

## REPORT OF THE COMMITTEE ON SCRAPIE

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The Committee met on October 27, 2015 in Room 553 of the Rhode Island Convention Center in Providence, Rhode Island from 9:00 am to 12:06 pm. There were 18 members and 20 guests present.

### **Time-Specific Paper Title.**

Diane Sutton, DVM presented a time-specific paper on the Newly Published Proposed Revisions to Scrapie Rules 9 CFR, parts 54 and 79. Dr. Sutton summarized the changes and explained the process for submitting comments. The committee discussed some of the highlights of the proposed changes.

### **Presentations & Reports**

#### **USDA APHIS Scrapie Program Update and Scrapie Surveillance Projects**

Diane Sutton, DVM

United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (USDA-APHIS-VS)

#### ***Scrapie Eradication Program Results***

- The National Scrapie Eradication Program continued to make progress in FY 2015.
- At the end of FY 2014, the percent of cull sheep found positive at slaughter and adjusted for face color was 0.018 percent and is currently at 0.004 percent for FY 2015. This measure has decreased by 80 percent compared to FY 2014 and by 98 percent compared to FY 2003.
- Three source flocks and 3 infected flocks were designated in FY 2014. One infected and three source flocks have been designated in FY 2015, a decrease of 30 percent.
- In November 2014, the first positive goat found through RSSS was identified. Based on the goats sampled at slaughter to date, the prevalence of scrapie in U.S. cull goats (2003 – 2015) was 0.0037 percent with an upper 95 percent confidence limit of 0.0097 percent.
- In FY 2015 there was a decrease in the number of States meeting their sampling minimums for sheep and goats. This was likely due in part to the impact of Highly Pathogenic Avian Influenza response on resources.

#### ***Slaughter Surveillance***

As of September 30, 2015, 40,862 animals were sampled for scrapie testing in FY 2015:

- 38,671 RSSS samples and 2,191 on-farm samples;
- Of which 33,698 were sheep and 7,164 were goats.

### **Scrapie Surveillance Plan**

- Implementation FY 2016
  - States with RSSS collection sites will continue to sample all targeted sheep and goats.
  - The annual State-of-origin sampling minimum for sheep is 20 percent of the number required to detect a scrapie prevalence of 0.1 percent with 95 percent confidence or 1 percent of the breeding flock in the State, whichever is less. The objective is to sample sufficient sheep in a 5-year period to detect a scrapie prevalence of 0.1 percent with 95 percent confidence or 5 percent of the breeding flock in the State, whichever is less.
  - The annual State-of-origin sampling minimum for goats is determined based on the States' goat scrapie case incidence.
    - If a State has not had a goat scrapie case in the previous ten years, its annual goat sampling minimum is its prorated share of 3,000 samples, based on its proportion of the U.S. goat population as determined by the NASS Sheep and Goat annual report.
    - If a State has had a goat scrapie case in the previous ten years, its annual goat sampling minimum is determined using the same method as is used for determining its annual sheep sampling minimum.

**Note:** These are minimums. Plan is to continue to collect samples from the maximum number of targeted animals given the available budget.

### **ID Compliance:**

- All scrapie positive animals in FY 2015 were traced back to their flock of origin.

### **Proposed Rules Planned for Publication:**

- VS published revisions to 9 CFR parts 54 and 79. The proposed changes are intended to improving the effectiveness and cost efficiency of surveillance and to increase animal identification compliance by addressing gaps in identification and by requiring States to meet reasonable surveillance targets to remain consistent States. States must meet these targets for VS to demonstrate geographically appropriate surveillance to meet the criteria for freedom and have confidence that all of the remaining cases have been found.
- The rule would propose to:
  - Give the APHIS Administrator authority to relieve requirements for sheep and goats exposed to scrapie types, such as Nor98-like, that do not pose a significant risk of transmission;
  - Increase flexibility in how investigations can be conducted and allow the epidemiology in a specific flock to be given more consideration in determining flock and animal status;
  - Add a genetic-based approach to regulation;
  - Make goat identification requirements similar to those for sheep to support ongoing slaughter surveillance in goats (no changes will be made in the consistent State requirements regarding identification of goats in intrastate commerce);
  - Tighten the definition of slaughter channels;
  - Expand the individual identification requirement to all sexually intact animals unless moving as a group/lot (allows mixed-source groups moving in slaughter channels at under 18 months);
  - Limit the use of tattoos and implants to animals not moving through markets and not in slaughter channels; and
  - Reduce recordkeeping requirements by making them similar to the current uniform methods and rules compliance guidance.
- APHIS is also revising its scrapie import regulations to bring them more in line with the OIE scrapie chapter. This will ensure that we meet OIE criteria for free status and prevent the reintroduction of scrapie after free status is achieved.

### **Scrapie Flock Certification Program (SFCP)**

- Implementation of the revised Scrapie Flock Certification Program (SFCP) in FY 2014 has increased the efficacy of the program while reducing program costs.
- At the end of FY 2015 there were 441 producers enrolled in the program.

## **TSE: An Update**

Linda Detwiler, DVM

Clinical Professor, Department of Pathobiology and Population Medicine, Mississippi State University,  
College of Veterinary Medicine

Dr. Detwiler reviewed and discussed recent transmissible spongiform encephalopathy research relevant to scrapie.

## **Update on Scrapie Research from the Animal Disease Research Unit**

David Schneider, DVM, PhD

Animal Disease Research Unit, Agricultural Research Service, USDA

The USDA ARS unit in Pullman, WA, conducts an integrated research program involving studies on scrapie diagnostics, the role of *PRNP* genetics, and modes of transmission in domestic sheep and goats. In this update, we report on a comparison between sheep and goats on factors that affect the diagnostic quality of rectal biopsy; progress on determination of the role of *PRNP* genetics on the susceptibility, disease progression, and impact on diagnostics in goats inoculated with classical scrapie; progress in evaluating potential modes of transmission for atypical (Nor98-like) scrapie in sheep and classical scrapie via goat's milk; and use of mouse models to discriminate sheep and goats with classical scrapie versus experimental chronic wasting disease.

Biopsy of the rectal mucosa is a sensitive and safe technique used world-wide in the live-animal diagnosis of classical scrapie infection in sheep and goats, but which is sometimes limited when biopsy samples contain insufficient follicles. Reported rates of biopsies with insufficient follicles have ranged from 3% to 33%, with a significantly higher rate reported in goats and indicating the number of follicles may depend on both procedural and animal factors. Using live-animal biopsies obtained from a cohort of research sheep and goats, we determined that laboratory handling had a minor effect on the number of the follicles observed in each section. The most important factor was the animal's age at the time of biopsy, decreasing at a steady rate of 13 percent per year during the first four years of the animal's life. There was no left versus right side difference in the age-related decline in follicle number and the findings were the same between sheep and goats.

Regarding prion protein genetics, we continue to monitor goats of different genotypes orally inoculated at birth with classical scrapie prions derived from naturally infected goats. Goats with the highly susceptible genotype all developed clinical disease within 24 months. Goats with the less susceptible or long incubation genetics (S146 or K222) have remained clinically normal with no evidence of prions in rectal biopsy tissues. These goats will be monitored for the duration of the natural lifespan. In addition, a related study was completed which demonstrates a doubly prolonged incubation period in inoculated goats bearing the GS127 polymorphism.

Regarding our studies on modes of prion transmission, we very recently completed and are finalizing analyses for a 7-year study on Nor98-like scrapie in breeding ewes. Ewes were experimentally inoculated with brain homogenate obtained from a US sheep with clinical Nor98-like scrapie. Recipient ewes were bred annually to examine the placenta for evidence of a transmissible agent. One recipient ewe developed an unrelated disease in her 5<sup>th</sup> year of scrapie incubation. At postmortem examination, a Nor98-like pattern of misfolded prion protein, PrP-Sc, accumulation was observed. Similar findings were recently confirmed through postmortem examination of the other three ewes in the 7<sup>th</sup> year of scrapie incubation. These results confirm that inoculation of these ewes was successful. Not all placental tissue analyses have yet been completed, but there has been no evidence of placental accumulation of PrP-Sc out to the 6<sup>th</sup> year of infection.

We have recently confirmed that the classical scrapie prions which accumulate in the placenta of goats are infectious to sheep. Similarly, transmission to sheep has also occurred via the milk of infected goats. Thus, both the placenta and milk of infected goats are significant transmission risks to sheep. Finally, we are nearing the completion of a study to determine if transgenic mice can be used to differentiate the origin of prions in new cases of scrapie disease in sheep and goats raised in regions with

endemic chronic wasting disease (CWD) in cervids. The results show that transgenic mice bearing a susceptible prion protein are readily susceptible to classical scrapie prions derived from naturally infected sheep and goats but not to CWD prions derived from naturally infected cervids. The converse was true for transgenic mice bearing a susceptible cervid prion protein. Both types of mice were only intermediately susceptible to CWD prions derived from experimentally infected sheep. Thus, to date, the results suggest this bioassay model can discriminate between these sources of prions in new cases of prion disease in small ruminants from regions in which CWD is endemic in cervid populations.

### **Committee Business:**

The committee reviewed its mission statement and no alterations were suggested. There was a discussion about whether the Committee on Scrapie and the Committee on Sheep and Goats should be combined. The committee members indicated that at this time the two committees should remain separate.

The committee reviewed its 2014 resolution that urged the Secretary of Agriculture to quickly publish and finalize the proposed rule amending 9 CFR Parts 54 and 79. This proposed rule is now published and open for public comment. The Committee passed a new resolution urging the Secretary of Agriculture to promptly publish a final scrapie rule in early 2016 following the appropriate review and comment period.

**Note:** Prior to the Committee on Scrapie Meeting the following presentation was given by Dr. Diane Sutton as part of the National Scrapie Oversight Board meeting.

### **USDA APHIS Scrapie Free Flock Certification Program (SFCP)**

National Scrapie Oversight Committee Update  
Diane Sutton, DVM, USDA-APHIS-VS

#### ***SFCP Participation***

- As of September 30, 2015 there were 441 participating flocks in the SFCP.
  - 277 Select Monitored
  - 142 Export Monitored
  - 22 Export Certified
- In FY2015 4 Export Monitored flocks advanced to Export Certified.
- 48 sheep breeds and 17 goat breeds are represented in the SFCP.
- As of September 30, 2015 there are active State SFCP boards in 9 States.

#### ***Canada's Import Requirements***

- APHIS still anticipates a change in Canada's import requirements, exact timeline of publication of new requirements not yet determined.
- The change will be an increase in the minimum time in status in the Export Category for eligibility to import US sheep or Goats into Canada.

#### ***Export Monitored Flock FY 2015 Review***

- Export Monitored flocks in Standard or Alternative 2 sampling protocols must meet sampling thresholds to reach 6 years of status (Standard=15; Alternative 2—at least 50% foundation flock). In June 2015 Export Monitored flocks with 6 or more years of status were reviewed. 96 flocks were reviewed, and of these:
  - APHIS identified 28 flocks with 6 or more years of status that had not met the sampling threshold;
  - The status dates for these flocks were reset to 5 years; and
  - Notification letters were sent to producers explaining their new status dates and steps they can take to regain 6 years of status by January 1, 2016.
- APHIS will continue to monitor flocks that are approaching 6 years and much meet threshold and notify those that need to take action to maintain their status date.

### **Select Category**

- Participation in the Select category was lower in FY 2015 than in FY 2014.
- APHIS' goal in FY 2016 is to increase participation in this category, thereby increasing the SFCP contribution to scrapie on-farm surveillance.
- APHIS will also review Select Monitored flocks in FY 2016 for compliance with sampling requirements.

### **SFCP Standards**

In FY 2015, APHIS revised the SFCP Standards. The revised standards are currently in clearance and are expected to be published in FY 2016. Updates to the SFCP Standards included the following items.

- In the Select category, animals collected through RSSS will count toward the sampling requirement if at least 10 animals are collected through RSSS in the same sampling period.
- Sampling requirements in genetically resistant Export Monitored flocks following the Standard sampling protocol: if there are no genetically susceptible animals in the flock (i.e. the flock is composed entirely of QR/RR ewes, RR rams, and no goats), the annual, 6-year, and 7-year sampling requirements are waived (assuming all other sampling requirements are met).
- Criteria for exempting lambs born in genetically resistant flocks from genotyping for Standard and Alternative 1 sampling protocol: if there are no genetically susceptible animals in the flock and the owner only has mature RR rams on the premises from that point forward lambs do not need to be genotyped. Note: these conditions will be confirmed at each subsequent annual inspection, and if an inspector believes at any time that one or more of the animals in the flock may be a QQ animal, the inspector will require that the animal(s) be officially genotyped.
- How to treat "Lost to Inventory" animals in Export Monitored flocks following the Alternative 1 sampling protocol:
  - The flock owner may elect to switch to the standard sampling protocol, and the flock's status date will be reset to the lesser of the flock's current status date or 12 months of status for each test eligible animal sampled and must meet the additional sampling requirements of the standard sampling protocol to retain more than 5 years in status; or
  - The flock owner may elect to stay in the Alternative 1 category, and the flock's status date will be reset to the date the VS office was notified (or the lost to inventory animal became known to the VS office) that the animal was lost to inventory.
- Animals from Inconsistent States not in slaughter channels must be from either an Export Monitored/Export Certified flock or from a Select Monitored flock in which it was born. There are no changes for animals in slaughter channels.
- Retesting animals to meet the annual sampling requirement:
  - If a flock following the Standard sampling protocol has live-animal tested all genetically susceptible test eligible animals at least once and must test an additional animal to meet the annual sampling requirement, previously tested animals can be repeat live-animal tested.
  - If all genetically susceptible animals in the flock have been live animal tested four times, the annual sampling requirement is waived.
- Export category flocks must report the use of milk/colostrum from a lower status flock.
- Animals tested within 12 months of another animal being "Lost to Inventory" can meet the lost to inventory sampling requirement in Export Certified flocks if the flock had already tested 30 animals (this does not apply to "Found Dead" animals).
- How to treat previously live-animal tested "Found Dead" and "Lost to Inventory" animals in Export Monitored flocks:
  - Lost to inventory – if the animal had been tested in the previous 12 months, no change in status and no additional animals need to be tested (and if the flock is following the Alternative 1 sampling protocol it does not have to switch to the Standard sampling protocol).
  - Found dead – APHIS will determine if the animal reasonably could have been sampled. If so, the animal will be treated as any other found dead. If not the animal is considered lost to inventory and will be treated the same as other lost to inventory animals.