

**American Jersey Cattle Association
National All-Jersey Inc.**

OFFICIAL NOTIFICATION

From: Neal Smith, Executive Secretary

Date: February 15, 2010

The American Jersey Cattle Association (AJCA) has been advised by the Animal Improvement Programs Laboratory (AIPL), ARS-USDA, that the genomes of 15 animals recorded by the association include DNA (breed-specific SNPs) associated with the Holstein breed. These animals are:

JEUSA000067010222	OOMSDALE JACE GRAT GRIEVES-ET	14JE431
JEUSA000067010224	OOMSDALE JACE GRATIT GARDEN-ET	7JE768
JEUSA000067010225	OOMSDALE JACE GRATUDE GANNON-ET	1JE604
JEUSA000067010234	OOMSDALE MORGAN GRATITUDE MIKE	7JE779
JEUSA000067010255	OOMSDALE GRATITUDE COUNTRY CARL-ET	11JE885
JEUSA000067010257	OOMSDALE GRATITUDE COUNTRY CASEY-ET	
JEUSA000067010258	OOMSDALE GRATITUDE COUNTRY CC-ET	
JEUSA000067010293	OOMSDALE REBEL GRAT GRETZKE-ET	1JE660
JEUSA000067027311	OOMSDALE ROCKET GOOSE-ET	1JE672
JEUSA000067027314	OOMSDALE BRAZO GRATITUDE GHENT-ET	11JE930
JEUSA000067027319	OOMSDALE BRAZO GRATITUDE GRACE-ET	
JEUSA000067027342	OOMSDALE BRAZO GRAT GOOFY-ET	7JE955
JEUSA000067027349	OOMSDALE IATOLA GRATITUDE GUINES-ET	11JE939
JEUSA000067027351	OOMSDALE IATOLA GRATITUDE GESUS-ET	
JEUSA000067027366	OOMSDALE GRATITUDE LEXING LIAM	14JE509

All are progeny of the cow, Oomsdale Gordo Goldie Gratitude 111224922. There are an additional 20 progeny of this cow recorded with the AJCA that have not been genomically tested as of this date.

AJCA staff, with full cooperation from AIPL geneticists, has begun a systematic process to discover, to the fullest possible extent, the percentage and source of Holstein DNA in the genomes of these animals. The investigation has centered on the dam, Oomsdale Gordo Goldie Gratitude 111224922 (“Gratitude”) because the identity and Jersey breed-specific SNP profiles of the sires of the above-listed progeny are not in question.

The cow “Gratitude” was DNA-typed by ImmGen Inc. in 2002 in accordance with AJCA rules governing registration of embryo transfer (ET) progeny. Adopted in 2002 and replacing blood typing, DNA-typing is the AJCA’s official method of parentage qualification. Her dam, Oomsdale Alf Gloria Goldie 3935190, and maternal grandam, Oomsdale Herm Groovy Gloria 3786238, had been previously blood typed as ET donor dams, and were DNA-typed in 2002 in conjunction with the parentage verification request for “Gratitude.” The sire of record of the cow “Gratitude,” Bold D Gem Gordo 666879, was not alive and had not been previously blood typed. On the basis of its tests and available information, ImmGen Inc. reported to the AJCA and the breeder, Michael A. Ooms, that the DNA-types of “Gratitude,” her dam “Goldie” and the grandam “Gloria” were consistent with the AJCA-recorded parentage.

“Gratitude” is dead and not available for genotyping. However, AIPL geneticists have examined the DNA of the 15 genomically tested progeny in addition to DNA obtained from the cow’s maternal grandam, Oomsdale Herm Groovy Gloria 3786238, and Oomsdale Grant-ET 11152315, a maternal brother of “Gratitude.” Their conclusions are:

(continued)

1. Oomsdale Alf Gloria Goldie 3935190 has been confirmed as the dam of Oomsdale Gordo Goldie Gratitude 111224922.
2. No conflicts were found in the breed check of the genotypes for Oomsdale Herm Groovy Gloria 3786238 and Oomsdale Grant-ET 111152315.
3. Based on the Holstein DNA identified in the genomes of the 15 progeny listed above, the Holstein inheritance of “Gratitude” has been imputed as 22.3% and is paternal in source. The most likely source is a red-carrier Holstein bull.

AIPL geneticists are now examining available bull genotypes in an effort to identify the source. The AJCA Executive Secretary has notified Michael Ooms of the parentage issues that have been discovered and has initiated investigation of breeding records.

About Genotyping

AIPL reported these discoveries to the AJCA on January 26, 2010 in the course of conducting genomic evaluations for the industry. Parentage (pedigree) validation through the use of genotype technology is an integral objective of AIPL genomic research to improve accuracy of genetic evaluations (Norman et al., 2010). Pedigree validation is performed by comparing SNP genotypes of animals with the SNP genotypes of recorded parents.

Genotypes are derived from blood samples or other sources of DNA (e.g., semen, hair samples). The DNA is extracted and then placed on a chip developed by Illumina (San Diego, CA), USDA’s Bovine Functional Genomics Laboratory (Beltsville, MD), and other research partners. That chip provides genotypes on 43,385 single nucleotide polymorphisms (SNPs) evenly distributed across all 30 chromosomes. To date, 3,025 Jersey males and 605 Jersey females have been genotyped by this procedure.

Genotypes document which genes have been inherited by an animal (VanRaden et al., n.d.). Parentage testing is possible because genotypes provide information about the actual genes shared between relatives (VanRaden, 2007).

A two-step procedure is used by AIPL (Wiggans et al. 2010). The first step examines 200 SNPs that are specific in Jersey cattle (*monomorphic SNPs*) to check an animal’s genotype at the breed level. This is a highly sensitive test. Conflicts at any one SNP are very rare occurrences within the general Jersey population (< .02%). The second step is to use all 43,385 SNPs to validate the animal’s pedigree by computing relationships to relatives at the gene level. Animals whose genotypes differ from expectation at either or both steps of this procedure are flagged for investigation.

Discovery Process Continues

The investigation of the parentage of Oomsdale Gordo Goldie Gratitude 111224922 is based upon the most advanced genomics technology available and is being conducted by internationally recognized dairy cattle geneticists. The association will continue to inform you of the facts as they become available through the discovery process. A detailed report will be presented to the AJCA Board of Directors at its meeting, March 13 and 14 in Columbus.

Published References

Norman, D., J. Cole, G. Wiggans, P. VanRaden, and C. Van Tassell. Improving genetic predictions for dairy animals using phenotypic and genomic information. Project Number: 1265-31000-096-00, http://www.ars.usda.gov/research/projects/projects.htm?accn_no=412342, accessed 2/10/2010

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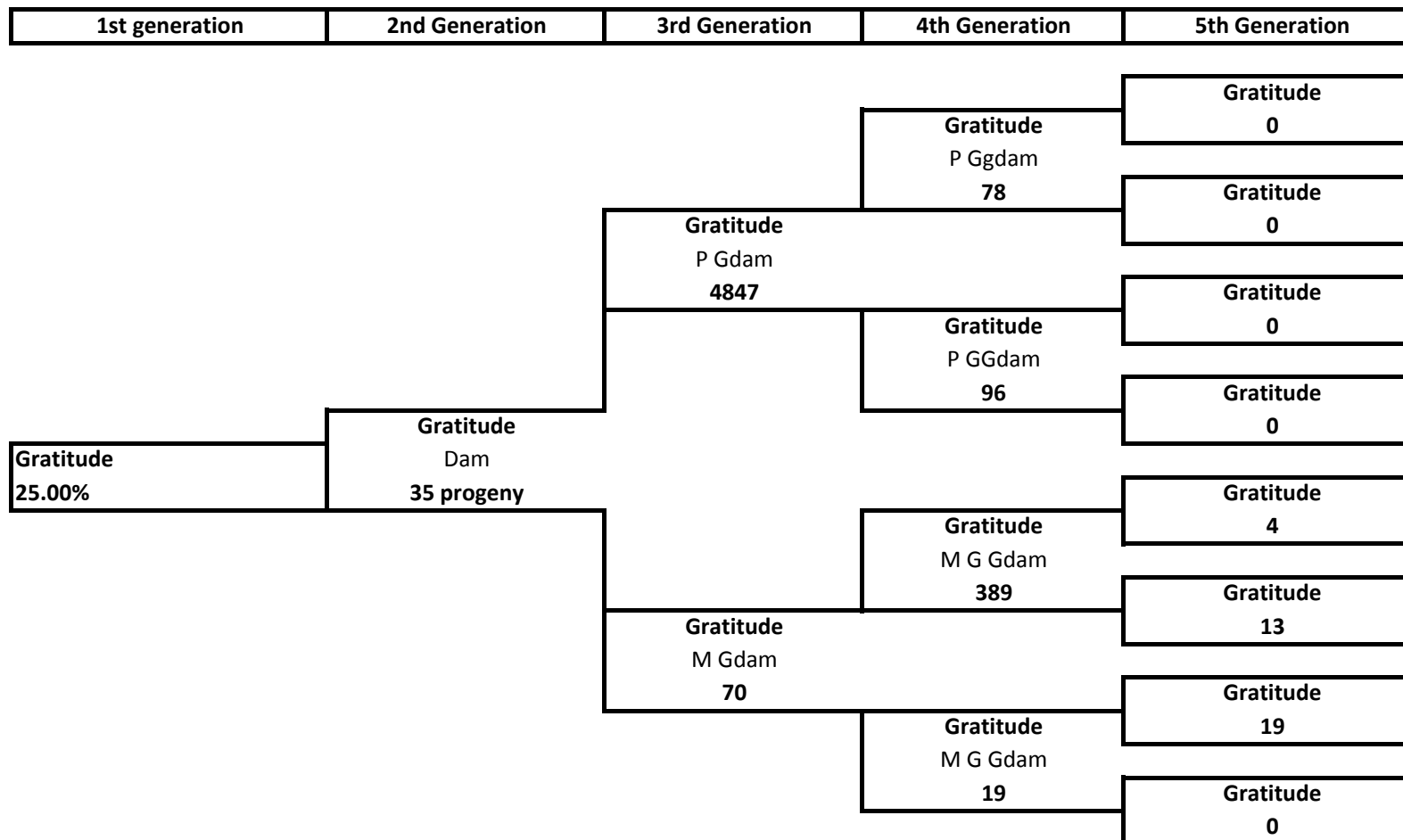
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Wiggans, G. R., P. M. VanRaden, L. R. Bacheller, M. E. Tooker, J. L. Hutchison, T.A. Cooper, and T. S. Sonstegard. Selection and management of DNA markers for use in genomic evaluation. *J. Dairy Sci.* 93: *accepted for publication*.

KEY MESSAGES

- The discovery that the ancestry of Oomsdale Gordo Goldie Gratitude 111224922 (“Gratitude”) is not pure Jersey was made using genomic SNP technology. This new technology was implemented for Jersey genomic evaluations in 2009.
- The official method of the American Jersey Cattle Association for parentage verification is DNA-typing. This method was adopted in 2002 and replaced bloodtyping.
- Oomsdale Gordo Goldie Gratitude 111224922 was DNA-typed in 2002, along with her dam and maternal grandam. The sire of record was dead and was not previously bloodtyped or DNA-typed. On the basis of its tests and available information, the testing laboratory found no conflicts with the AJCA-recorded parentage.
- AJCA staff and AIPL research geneticists are working in cooperation to determine the correct parentage of “Gratitude.” The breeder of “Gratitude” has been very cooperative and diligent in reviewing and providing records extending for more than 15 years.
- Although “Gratitude” is dead and not available for genomic testing, AIPL research geneticists have been able to use the genomic information from her tested progeny to further their work. They have determined that the genome of “Gratitude” is 22.3% Holstein and the most likely source is a red-carrier Holstein bull.
- The AJCA Board of Directors was informed of the known facts in a conference call on February 12, 2010. They will continue to be apprised of facts as they emerge between now and March 13 when the Board will meet to receive a full report and consider official action.
- The National Association of Animal Breeders (*A.I. industry*) received notification of these discoveries from the AJCA Executive Secretary on February 12, 2010.
- Official notification to the AJCA membership, Jersey recording associations in other countries, and the industry at large will be made Monday, February 15, 2010.

Progeny of Gratitude in Registered Jersey Population as of 1/31/2010
Blocks containing the name "Gratitude" indicate where she appears in pedigrees.



	2nd Generation	3rd Generation	4th Generation	5th Generation
Total Progeny (5,551)	35	4917	563	36
Generational progeny name	Progeny	Grand Progeny	Great Grand Progeny	Great Great Grand Progeny
Dam count	Dam	2nd Dam	3rd Dam	4th Dam
Percent non-Jersey genes	12.500%	6.250%	3.125%	1.563%
Fraction non-Jersey genes	1/8	1/16	1/32	1/64