurl placement, neat hocks and large pasterns.

With central thurls and more substance of bone, this cow's daughter will stand with her rear legs placed squarely under her pelvis and have the substance of bone to walk on concrete for many years without developing lameness and chronic pain like her dam – who has a wide, open pelvis but may be culled prematurely due to mobility problems.

A cow with aAa quality 2

This cow also has a short head, short forelegs, low loin, meaty front udder, low rear udder and cocky tailhead. She needs a bull who brings aAa 2 (Tall). A bull with aAa quality 2 (Tall) will sire a long head, long forelegs, a high loin, an elastic front udder, a high rear udder and neat tailhead.

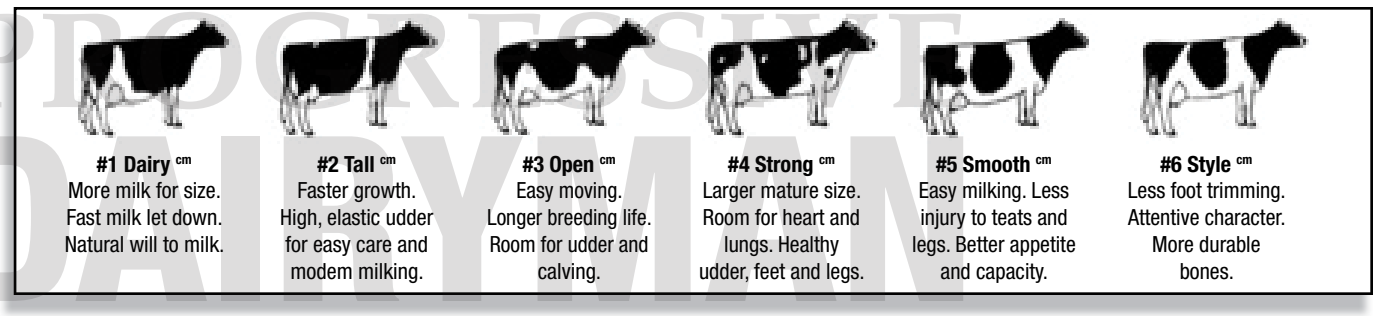
With a high and elastic udder, this cow's daughter will be more easily milked than her dam – whose high SCC may be due in part to her low-hanging udder with its abundance of excess udder tissue that can harbor bacteria.

and states what is causing the problem. With this knowledge, the source problem can be rectified in the next generation."

Secondly, Dransfield says, aAa is not a judgment on the merit of stock. It only focuses on the areas for improvement in the cow, regardless of breed or genetic merit.

Weeks also states that aAa does not breed opposites together. Instead, it finds the source of the problem, and depending on the relationship of parts, this may be solved in different ways. For example, if the cow has narrow pin bones, simply breeding her to a wide-rump bull may not result in better-quality heifers. The problem may arise from naturally close pins in a cow that needs aAa Quality 3 (Open), or it could stem from a narrow head, narrow chest and flat ribs in a cow that needs aAa Quality 5 (Smooth). "Breeding opposites together does not fix the problems," Dransfield says.

Figure 1



Does structure matter?

World-renowned animal behavior expert professor Temple Grandin states, "Don't over-select for any single trait ... you will wreck your animal." John Brubaker, a pedigree Holstein dairy farmer from Buhl, Idaho, has taken this advice to heart and avoids excessive selection on yield and components in favor of improved structure. "My breeding plan is simple: All my cows are analyzed by an aAa analyzer. I pick a Holstein family that has high components, and I select bulls with the correct structure to match my cows' needs." Brubaker has not used PTAs for more than 30 years, and although his cows have negative figures for components and yield, he attributes his herd average yield of 24,000 pounds to the sound structure of the cows. "Our yield isn't from small grains that 'burn out' cows either; 60 percent of the diet is from forage," Brubaker says.

"Once a cow is comfortable in her skeletal design, she will do what you ask of her. Our cows have good width throughout, from a wide head to bold ribs that can handle lots of forage; they're round, with enough angularity to milk." Brubaker also highlights the benefit of improved longevity of his herd. "Our cows are reaching seven or eight lactations, so we have surplus heifers for sale. That's become a big source of income."

While Brubaker only uses aAa for selecting bulls, in Ireland, Holstein X Friesian dairy farmer Stanley Wright selects for both high PTA merit bulls and aAa structure analyses. "We need good components to hit our milk price bonus, so I pick a team of genomic bulls with good figures, but they must have the correct aAa structure to match my cows," Wright says. The benefit of combined selection has resulted in Wright's annual surplus heifer farm sale having some of the highest average Irish Holstein heifer prices for the last five years. "My repeat buyers know our heifers have the structure for longevity and the figures for yield."

"At the end of the day," Dransfield says, "If a cow is balanced enough with optimal form, she can easily produce a lot of milk, reproduce effectively, be lower-maintenance, healthier and longer-living than an individual with structural inadequacies." She says, "We're not reinventing the wheel, just pointing out how to ensure you improve your chances of not getting a puncture in the future." **PD**