

What is Scrapie?

Scrapie is a relatively rare, fatal disease that affects the central nervous system of sheep and goats. It is classified as a transmissible spongiform encephalopathy (TSE). The occurrence of scrapie in sheep has been recorded for over 200 years, without any sign that the disease is transmissible to humans. While the exact cause of scrapie is unknown, it is thought to be associated with the presence of an abnormal form of the prion protein.

Clinical signs of scrapie are usually not evident until two to eight years after infection. There is no cure, vaccine or reliable live animal test available for scrapie. Once clinical signs are observed, the animal will generally die within a few months. Signs of the disease may include: wasting, increased aggression or apprehension, disorientation, teeth grinding, biting at limbs and feet, increased scratching, and development of an unusual 'bunny hopping' gait. Scrapie is transmitted at lambing through the placental tissues and fluids of infected ewes. It can be transmitted from an ewe to her lambs and to other sheep and goats that are exposed to the birthing environment.

Current Status of Scrapie Control in Canada:

Scrapie has proven to be a difficult disease to eradicate or even control for several reasons. With the lengthy incubation period, sheep are generally infected with scrapie for many years before they show any signs of illness. Sheep may change hands several times during the incubation period, greatly contributing to the spread of the disease. Since there is no immune response or tissue inflammation associated with the disease, developing a reliable test to detect scrapie in living animals has proven difficult. Presently the only way of proving that an animal is infected is by examining the brain tissue of dead animals for the microscopic lesions caused by TSE's.

In Canada, scrapie has been a reportable disease under the federal Health of Animals Act since 1945. Sheep showing signs of scrapie are humanely euthanized and samples of brain tissue are taken for laboratory testing by the Canadian Food Inspection Agency (CFIA) to confirm the presence of the disease. If the animal is infected, it is generally assumed that the entire flock has been exposed to the disease. The producer has the option of depopulating the flock or using genotyping to triage the sheep in their flock based on their genetic susceptibility to contracting scrapie. Track backs are made to all flocks that may have been exposed to the infected animal. All infected premises are subject to ongoing CFIA requirements (surveillance or flock certification programs) once the initial disease control actions have been carried out (source: CFIA website www.inspection.gc.ca)

Scrapie Projects Underway

by Beth Kyle, Scrapie Program Coordinator

Throughout the spring of 2005, the Canadian Sheep Breeders Association, the Canadian Sheep Federation, and the Ontario Sheep Marketing Agency laid the foundations for two national scrapie projects. The projects, funded in part by the Advancing Canadian Agriculture Agri-Food program, are designed to reduce the prevalence of scrapie in Canada by encouraging individual producers to take steps to control this disease in their flocks (please read accompanying articles for project details). Given the recent focus on transmissible spongiform encephalopathies (TSE's) in livestock industries and with scrapie control programs in place in many countries, these projects represent an important step forward in maintaining and developing markets for Canadian sheep and lamb. In May, the final financial agreements were made with Agriculture and Agri-Food Canada to secure funding and by summer both fledgling projects were officially underway. Below are brief updates on project progress.

Progress on the Scrapie Flock Certification Program Pilot Project (Project 1)

Although program information was available and a few producers sent in applications for the program early in 2005, many important aspects of the program were not in development until the spring, including:

- Hiring of a project coordinator in April
- Developing a database for tracking inventories of flocks/herds on the program
- Establishing laboratory services. An agreement was made with the Animal Health Laboratory in Guelph in June to analyze brain tissue samples from Ontario flocks/herds. TSE testing labs in other provinces have been approached and agreements should be finalized by the end of the summer.
- Developing a verification protocol detailing how the industry will manage and document the day-to-day operation of the program. Industry is responsible for program management, including issuing certificates. To maintain CFIA approval we must be

able to confirm with complete and auditable documentation that what we say is happening is happening. The verification protocol is the blueprint for gathering this documentation. The protocol will also help ensure that producers are dealt with in a timely and consistent manner.

With these important aspects of the project completed or nearing completion, provincial sheep associations and the Canadian National Goat Federation put forward names of producers who were interested in joining the pilot project. In June and July, application packages were mailed to 39 producers across the country. Currently, space is still available for flocks on the pilot project and interested producers should contact their provincial organizations or the Scrapie Project Coordinators at the numbers listed below.

Progress on the National Genotyping Survey (Project 2):

- In June, agreements were reached with five labs from across the country to analyze blood samples.
- In June and July invitation letters and submission forms were mailed to over 900 purebred sheep producers informing them of this opportunity.
- By mid July, ~350 samples had been received by the participating labs.
- As they are received, results will be forwarded to a national database (<https://genenovas.ca>) being developed by the Nova Scotia Agricultural College (NSAC).
- We are currently working with NSAC to develop an extension program to interpret genotype results and help producers use the genotype information when making breeding decisions.
- Sample collection and analysis will be ongoing until November 2006, or until the project objective of 36,000 samples is met (only 35,650 to go!). 🐏

For more information about these projects please call 519-836-0043, email admin@scrapiecanada.ca; info@scrapiecanada.ca; or visit www.scrapiecanada.ca.

Tips for Using Genotype Information to Breed for Scrapie Resistance in Sheep

by Hossain Farid, Department of Plant and Animal Sciences, Nova Scotia Agricultural College

Breeders who participated in the genotyping project in Nova Scotia and British Columbia now know the genotype of their ewes and rams at codons 136, 154 and 171 of the prion protein gene. The question is how should the breeder interpret and apply the genotype information to increase the natural resistance of their sheep to scrapie?

One important question is if there is any relationship between scrapie resistant genotypes and sheep productivity? There is limited information on this topic, and published reports are often contradictory. Some Nova Scotia sheep breeders who took a serious look at their genotype results last year noticed that some of their best rams had the susceptible genotype (QQ171). The same observation was made by at least one breeder in British Columbia. Is it bad luck or is there a negative genetic relationship between the resistant genotype and performance and/or conformation?

Analysis of the genotype results of the Nova Scotia purebred sheep indicated that, in a few breeds, a higher than

expected proportion of breeder rams carried the scrapie susceptible allele (Q171). This observation suggests that rams that carried Q171 had some characteristics that appealed to breeders, i.e. there may in fact be a negative relationship between resistance to scrapie and conformation or performance in some breeds. We currently have a project to look into this issue.

Breeding strategies for your flock should be based on the fact that, at present, it is unclear whether scrapie resistance is related to production performance. Keeping this in mind, below are a few suggestions on how to use genotype information in your breeding and selection scheme.

- 1- Do not sacrifice high production for genetic resistance to scrapie. A low-performing resistant sheep has little market value.
- 2- Rams do not transmit the scrapie agent to your flock, but they have a marked effect on the genetic status of your flock. Where possible, use very resistant (AA136 RR154 RR171) rams.

- 3- When you are purchasing a ram, try to obtain a high-performing resistant (RR171) animal.
- 4- Cull your low-performing susceptible QQ171 ewes, particularly those with VV136 or VA136 genotypes that are very susceptible, or use such ewes only for market lamb production.
- 5- Information on the genotype of both ewes and rams in your flock provide you with the opportunity to arrange breeding strategies that will produce genetically resistant lambs in the next lambing season, thereby accelerating the rate of progress toward establishing your scrapie resistant flock. If you have no RR171 rams, breed high performance QR171 and QQ171 ewes with high performance QR171 rams, and vice versa, to produce RR171 or QR171 lambs. With this strategy, it will take longer to establish a resistant flock, but it will allow you to maintain a high performance flock. 🐏

I greatly appreciate constructive comments from Judith Glibbery from BC and Marg Zillig from NS

Scrapie Flock Certification Program (SFCP) Pilot Project

by Beth Kyle, Scrapie Program Coordinator

What is SFCP?

The SFCP National Standards were developed by the Canadian Food Inspection Agency (CFIA), in collaboration with the sheep industry, as the basis for Canada's on-farm, voluntary scrapie control program. It is intended to be a long-term, internationally recognized flock/herd scrapie control program for the sheep and goat industries. This program is unique as a CFIA approved disease control strategy. The CFIA only provides a guiding hand in ensuring that the program retains key requirements to meet international standards. The day-to-day management and verification is placed in the hands of industry. If shown to be effective, the SFCP may be used as a template for other industry-led TSE control programs.

How does the SFCP work?

Given the nature of scrapie (see 'What is scrapie?'), infection in a flock/herd may go undetected for many years. As well, with no reliable live animal test for detecting the disease in individual animals, one-time testing and eradication are not possible. Working with these restrictions, the SFCP is designed to gradually assess whether flocks/herds are currently infected and to minimize the risk of contracting scrapie in the future. Flocks/herds advance through the various levels of the program as the risk of scrapie infection decreases. Producers have the option of following one of three pathways under the program. In Pathway 1, the assessment of risk (level the flock/herd has achieved on the program) is determined by the number of years that the producer has followed program requirements and scrapie has not been detected. In this pathway, flocks/herds advance one level (E, D, C, B, A, certified) for every year that the requirements are met. In Pathways 2 and 3, other technologies such as genotyping for resistance to scrapie are used in combination with disease surveillance to reach certification in a fewer number of years.

Requirements for all pathways include:

- Surveillance for the disease is made by submitting brain samples from all adult sheep and goats that die on-farm. If no animals die on-farm during a 12-month period, a sample from at least one cull animal over 24 months must be submitted.
- Producers must work with a veterinarian accredited with CFIA to deliver the SFCP.
- Producers must make an annual, vet supervised inventory of their flocks/herds and maintain documentation throughout the year on animals entering and leaving the premises.
- The flock/herd must be closed to additions of female animals, except from flocks/herds on the same or higher program level. The source of rams, bucks and/or semen is not as restricted, although some conditions do apply in Pathways 2 and 3.

For a detailed description of program requirements, call 519-836-0043; email admin@scrapiecanada.ca or info@scrapiecanada.ca; or visit www.scrapiecanada.ca.

Why conduct a pilot project?

There are many reasons for controlling scrapie in the sheep and goat industries, including improved animal welfare, marketing advantages for individual producers, and strengthening the overall image of the industries. However, if the costs of the program greatly outweigh the benefits for individual producers, there will be little uptake of this voluntary program. Therefore, the primary goal of the pilot project is to generate information by testing the program on 60 sheep flocks and 10 goat herds from across the country. Producers can then apply a cost/benefit analysis of using the SFCP for managing the risk of scrapie on their own farms. In addition to determining program costs, the pilot project will test the on-farm practicality of the National Standards as developed by CFIA. Standards will be reviewed annually (or as needed) with CFIA and a producer committee to ensure the program is as user friendly as possible while retaining CFIA approval.

Why join the SFCP pilot project?

- The SFCP is recognized by the USDA and certification with the program may be required in the future for exporting breeding stock.
- Participating producers are eligible to continue on the certification program at the same level that they have attained during the pilot project. As the minimum time to reach certification following Pathway 1 is five years, this may provide a significant advantage to producers wishing to become certified.
- This is a five-year project, with funding provided between 2005 and 2010. Some costs incurred by producers participating in the pilot will be covered by project funding:
- The project will cover cost of brain sample analysis.
- Producers will be reimbursed \$50/year for a minimum of the first two years on the project for vet bills incurred through inventory and obex (brain tissue) removal.
- Producers participating in this project will provide an important step in moving us toward a TSE-free industry.

The National Genotyping Survey

What is the National Genotyping Survey?

Variations at three regions of the sheep prion gene (codons 136, 154, 171) are associated with how easily sheep exposed to scrapie will become infected. By genotype testing, it is possible to determine which animals are genetically resistant to scrapie and will pass that resistance on to their lambs. Through this project, sheep breeders are offered the opportunity to genotype registered sheep at a discounted rate. Targeting purebred animals will hopefully lead to an eventual increase in scrapie resistance of the entire national flock.

Although genotyping is used in scrapie control programs in many countries, this project is currently the most extensive testing program in the world. Because the Canadian project includes ewes as well as rams, producers are better able to use the information to develop breeding programs that consider quality and performance first and then look at scrapie resistance among those top performing animals. There is no requirement for producers testing with this project to cull animals of a particular genotype. It is important to note that animals with susceptible genotypes do not have scrapie, only a greater potential of contracting the disease if they are exposed. The desired outcome of the project is to maintain flock productivity while increasing the scrapie resistance of the flock. This may include selective mating of highly productive animals with a genetic susceptibility to contracting scrapie with those of a more resistant genotype (Please see the accompanying article 'Tips for using genotype information to breed for scrapie resistance in sheep').

The National Survey of Scrapie Genetics at a Glance:

- Samples will be accepted between June 2005 and November 2006, with funding available for 36,000 head.
- Discounted rate (\$10/sample) for lab analysis of three codons of the sheep prion gene (codons 136, 154, 171)
- All sheep tested must be registered

with the Canadian Livestock Records Corporation.

- Producers must use a veterinarian for collecting the blood samples.
- Part of the vet visit (75% up to \$6/sample) and shipping cost (50%) will be reimbursed, provided producers send in vet invoice within 90 days of sampling.
- Results will be forwarded to a national database, which already includes data from the Nova Scotia and British Columbia provincial genotyping projects. The database will be expanded to link Canadian Livestock Records Corporation records with the new genotyping data. Information on individual flocks will be password protected and accessible only by the flock owner. However, project summaries and a forum for posting tested animals that are for sale will be open to all producers.
- In order to include as much information as possible in the database, producers genotyping registered animals between June 2003 and June 2005 are eligible to receive \$5/animal when they submit official lab reports of genotype results. The analysis must have been paid for completely by producers and not funded through various provincial projects.
- This project is intended to provide producers with information to make breeding decisions for their own flocks and is not part of the certification program. 🐏



Food-Safe Farm Practice Program: Implementation Funds Available

by France Lanthier, National Coordinator On-Farm Food Safety

On July 19, 2005 the Canadian Sheep Federation (CSF) had the pleasure to announce that the Canadian Food Inspection Agency (CFIA) had awarded us a letter of Completion of Technical Review for our Food-Safe Farm Practices (FSFP) program. As stated in the CFIA guidelines, completion of the technical review signifies that the food safety program “meets necessary technical and regulatory requirements”.

As a result of having produced a sound Hazard Analysis Critical Control Points (HACCP) model and a practical producer manual, the CSF is now eligible to apply for Implementation Funds under the Canadian Food Safety and Quality Program’s (CSFQ) *On-Farm Implementation Component*, which is managed by Agriculture and Agri-Food Canada (AAFC). As part of the Federal, provincial, and territorial governments commitment to ensuring the development and implementation of government-recognized food safety programs, \$80 million in funding has been made available to help implement HACCP based On-Farm Food Safety programs.

The implementation fund is there to assist **producers** in implementing the FSFP program on their farms. Here is a list of frequently asked questions (FAQ’s) provided by the AAFC concerning eligibility and scope of the program.

Who qualifies as a producer?

For the purpose of the CSFQ On-Farm Implementation program a producer must have:

1. Earned at least \$2500 in farm cash receipts during the most current taxation year
2. Filed Form T2042, Statement of Farm Activities, for that taxation year

What is available to producers?

Under the program, each producer can access up to \$850 worth of services as follows:

1. Workshops (\$100)

- Workshops focused on the implementation of food safety systems valued at \$50 per workshop. Producers are eligible for \$100 for the purpose of

workshops, therefore two workshops per producer.

- **Note:** producers will NOT be paid \$50 to attend a workshop. The CSF must provide the CSFQ with the number of participants then the funding is provided to the CSF to fund the workshop.

2. On-Farm Support (\$750)

- **Technical Support:** producers may request on-farm technical support specific to adapting and implementing a food safety system on their farm. Technical support essentially means the request for a consultant or specialist to assist with implementation. Technical support is cost-shared; the CSFQ fund pays for 70% of the cost, up to a maximum of \$750. The producer or commodity organization will be responsible for the remaining 30%.
- **Specialized equipment:** producers may request funding for equipment that they will need in order to implement a food safety program on their farm. Financial support for specialized equipment is cost-shared; the CSFQ fund will pay for 50% of the purchase price, up to a maximum of \$750. The producer or the commodity organization will be responsible for the remaining 50%. To be reimbursed, producers may be required to submit original receipts for the amount received (Form AGR-1, Statement of Farm Support Payments), as it is a taxable benefit.

It is important to note that the total contribution per producer for technical support and/or specialized equipment cannot exceed \$750. This may be of interest to producers that are involved with more than one commodity and who are considering implementing more than one food safety program, as the \$750 is allotted per producer and not per commodity. For example, if a producer obtains \$450 in funding as technical support to implement a food safety program for his/her beef production unit, then he/she is eligible for \$300 for technical support or specialized

equipment to implement his/her grain or dairy or lamb food safety programs.

Where we are at with the FSFP program

As previously mentioned the program has passed technical review, which has given the CSF the green light to go forth with training and manual distribution. This is timely as the CSF is planning to provide producer-training sessions this coming winter. During these training sessions producers will receive a Food-Safe Farm Practices manual, and receive instruction on how to use the forms and tailor the program to their needs. The CSF is currently in the early stages of developing that management manual for the FSFP program. As this venture requires the participation of ALL our provincial organizations, a Food-Safety meeting, at which all the provincial organizations have been invited, has been scheduled for this November’s AGM.

Provincial organizations should start considering how they plan to implement and manage the program in the coming years. Although this line of thought is likely premature for many, it is imperative that we push forth.

What producers need to do

Producers intending to participate in a workshop should notify their provincial organizations or the National Coordinator for the On-Farm Food Safety Program (france@cansheep.ca) as soon as possible. This will allow us to initiate funding applications and to prepare the required materials.

What the CSF and provincial organizations are doing

The first step in the CFQP On-Farm Implementation funding component is to identify the demand for workshops and specialized equipment. Considering the vastness of our country, the CSF will be working closely with provincial organizations to identify the areas where training workshops would be most effective at servicing the greatest number of producers. 🐏