National Animal Health Monitoring System (NAHMS) Scrapie Genetic Resistance Report

Date of report: 11/1/2019

Scrapie genetic resistance test results for NAHMS ID: 999999
Date of sample collection: 10/1/2019

Dear participant,

Thank you for participating in the scrapie genetic resistance testing portion of the NAHMS Goat 2019 Study. This report contains results of the scrapie genetic resistance testing performed on goats at your operation. Please consider sharing these results with your veterinarian.

If you have questions about the accuracy of your results, please contact Dr. Alyson Wiedenheft, the NAHMS biologics coordinator, at (970) 494-7290 or Alyson.M.Wiedenheft@aphis.usda.gov.

Background on Scrapie:

Classical scrapie is an infectious degenerative disease affecting the central nervous system of sheep and goats and is believed to always be fatal. Scrapie is caused by an infection with a disease-causing agent known as a prion. Prions form abnormal protein deposits in the central nervous system, which disrupt the normal nervous system structure resulting in progressive neurological degeneration. The earliest clinical sign of classical scrapie is often subtle changes in behavior, which may be followed by scratching against fixed objects, loss of coordination, weight loss despite retention of appetite, biting of own feet and limbs, lip smacking, or gait abnormalities or a combination of these. Loss of coordination is the most common sign reported.

Scrapie can be transmitted from infected does during or following kidding when herd mates or newborn kids ingest the infected placenta, birthing fluids or contaminated bedding. Once infected, the animal remains infected for life.

Genetic Resistance Testing and Reported Results:

Blood samples collected from goats on your operation were tested for the presence of the two alleles (alternative forms of the same gene) that appear to make goats more resistant to classical scrapie, Serine-146 (S146) and Lysine-222 (K222). S146 is the protective variant of the normal gene Asparagine-146 (N146). K222 is the protective variant of the normal gene Glutamine-222 (Q222). Evidence shows that goats with a single copy of either of these protective alleles have been resistant to scrapie infection during natural disease outbreaks and also direct challenge experiments but not fully resistant similar to what is seen with QR sheep. Scrapie resistance alleles in goats have not been formally recognized in the United States, so genetic testing in goats is not considered official testing for scrapie program purposes.

Genetic Resistance Interpretation Key:

Genetic Resistance Interpretation	146	222
No resistance to classical scrapie	NN	QQ
One copy of protective variant K222, increased resistance to classical scrapie	NN	QK
Two copies of protective variant K222, increased resistance to classical scrapie	NN	KK
One copy of protective variant S146, increased resistance to classical scrapie	NS	QQ
Two copies of S146 protective variant. Increased resistance to classical scapie	SS	QQ
One copy each of S146 and K222 protective variants. Increased resistance to classical scrapie	NS	QK

Individual Goat Scrapie Genetic Resistance Test Results:

Sample #	Goat name/ID	146	222
1	Patty	NN	QQ
2	Alice	NN	QQ
3	Jackie	NS	QQ
4	Willa	SS	QQ
5	Jane	NN	KK

Interpretation of results (alleles present):
One or more of the goats tested on your operation were found to have either of the two alleles, S146 and K222, that appear to make goats resistant to classical scrapie. This genotyping information can be used to select breeding stock to increase the frequency of the beneficial alleles within the herd. Breeding for resistance could help prevent classical scrapie transmission.

Interpretation of results (alleles not present):
No goats tested on your operation were found to have either of the two alleles, S146 or K222, that appear to increase resistance to classical scrapie. Including goats in your breeding stock with these alleles may provide increased resistance to classical scrapie in your herd.