

Resistance to Displaced Abomasum (DA)

INTRODUCTION DATE

April 3, 2018, and then in all subsequent weekly, monthly and tri-annual evaluations.

DESCRIPTION OF TRAIT

Genetic and genomic evaluations for resistance to displaced abomasum (DA) are provided for Holstein males and females. Evaluations are expressed in percentage points of resistance above or below the breed average.

Trait definition

The DA predicted transmitting ability (PTA) represents the expected resistance of an animal's offspring to displaced abomasum in a herd with average management conditions. Larger, positive values are more favorable.



Photo source: ABS Global

Unit of measurement: Percentage points

The average resistance rate is equal to 97.9% in U.S. Holsteins. The resistance rate is equivalent to the incidence rate subtracted from 100.

Daughters of a Holstein bull with a DA PTA of +1.0% are expected to have an average resistance rate to displaced abomasum of 99% (assuming the breed average resistance is approximately 98%). Daughters of a Holstein bull with a DA PTA of -2.0% are expected to have an average resistance to displaced abomasum of 96%. Daughters from the bull with PTA of -2.0% are expected to have four times the number of cases of displaced abomasum as daughters from the bull with PTA of +1.0%.

Benefits of trait:

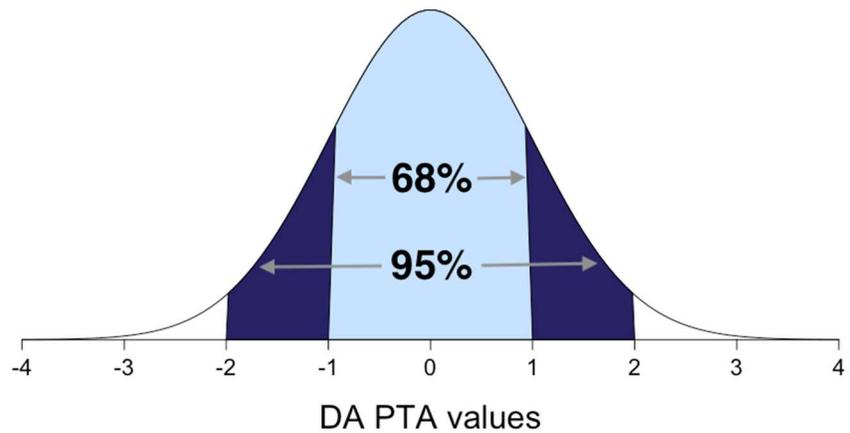
- Displaced abomasum is a serious health event, often requiring veterinary intervention and surgery.
- Displaced abomasum has the highest direct cost of the six new health traits at \$197 per case. This does not include any associated costs such as decreases in production and fertility^{1,2} already accounted for in Net Merit.
- The significant genetic component of this trait indicates that producers can select animals less likely to have displaced abomasum.

Breeds: Initially, the evaluations will be available only for Holstein animals. As more health data become available, evaluations can be provided for additional breeds.

Data source: CDCB DA evaluations were developed using producer-recorded data collected through Dairy Herd Information (DHI) affiliates from herds across the U.S. Strict editing was applied to ensure only the most reliable data was included for the development of genetic evaluations. The edited data included a total of more than 1.8 million DA records from over 1 million cows. These health records are used in conjunction with lactation data available in the CDCB cooperator database.

Range of population:

The standard deviation (variation) for DA PTA is 1.0%. Because one and two standard deviations normally include 68% and 95% of observations, respectively, we assume about 68% of bulls will have a DA PTA between -1.0 and +1.0 percentage points while 95% of the bulls will range from -2.0 to +2.0 percentage points.



DA PTAs range from 4.0 percentage points below to 1.6 percentage points above average in evaluated Holstein bulls born since 1990 with reliabilities $\geq 90\%$ (December 2017).

Pre-release testing indicates the active AI Holstein sires in December 2017 (614 bulls) range from -1.0 percentage points to +1.1 percentage points, with the average at approximately 0 percentage points.

Reliability range: Young genomic bulls are expected to have reliabilities averaging 42% for resistance to displaced abomasum, and progeny tested bulls are expected to have genomic reliabilities averaging 47%. As additional data are accumulated, reliabilities will increase.

Heritability: Estimated heritability is 1.1% for resistance to displaced abomasum (observed scale).

Use in net merit indices: This trait will not be incorporated into net merit indices at launch; development of a health-enhanced net merit is expected in the future (date to be determined).

It is suggested that producers continue to rely primarily on a composite economic index with the specific choice dependent on the farm's milk payment situation and management system. In the meantime, producers might consider avoiding those service bulls having low predictions for resistance to displaced abomasum.

PTA Correlations: The largest significant ($P < 0.05$) correlation with PTA for resistance to displaced abomasum was with PTA for livability at 0.47. This implies that animals that experience displaced abomasum are much less likely to survive in the herd. Additional significant correlations were 0.35 with productive life PTA, 0.32 with daughter pregnancy rate PTA, and 0.28 with cow conception rate PTA.

Future developments:

In the future, further model improvements and development will be researched and tested. This may include the development of a multi-trait model that incorporates multiple metabolic disorders.

RESEARCH REFERENCES

¹Donnelly, M. R., A. R. Hazel, B. J. Heins, & L. B. Hansen, 2018. Health treatment cost of Holsteins in 8 high-performance herds. *J. Dairy Sci.* (in preparation).

²Liang, D., L.M. Arnold, C.J. Stowe, R.J. Harmon, & J.M. Bewley, 2017. Estimating US dairy clinical disease costs with a stochastic simulation model. *J. Dairy Sci.* 100(2): 1472–1486.