

The importance of linear type traits in Irish Holstein-Friesian cows

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Summary

- Some udder-related linear type traits are known to be associated with udder health, and will become more important determinants of survival as the Irish dairy cow population ages.
- Over the last 20 years, Holstein-Friesian cows have become shorter in stature with shallower, less angular bodies.

Introduction

Linear type traits are an assessment of an animal's physical characteristics. Linear type traits are assessed on a scale of 1-9 and can generally be categorised into three classes; 1) body size, 2) the mammary system, and 3) feet and leg conformation. One hypothesis is that cow conformation will become a more important determinant of longevity as the dairy cow population ages. Additionally, little is known about how the size and conformation of dairy cows has changed in recent decades.

Relationship between survival and linear type traits

Selecting for dairy cow longevity is challenging, as a cow's true longevity is not known until she is culled. Linear type traits are typically scored during the first lactation, and have frequently been proposed as potential early indicators of dairy cow survival. This could be particularly relevant for older cows and this is worth investigating in Ireland given the push to achieve 5.5 lactations per cow. An analysis of linear scores from 52,121 Irish dairy cows and survival data from 152,894 lactations on 52,447 dairy cows identified three linear type traits that become more important to the genetic merit of survival as cows age; these were udder depth, rear udder height, and teat length (Figure 1).

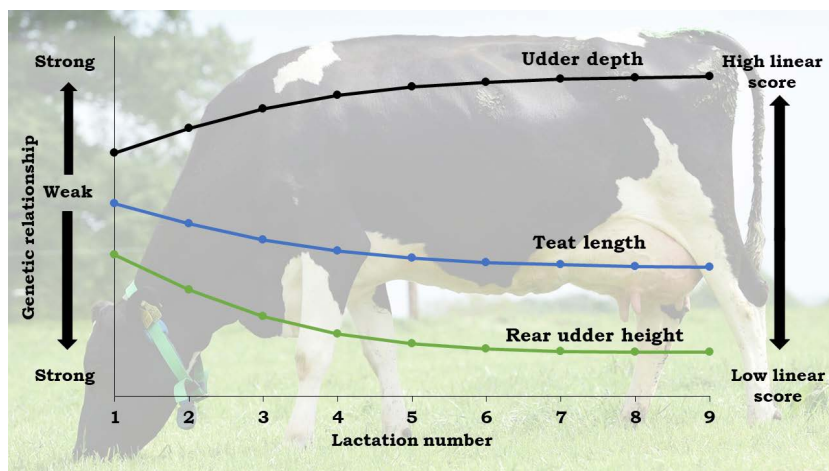


Figure 1. The strength of the genetic relationship between survival in each lactation and rear udder height, teat length, and udder depth

As cows get older, having shorter teats (lower teat length scores), a bigger distance between the vulva and udder (lower rear udder height scores), and a shallower udder (higher udder depth scores) become more important to survival. Each of these udder traits had previously been linked to somatic cell count and/or mastitis suggesting that traits associated with udder health become more important genetic determinants of survival as cows age.

How has the genetic merit for linear type traits changed?

Linear type traits from 246,870 Holstein-Friesian cows, born between 2000 and 2018, were used to quantify how the genetic merit for cow size and confirmation has changed in recent decades. On average, Holstein-Friesian cows are getting shorter with shallower, less angular bodies and better body condition (Figure 2).

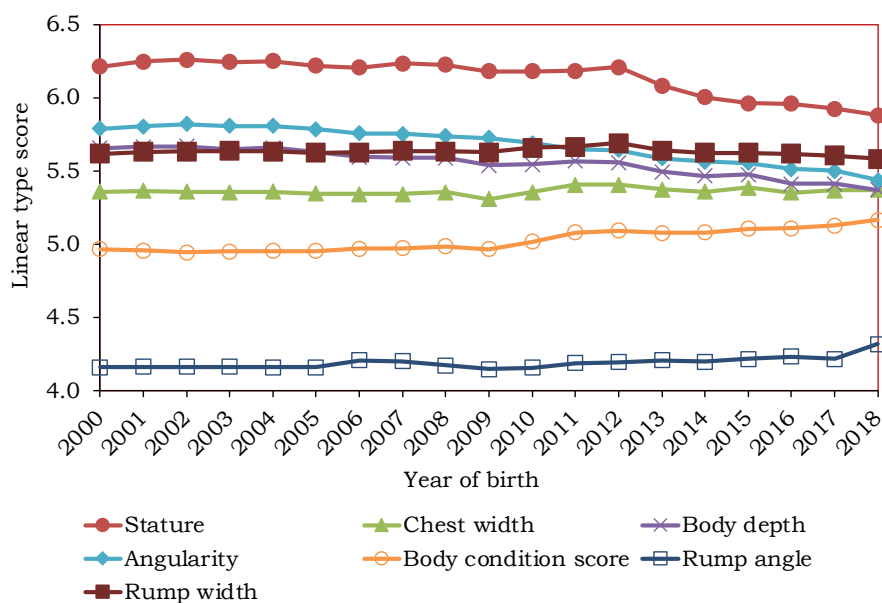


Figure 2. Average linear score for stature, chest width, body depth, angularity, body condition score, rump angle, and rump width by year of birth for Holstein-Friesian cows born between 2000 and 2018

The analysis also separated herdbook-registered cows from non-registered cows; the direction and speed of the trend varied between the two groups for some traits. For example, herdbook-registered cows were holding constant for height, and they were only becoming shallower and less angular at half the speed of the non-registered cows.

Conclusions

Traits associated with udder health become more important genetic determinants of survival as cows get older. Overall, Holstein-Friesian cows are getting shorter, shallower, and less angular, but herdbook-registered cows are taller, deeper, and more angular with less condition than their non-registered counterparts.