Which conformation traits are most important for dairy cow functionality?

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Many conformation traits have an effect on cow health and longevity. The most important udder traits in relation to udder health and longevity are fore udder attachment and udder depth, where strongly attached fore udders and high udders are beneficial. For body traits it is found that smaller and shallower cows have the capacity to live longer than higher and deeper cows.

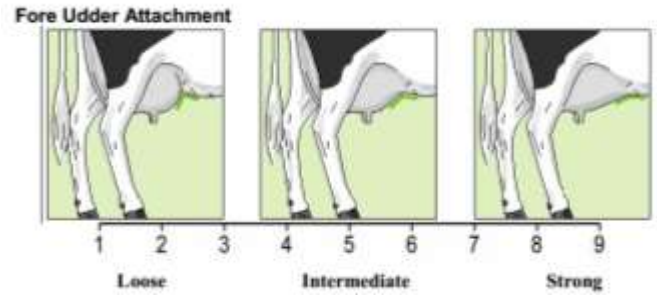
You often hear: “Udder cleft is the most important udder trait in relation to udder health and longevity” or “Cows have to be tall, deep and wide to be able to eat enough roughage and become old in the herd”. There are many views among farmers concerning what conformation traits are important for the cow to become a healthy and long living cow.

In this paper we look on the actual effect of all the conformation traits on udder health and longevity.

The linear conformation traits are registered by classifiers. They go into indices for body, feet and legs and udder, which in turn are weighed into NTM.

Showing the effect of the linear traits on udder health and longevity- an example

Breeding values for the linear conformation traits are calculated on the basis of classification values on a linear scale from 1 to 9. For instance for fore udder attachment the scale goes from loose to strong:



The breeding values for proven bulls for fore udder attachment can be plotted against the bulls breeding values for udder health and longevity. For fore udder attachment high breeding values correspond to strongly attached fore udders. For udder health and longevity high breeding values correspond to very good genetic ability for mastitis resistance and survival.

For some traits there is a strong relation between the linear conformation trait and udder health or longevity. Such strong relationships between traits are marked with “Strong” in table 1a, 1b, 2 and 3. This is the case for fore udder attachment. Bulls with high breeding values for fore udder attachment (which inherit strongly attached fore udders to their daughters) have considerably higher breeding values for udder health than bulls which inherit loose fore udders. Thus, this conformation trait has a strong positive effect on udder health.

For other conformation traits the relation to udder health or longevity is more moderate and these relations are marked with ”Moderate” in the tables. An example is the effect of strong fore udder attachment on longevity in RDC and Jersey, where strongly attached udders have only some positive effect.

Other conformation traits have no effect, or only a very weak effect on longevity or udder health. These “lack of effect” is not marked (indicated with an empty space) in the tables. For fore udder attachment this is the case for longevity in Holstein. In other words stronger or looser fore udder attachment has no effect on longevity for Holstein.

Udder conformation traits

The different udder traits have varying effect on udder health and longevity. In table 1a and 1b, the relation (moderate or strong) is shown. For instance for udder depth, high udders have a strong positive effect on udder health and longevity for all breeds except for longevity for Holstein where it only has some positive effect.

Table 1a. Relation (strong or moderate) between linear udder traits and udder health– see explanation in fact box. Always remember to notice the scale when looking at the results

Udder traits	**What gives good udder health**					
		Moderate		Moderate	Strong	
Fore udder attachment	Loose				RDC, HOL, JER	Strong
Rear udder height	Low			JER		High
Rear udder width	Narrow					Wide
Udder cleft	Week			JER		Strong
Udder depth	Deep				RDC, HOL, JER	High
Teat length	Long[1]			JER		Short
Teat thicknes	Thick[1]			RDC, HOL, JER		Thin
Teat placement, Front	Wide			RDC, JER		Close
Teat placement, Back	Wide			JER		Close
Udder balance	Rear			RDC, HOL		Front

[1]Scale is reversed compared to classified scale

Table 1b. Relation (strong or moderate) between linear udder traits and longevity – see explanation in fact box. Always remember to notice the scale when looking at the results

Udder traits	**What gives good longevity**					
		Moderate		Moderate	Strong	
Fore udder attachment	Loose			RDC, JER		Strong
Rear udder height	Low					High
Rear udder width	Narrow					Wide
Udder cleft	Week					Strong
Udder depth	Deep			HOL	RDC, JER	High
Teat length	Long[1]			RDC, JER		Short
Teat thicknes	Thick[1]			RDC, JER		Thin
Teat placement, Front	Wide	HOL				Close
Teat placement, Back	Wide	HOL				Close
Udder balance	Rear					Front

[1]Scale is reversed compared to classified scale

In general, the most important udder traits in relation to long lasting cows and cows with good udder health are primarily strong fore udder attachment and highly attached udder. This is the case for all breeds. There is

also moderate positive effect for some other combinations of breeds and traits, for example thinner teats have some positive effect on udder health for all breeds, whereas other conformation traits have no effect on health and longevity.

For most traits the relation between the linear conformation traits and udder health or longevity is similar for all breeds. However for teat placement, Holstein cows tend to live longer with wider distance between teats, while Jersey and RDC cows with closer teats are healthier.

Feet and leg conformation traits

Only a few feet and leg conformation traits have an effect on longevity for Holstein and RDC, and the effect is moderate – see table 2.

Further for some of these traits, cows with the best longevity are classified in the middle of the scale. This means that it is none the extremes on the classification scale that gives the best longevity. This is the case for legs side and legs rear in Jersey i.e. it is not the Jersey cows with the most sickled or straight legs that has the best longevity. The same is true for legs side and foot angle for RDC.

Table 2. Relation between linear feet and leg traits and longevity – see explanation in fact box. Always remember to notice the scale when looking at the results

Feet&Leg traits	**What gives good longevity**					
		Moderate		Moderate	Strong	
Legs side	Sickled[1]			HOL		Straight
Legs rear	Toes out					Bow-legged
Hock quality	Filled			RDC		Dry
Bone quality	Coarse					Fine
Foot angle	Low					Steep

[1]Scale is reversed compared to classified scale

Body conformation traits

For body traits, stature and body depth have the strongest effect on longevity, although the strength of the relation differ between breeds. Thus smaller and shallower cows live longer for all breeds. Some other body traits have some positive effect on longevity, for example dairy form, where more coarse cows tend to live longer for Holstein and Jersey.

Table 3. Relation between linear body traits and longevity – see explanation in fact box. Always remember to notice the scale when looking at the results

Body traits	**What gives good longevity**					
		Moderate		Moderate	Strong	
Stature	Higher[1]			RDC, HOL	JER	Smaller
Body depth	Deep[1]			HOL, JER	RDC	Shallow
Chest width	Wide[1]			RDC		Narrow
Dairy form	Angular[1]			HOL, JER		Coarse
Top line	Weak					Upwards
Rump width	Wide pins[1]	JER		RDC		Narrow pins
Rump angle	High pins	JER				Low pins

[1]Scale is reversed compared to classified scale