American International Charolais Association

Charolais Udder Quality Genetic Evaluation

Few may be aware, but in the last 10 years, the Charolais breeders have amassed a sizable udder score database. The American International Charolais Association's Whole Herd Rewards (WHR) process has been a contributing factor in capturing these valuable cowherd records.

Udder soundness is a major factor in determining cow longevity. Poor udder quality can contribute to calf mortality, increased labor requirements, and more frequent animal handling.

The July 2020 AICA National Cattle Evaluation update is the first udder quality EPD release since the AICA research was reported in 2018. The udder and teat EPDs can be accessed as part of the AICA Database Search http://search.charolaisusa.com/

Udder Score Reporting

Individual udder suspension and teat size scores are reported by Charolais breeders to the American International Charolais Association (AICA) using a nine-point scoring system as recommended in the Beef Improvement Federation Guidelines (9th edition, March 2018).

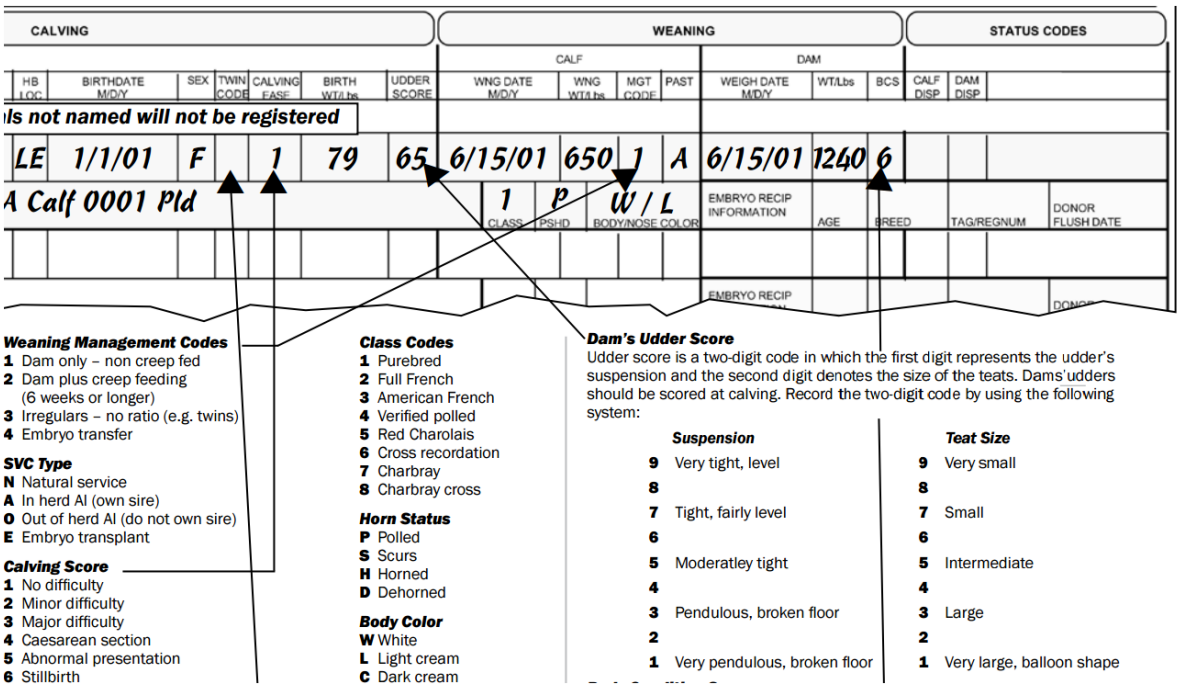
The AICA reported udder score is a two-digit code in which the first digit is associated with suspension and the second digit represents teat size. These scores are assigned by breeders to individual females, preferably by the same person on the weakest quarter at or near a 24-hour window of calving. Udder suspension scores are assigned ranging from a numeric 9 (very tight) to 1 (very pendulous). The teat size scores range from 9 (very small) to 1 (very large). The AICA udder scores are submitted either online or by printed forms for the AICA Registration Form & Weaning Worksheet.

Figure 1 summarizes the scoring system. Figure 2 illustrates the AICA data entry form for reporting udder scores.

Figure 1. AICA udder suspension and teat size scoring system.

Suspension	Teat Size
9 Very tight, level	9 Very small
8	8
7 Tight, fairly level	7 Small
6	6
5 Moderately tight	5 Intermediate
4	4
3 Pendulous, broken floor	3 Large
2	2
1 Very pendulous, broken floor	1 Very large, balloon shape

Figure 2. Example form for AICA udder score data entry by breeders.



Performance Records and Genetic Parameter Estimates

The AICA udder and teat score performance records are edited for contemporary group size, pedigree completeness, and scoring system errors. Udder quality traits are analyzed in a multi-trait single-step genetic evaluation with repeated udder score records, pedigree, and DNA genotypes. As an overview, the mathematical model accounted for the age of the female measured, contemporary group differences, and permanent environment effects for multiple scores on females. Heritability estimates of .25 and .23 for udder suspension and teat size are part of the genetic evaluation procedure. These two traits where highly correlated, with a .85 genetic correlation. The high genetic correlation indicates these two traits are somewhat controlled by the same genes.

Known to be moderately heritable, udder quality genetic parameters have been quantified and breeding values published as expected progeny differences (EPDs) for the American Hereford Association animals. Bradford et al. (2015; J. Anim. Sci. 2015.93:2663) reported heritability estimates of .32 and .28 for udder suspension and teat size, respectively. The genetic correlation was reported to be .81 in the Hereford data.

Genetic Evaluation for Udder Quality Traits in Charolais

Figure 3 illustrates the hypothetical comparison of two sires with udder trait EPDs. Assuming both sires have similar accuracies, Sire A would be expected to have daughters with more favorable udder suspension and teat size at calving than daughters of Sire B. The magnitude of difference between the two sets of future daughters' expected scores would be about a half score favoring Sire A, based upon the nine-point scoring system.

Figure 3. Example of two Charolais sires with udder trait EPDs.

	Suspension EPD	Teat EPD
Sire A:	**1.00**	**0.90**
Sire B:	**0.50**	**0.45**
Score Difference	**0.50**	**0.45**

Through performance record reporting by AICA breeders, a large dataset of udder suspension and teat scores were available to estimate genetic parameters and generate selection tools for traits not readily accessible in many beef cattle breeds. The efforts by AICA to provide this new trait suite further generates interest in Charolais maternal traits as well as accessibility to future selection tools for seedstock and commercial beef producers.

To access udder quality EPDs and accuracies, go to the AICA website or database search at http://search.charolaisusa.com/