
Jersey Neuropathy with Splayed Forelimbs (JNS)

Description of Condition and Requirements for Designation

*With excerpts from Policies Regarding Undesirable Genetic Factors,
published at http://www.usjersey.com/Reference/Policies_Undesirable_Genetic_Factors_rev711.pdf*

*Effective February 22, 1983
Revised November 6, 2020*

Statement of Policy

Every effort should be made within the breed to identify those animals that carry undesirable genetic factors. The American Jersey Cattle Association considers it the responsibility and obligation of each member of the Association and each breeder of Jersey cattle to report to the Executive Secretary any known case of an abnormal Jersey animal. The Executive Secretary shall maintain records of abnormalities and shall make available information from such records in accordance with rules established by the Board of Directors from time to time.

The Board of Directors considers it to be unethical practice to offer for sale an animal, male or female, an embryo or semen from an animal that has been designated a carrier of an undesirable genetic factor without first informing the prospective buyer of this fact. In practice this means that any advertising, descriptive material, or pedigree containing a designated carrier of an undesirable genetic factor shall carry a statement indicating designated carriers.

This statement of policy is made in belief that it is in the best interests of the breed and the breeders of Jersey cattle. It is made in the belief that it will serve the position of those who have taken the more difficult, positive, open approach to this fundamental concept of ethics in the improved breeding of dairy cattle. In the long run, all serve to gain by such a policy, but only to the degree that all cooperate in the acceptance and enforcement of this policy.

Identification of Undesirable Genetic Factors

In determining what genetic factors are considered to be undesirable in the Jersey breed, the Board of Directors shall consider such evidence as it considers appropriate. The Executive Secretary shall make such investigations of genetic factors occurring in Jersey animals as he or she may believe necessary or advisable and shall report the results of his or her investigations to the Board of Directors. Before recommending that the Board make a determination regarding the existence of an undesirable genetic factor, the Executive Secretary shall consult with at least two experts whose recommendations shall be submitted to the Board.

Identification of Carrier Animals

When the Board of Directors shall determine that an undesirable genetic factor exists in the Jersey breed, the Board shall take whatever action it may consider appropriate to control and limit the genetic

factor. Such action will include procedures to identify animals that are probable carriers of the undesirable genetic factor and to inform persons having an interest in the Jersey breed of the identity of such probable carriers. The procedures for publication of the identity of

probable carrier animals, referred to as "designated" carriers, are contained in supplemental statements adopted with respect to each undesirable genetic condition.

For each undesirable genetic condition the Board of Directors shall adopt a separate statement of procedures for designating animals, referred to as "Statement of Designation Procedures," and designate an official report form to be used for reporting affected animals. The Board of Directors shall be responsible for designating animals as carriers of an undesirable genetic factor. When an animal has been designated as a carrier, the Executive Secretary shall notify the last recorded owner, the breeder, any lessee, and any third-party nominator by regular U.S. Mail.

The Board of Directors may adopt procedures and rules by which a Jersey may be progeny tested for a particular undesirable genetic factor. The rules and procedures for progeny testing are contained in supplemental statements adopted with respect to each undesirable genetic condition.

The policy of the Association is to identify and designate Jersey animals as carriers of undesirable genetic factors when (1) genomic detection based on DNA analyses and/or (2) documentation of their own progeny is sufficient to accomplish designation.

Publication and Release of Information

Male and Female Animals

The Executive Secretary shall maintain a record of all animals that have been designated carriers of an undesirable genetic factor, and designation shall be noted on all advertising, descriptive material, or pedigrees published by the Association containing reference to a designated carrier. The Association shall also notify the recorded owner, the breeder, any lessee, and any third-party nominator if the animal carries an undesirable genetic factor.

Except as provided in this statement of policies, no information concerning the genetic condition of any animal shall be released by the Association without approval of the Board of Directors.

Sales

For each undesirable genetic condition the Board of Directors shall establish policies for the marketing of carrier animals and their progeny in all sales sponsored or managed by the Association or Jersey Marketing Service.

Jersey Neuropathy with Splayed Forelimbs (JNS) Statement of Designation Procedures

Designated November 2020

Description of Condition

Calves affected with Jersey Neuropathy with Splayed Forelimbs (JNS) are unable to stand and exhibit significant extensor rigidity of forelimbs and/or excessive lateral abduction. Affected calves are generally bright at birth but exhibit neurologic symptoms including spasticity of head and neck and convulsive behavior. Other symptoms reported include dislocated shoulders, congenital craniofacial anomalies and degenerative myelopathy.

JNS is attributable to a specific haplotype on Bos taurus autosome 6 (BTA6). Subsequent investigation identified the biological cause within the haplotype as a UCLH1 missense variant located at 60,158,901.

Requirements for Designation of JNS Carrier or Tested Free Status

The Board of Directors will not designate an animal either a carrier or free of JNS haplotype if the Board considers that there is a reasonable doubt that the animal is a carrier. The determination as to reasonable doubt depends upon the quality and amount of available evidence which will vary in each case.

Official JNS status is obtained (1) by direct observation of the UCLH1 missense variant on BTA6 in the genotype of an animal, or (2) by direct observation of the haplotype including the UCLH1 missense variant on BTA6 in the genotype of an animal, or (3) by use of genomic test results of family members to determine through imputation, if the variant is contained in the JNS haplotype of other genotyped animals, and reassessed as additional information is obtained from genomic analyses.

With respect to all sales sponsored by the Association, a bull shall not be accepted unless designated free of Jersey Neuropathy with Splayed Forelimbs (JNS).

Frequently Asked Questions: Jersey Neuropathy with Splayed Forelimbs (JNS)

What is Jersey Neuropathy with Splayed Forelimbs (JNS)?

JNS is a recessive genetic condition which, when inherited from both parents, results in an affected calf that is unable to stand. Front legs are splayed and rigid. Affected calves are generally bright at birth but exhibit neurologic symptoms including spasticity of head and neck and convulsive behavior. Other symptoms reported include dislocated shoulders, congenital craniofacial anomalies and degenerative myelopathy. JNS is attributable to a specific haplotype on Bos taurus autosome 6 (BTA6). Subsequent investigation identified the biological cause within the haplotype as a UCLH1 mis-sense variant located at 60,158,901.

What is a haplotype? Is a haplotype different from a gene?

A haplotype is a region of closely linked genetic markers (single nucleotide polymorphisms, or SNPs) that are located on one chromosome and that are inherited as a group. As such, a haplotype encompasses multiple genes. There are many haplotypes, most of them good or benign, but a few of them not so good.

Is Jersey Neuropathy with Splayed Forelimbs (JNS) the same genetic condition as Limber Legs (LL)?

No, for several reasons. The symptoms and pathology for affected JNS calves are not the same as with affected LL calves. The genotypes of known Limber Legs (LL) carriers do not include the same haplotype or causative variant attributed to JNS. The genetic variants for LL and JNS are located on 2 different chromosomes.

Why did the Board of Directors designate Jersey Neuropathy with Splayed Forelimbs (JNS) as an undesirable genetic factor?

Healthy calves are the basis for Jersey breed growth, and a key to the profitability of your Jersey business. By designating JNS as an undesirable genetic factor, information will be available to all Jersey owners so they can limit carrier to carrier matings and manage the impact of potential calf loss.

What is the frequency of JNS in the Jersey population?

Current carrier frequency is 5.92% in the genotyped Jersey population. That means that approximately 6% of the genotyped Jersey population is a Carrier of one copy of the JNS haplotype (JNSC) and 94% are Free of JNS haplotype (JNSF).

What is the basis for designating JNS status?

JNS status is determined by identification of the haplotype from a 6K or higher genotype. A direct test will be included in future genomic test chips.

How will this information be published?

Status of an animal is listed as JNSF designating status Free, JNSC designating status Carrier. When an animal is tested as a carrier, the recorded owner, the breeder, any lessee, and any third party nominator will be notified by the AJCA. The association maintains a record of all animals that have been designated carriers, and such designation shall be noted on all advertising, descriptive materials, or pedigrees published by the AJCA. This includes Genomic Evaluation Reports, Official Performance Pedigrees, Performance Progeny Reports and genetic evaluation reports.

What can I expect if I mate two known carriers of JNS?

As shown below, there is a 25% chance that the calf would inherit two copies of JNS and be born with the affected condition.

The chance that the calf would be a carrier is 50%. But there's also a 25% probability that this mating would result

Outcomes from Mating Carriers of JNS

25% are Normal Non-Carriers, 50% are JNS Carriers, 25% are Affected with JNS

JNSIC FEMALE	NORMAL (N)	JNS
JNSC MALE		
NORMAL (N)	N-N Normal Non-Carrier	M-JNS Heterozygous Carrier
JNS	JNS-N Heterozygous Carrier	JNS-JNS Affected Calf

in a calf that does not inherit JNS from either parent.

What about matings of a carrier bull to non-carrier females?

Half of the offspring (50%) would be JNS carriers, and the other half would be normal.

Outcomes from Mating JNS Carrier to Non-Carrier JNS

50% are Normal Non-Carriers, 50% are JNS Carriers

JNSIC FEMALE	NORMAL (N)	NORMAL (N)
JNSC MALE		
NORMAL (N)	N-N Normal Non-Carrier	N-N Normal Non-Carrier
JNS	JNS-N Heterozygous Carrier	JNS-N Heterozygous Carrier

How will JerseyMate handle JNS?

1. JerseyMate eliminates matings of designated JNS carrier bulls to designated JNS carrier females.
2. JerseyMate discounts potential matings by accounting for the probability of a lost calf when two copies of the JNS haplotype are inherited. The economic impact of a lost calf is estimated to be \$150.