Health Evaluations for Jerseys Arriving on April 7, 2020

By H. Duane Norman, Kristen Parker Gaddis and Laura Jensen[1]

Jersey breeders will receive genetic evaluations to strengthen cows' resistance to health disorders in April 2020. These evaluations from the Council on Dairy Cattle Breeding (CDCB) are derived from Jersey data recorded in Dairy Herd Information (DHI) herds. These new genetic evaluations will help alleviate six costly health conditions impacting Jerseys. These will help build resistance against *displaced abomasum*, *milk fever*, *ketosis*, *mastitis*, *metritis* and *retained placenta*, the same as introduced for Holsteins in April 2018.

Historically, most health records resided in on-farm computers. Recently, however, a concerted effort was undertaken (aided by Cari Wolfe of the American Jersey Cattle Association) to transfer more Jersey health data to the national collaborators' database so genetic predictions can be generated. We expect even more Jersey producers to benefit from the new evaluations when additional health data is collected and made available to CDCB. All producers can benefit when genetic evaluations are provided on AI bulls, but the most gains go straight to herds supplying data because they receive highly accurate Predicted Transmitting Abilities (PTA) on their heifers and cows. The bottom line: the U.S. cattle will be healthier. Clearly today's consumers are paying attention and even requesting assurances of animal health. One additional perk for producers is that herds with recorded health data can qualify for reduced fees when genotyping.

Table 1 shows characteristics of the Jersey health data in the CDCB test run, showing a majority of the data arrived in the previous 12 months. Frequencies of the disorders vary considerably as 10.4% of lactations included a code for clinical mastitis while only 1.3 and 1.2% had a code for displaced abomasum and milk fever. Thus, average resistance rate to mastitis in U.S. Jerseys is defined as 89.6%, obtained by subtracting the mastitis incident rate (10.4%) from 100%. The genetic component for these traits in Holsteins ranges from 0.6 (milk fever) to 3.1% (mastitis). More characteristics for the Jersey evaluations will be coming shortly.

Description of Health Disorders

Displaced abomasum: Enlargement of the abomasum with fluid and/or gas that caused its movement to the left or right of the abdominal cavity; the twisting blocks the digestive process and usually requires veterinary intervention.

Milk Fever, or Hypocalcemia: Typically results after calving due to low total blood calcium levels.

Ketosis: Build-up of ketone bodies that typically occurs due to negative energy balance in early lactation.

Mastitis: Infectious disease that causes inflammation of the mammary gland; one of the most common and costly diseases of dairy cattle.

Metritis: Infection of the endometrium (lining of the uterus) after calving.

Retained placenta: Retention of fetal membranes more than 24 hours after calving.

Table 1. Number of Jersey health records, frequency of incidents, trait resistance[1] and heritability[1].

Health trait	Number of herds with health records in test run	Number of health records in the test run	Health records arriving in just the last 12 months	Frequency of recorded health disorder (%)	Health trait resistance rate (%)	Genetic control (h², or heritability)
Displaced abomasum	355	110,181	50,307	**1.3**	98.7	1.1
Milk fever	293	143,009	77,507	**1.2**	98.8	**0.6**
Ketosis	253	85,417	45,701	2.6	97.4	1.2
Mastitis	515	168,342	70,835	**10.4**	**89.6**	**3.1**
Metritis	370	117,744	47,530	5.0	95.0	1.4
Retained placenta	416	132,766	72,958	1.9	98.1	1.0

[1] *Trait resistance rate (%) defined as 100% minus frequency of the health disorder; h² from Holstein data.*

PTAs for each of the six health traits will be the predicted daughter difference for resistance above or below the Jersey breed average. The larger the positive values, the more favorable the genetic resistance to the disorder. Let's look at how these new evaluations can be used in the breeding program. In a herd with average management conditions, daughters of Jersey Bull A with a PTA for mastitis resistance of +3.0 are expected to have an average resistance rate to clinical mastitis of 92.6% (89.6 + 3.0) . Likewise, daughters of Bull B with a PTA of –3.0 are expected to have lower average resistance, 86.6% (89.6 – 3.0). This can also be indicated inversely by stating in the typical Jersey environment, only about 7.4% of the daughters of Bull A will have a mastitis incident, while about 13.4% of Bull B's daughters will have the mastitis code. Differences in extra costs and lost milk income from these two alternatives equates to a hefty difference in herd income.

CDCB Disease Resistance Traits

Displaced abomasum (DA)

Hypocalcemia, or milk fever (MFEV)

Ketosis (KETO)

Mastitis (MAST)

Metritis (METR)

Retained placenta (RETP)

Bringing new health evaluations to reality would not have been possible without the help of many in the dairy community – notably dairy producers, dairy records processing centers, genomic nominators, plus USDA and industry geneticists. Nevertheless, there are still many herds whose health data is not being sent to the national database. Before the data can flow, various issues may need to be addressed. In some cases, the producers may not have signed an agreement with their DHI organization to indicate they want their data to go to the CDCB for this purpose. In other cases, computer software has not been modified to transfer the data. A third possibility is that agreements may need to be negotiated between organizations to send data. Most producers still need to check to determine which of these obstacles are preventing them from getting accurate health evaluations on their animals. Producer pressure to remove these obstacles will help deliver accurate health evaluations to more herds and generate encouragement to breeds with small population size that don't currently have them.

Careful editing was needed to ensure that only reliable data is included in the new evaluations. Besides the development of the evaluations for Holsteins, two additional actions helped move this initiative forward; Kristen Gaddis completed a ketosis study funded by the American Jersey Cattle Association's Research Foundation on ketosis while she worked at USDA (abstract link). Laura Jensen selected the Jersey health initiative for her CDCB internship project in 2019 and presented at the June 2019 American Dairy Science Association meeting (presentation link). Kristen Gaddis directed the editing strategy to finalize the Jersey trait evaluations.

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