

REPORT OF THE COMMITTEE ON SCRAPIE

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Vice Chair: Joe D. Ross, Sonora, TX

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The Committee met on October 17, 2006, from 12:30 p.m. until 5:30 p.m. in Minneapolis, Minnesota. The meeting was called to order by Dr. Jim Logan, chair, with vice chairman Dr. Joe D. Ross attending. There were 55 people in attendance. Committee members were welcomed and each introduced themselves.

Drs. Diane Sutton and Frank Ross, U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Scrapie Program staff, presented the general Scrapie Program update. This report is in its entirety in these proceedings.

Dr. Chuck Gaiser, USDA-APHIS-VS, presented Descriptive Analysis and Scrapie Infected/Source Flocks and Investigations in FY 2006. This information is included in full in these proceedings.

Dr. Katherine O'Rourke, Agriculture Research Service (ARS), USDA, presented an ARS research update. The progress reported this year in the joint federal/state/industry scrapie eradication program is encouraging. ARS reported on progress in work conducted in Pullman, WA, on the issues of silent infection in genetically resistant ewes with natural exposure to scrapie, atypical scrapie, and goat scrapie. Genetically resistant (AAQR) ewes born to infected AAQQ dams have been moved to a secure permanent quarantine facility and bred to a susceptible (AAQQ) buck. All placentomes are examined for PrP-Sc using a number of biochemical tests and all genetically susceptible (AAQQ) lambs are held for observation for at least 18 months. No positive placentomes or lambs have been identified. The program moves into its final year and a final report will be given at next year's meeting. A short update on atypical scrapie in Europe and the United Kingdom included information on genotypes found in the affected sheep and the types of diagnostic tests needed to identify the disease. If atypical scrapie is found in the United States, an additional control program may be necessary but it is likely that no changes in the current control program will be needed. Natural scrapie has been diagnosed in two goats using the rectal biopsy sampling procedure. These goats are being bred for examination of the placenta, transmission to kids, and distribution of the scrapie agent in the tissues and fluids. In addition, trials including breeding of goats following oral challenge with sheep scrapie and intracerebral challenge with goat scrapie have been initiated. In addition to placenta testing, assays for the TSE agent in urine and blood are in progress.

Dr. Katherine Marshall, Centers for Epidemiology and Animal Health (CEAH), VS-APHIS-USDA, presented information on Scrapie epidemiology, the rectal biopsy study, the goat scrapie slaughter prevalence study, and gave an update on the assessment of the scrapie program surveillance. Her presentation was titled Study to Evaluate Prion Protein Detection in Recto-anal Mucosa Associated Lymphoid Tissue (RAMALT) for Scrapie Diagnosis. Several recently published studies have shown that RAMALT tissue may be a useful test for field diagnosis of scrapie in live sheep and goats. This study will focus on the collection of rectal biopsy tissue in high-risk sheep and goats for up to 200 positive animals. Antemortem rectal biopsies and third eyelids will be collected, and within three weeks, animals will be necropsied for the collection of more rectal biopsy tissue, along with obex, retropharyngeal lymph nodes and tonsil tissue. We will then compare the sensitivity of the rectal biopsy tissue to third eyelid tissue in live animals, and to obex, retropharyngeal lymph nodes and tonsil tissues. We will also be looking at the repeatability of rectal biopsy results in ante- and post-mortem tissues from the same animal.

Scrapie Surveillance Update

Scrapie surveillance in the United States currently consists of the collection of tissue at slaughter and from animals that fall under non slaughter surveillance which includes samples collected from sheep and goats that are not in known positive or source flocks. These include clinical or dead animals from markets, renderers, diagnostic labs, farms, and feedlots, and third eyelid tests conducted on farms in black-faced sheep, and necropsies of high-risk animals. Approximately 105,116 samples have been collected at slaughter and 2,695 samples have been collected as part on non-slaughter surveillance. Since the beginning of the regulatory slaughter surveillance program in April 2003, there has been a reduction of scrapie in the black-faced sheep collected at slaughter. In 2006, a scrapie surveillance evaluation was conducted which provided recommendations to the scrapie eradication program for improving the efficiency of the program.

Caprine Scrapie Prevalence Study

This study will focus on the collection of two to five-year old goats at slaughter which we believe is the best opportunity for a wide array of the goat population, especially older ages. We will estimate prevalence of detectable scrapie in adult slaughter goats using a targeted sampling of goats which may have greater exposure to sheep and scrapie. Approximately 3,800 samples have been allocated to 79 slaughter plants in 20 states. Because of the fluctuation in adult goat slaughter, sample allocations may need to be adjusted based on feedback from the plants.

Dr. Jack Rhyan, VS-APHIS-USDA, presented preliminary results of the Evaluation of Five Prion Vaccines in the Mouse – Scrapie Model. Results of that study, conducted at the National Wildlife Research Center in Fort Collins by investigators John Pilon, Danelle Okeson, Lowell Miller, and Jack Rhyan and collaborators at the National Veterinary Services Laboratory (NVSL) in Ames, IA, showed three of the five peptide vaccines tried resulted in delayed onset of clinical signs of scrapie as compared to controls.. Two of the vaccines resulted in delayed onset of signs by two to three weeks; results were highly significant. Future studies will utilize the two most promising vaccines in mice, deer and sheep.

Dr. Cindy Wolf, University of Minnesota and Chair of the National Animal Identification System Sheep and Goat Identification working group presented information regarding sheep and goat identification and its correlation to the scrapie program identification requirements. The

scrapie program ID requirements have enabled the sheep and goat industries to progress with the National ID system with broad industry support. Although the scrapie system is not broadly using electronic identification, traceability is possible and the system is working. ID and recording movement in commerce and for exhibition is gaining support in the field. There is still concern and confusion amongst producers regarding the NAIS and there is a great need for continuing education about the purposes and need for animal identification.

Dr. Sutton and Marsh Koeneker, VS-APHIS-USDA, presented the scrapie program ID update and information on the emerging electronic technology being used for the Animal Health Surveillance Management and Mobile Information Management data in the scrapie program. A goal with this new technology is to “collect once and use many times” the necessary information and to minimize the potential for error in data entry.

The business portion of the meeting consisted primarily of discussion of six proposed changes to the Scrapie Uniform Methods and Rules (UMR). These proposed changes target surveillance, and identification compliance, and resulted in two resolutions being unanimously passed by the committee. One resolution requests USDA/APHIS and states to aggressively enforce the scrapie ID and record keeping requirements. The second resolution requests that development and implementation of an adequate surveillance system be a high priority of the USDA-APHIS-VS National Surveillance Unit.

The Committee considered four other proposed changes to the UMR and reached agreement to accept some minor changes and have Dr. Sutton incorporate them into the UM&R.

Status Report-Fiscal Year 2006: Cooperative State-Federal Scrapie Eradication Program

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In Fiscal Year 2006 the Scrapie Eradication Program focused on: (1) cleaning up infected and source flocks utilizing a genetic based approach; (2) tracing and testing exposed animals and flocks; (3) expansion of regulatory slaughter surveillance (RSSS); (4) conducting consistent state reviews, (5) producer education and ID compliance; and (6) upgrading of the Scrapie National Database to provide web access through the Animal Health and Surveillance Monitoring (AHSM) website and to allow electronic transmission of test charts and results through a mobile information management module (MIMM).

Consistent State Reviews

States must meet the Consistent State requirements in 9 CFR 79.6 in order to move sheep and goats in interstate commerce with minimal restrictions. Forty-seven states have enacted the required identification rules. Regulatory action has been initiated to remove the remaining three states that are not in full compliance. Removal from the list would create a significant impact on the interstate movement of sheep and goats from those States. U.S. Department of Agriculture (USDA) is conducting onsite scrapie program consistent state reviews and has completed reviews in 35 states. The review of the remaining states will be completed by February 2007.

Scrapie Flock Certification Program

As of September 30, 2006, there were 2,027 flocks participating in the Scrapie Flock Certification Program (SFCP). Of these flocks 297 were certified flocks, 1,727 were complete monitored flocks, and 3 were selective monitored.

Infected and Source Flocks

As of September 30, 2006, there were 85 scrapie-infected and source flocks (48 infected and 37 source). There were a total of 116 new infected and source flocks reported for FY 2006. Figure 1 shows the number of new infected and source flocks by year. The total infected and source flock statuses that were released in FY 2006 was 100. A total of 343 positive scrapie cases were confirmed and reported by the National Veterinary Services Laboratories (NVSL). Of these, 70 were RSSS cases, (collected in FY 2006 and confirmed in FY 2006 or FY 2007), and 222 positive field necropsy cases (most of these cases were found during depopulations of scrapie exposed animals in infected/source flocks), 14 necropsies of field cases retained long term for test evaluation, and 37 third eyelid regulatory tests confirmed in FY 2006. Three of the field cases were goats. One goat case, in Colorado, could not be linked to exposure in sheep as a result Colorado goats no longer meet the requirements to be classified as low-risk goats or low-risk commercial goats for interstate movement.

Approximately 3,822 animals were indemnified comprised of 62% non-registered sheep, 30% registered sheep, 5% non-registered goats and 3% registered goats. This represents a 26% decrease over FY 2005 with a significant shift from registered to grade animals.

Regulatory Scrapie Slaughter Surveillance (RSSS)

RSSS was designed based on the findings of the Center for Epidemiology and Animal Health (CEAH) Scrapie: Ovine Slaughter Surveillance (SOSS) study. The results of SOSS can be found at <http://www.aphis.usda.gov/vs/ceah/cahm/Sheep/sheep.htm>.

RSSS started April 1, 2003. It is a targeted slaughter surveillance program which is designed to identify infected flocks for clean-up. During FY 2006, collections increased by 9% overall and by 16% for black and mottled faced sheep compared to FY 2005. Improvement in the overall program effectiveness and efficiency is demonstrated by the 33% decrease in percent positive black faced sheep compared to FY 2005 (0.67 to 0.45%, based on test results posted before November 6, 2006). During

FY 2006, 37,167 samples were collected. The distribution of these samples is shown in figure 2. There have been 70 NVSL confirmed positive cases that were collected in FY 2006. Face colors of these positives were 62 black and eight mottled. The percent positive by face color is shown in the figure 3 below.

Scrapie Testing

In FY 2006, 42,823 animals were sampled for scrapie testing: 37,167 RSSS; 3,649 regulatory field cases, 1,934 regulatory third eyelid biopsies, and 73 necropsy validations.

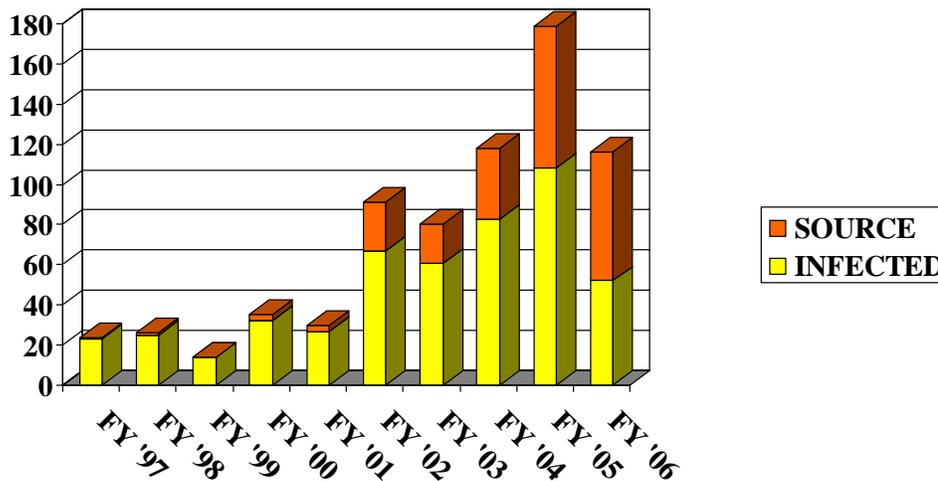
Animal ID

As of October 02, 2006, 118,668 sheep and goat premises have been assigned identification numbers in the Scrapie National Generic Database. Official eartags have been issued to 96,755 of these premises.

Note: report based on data available as of November 6, 2006

Figure 1. Infected and Source Flocks, New Statuses by Year, FY 1997-2006

**Infected and Source Flocks
New Statuses by Year
FY 1997 – 2006**



*based on status reported
before 11-06-06

Figure 2. Number of Samples Collected, FY 2006, by State of Tag Origination

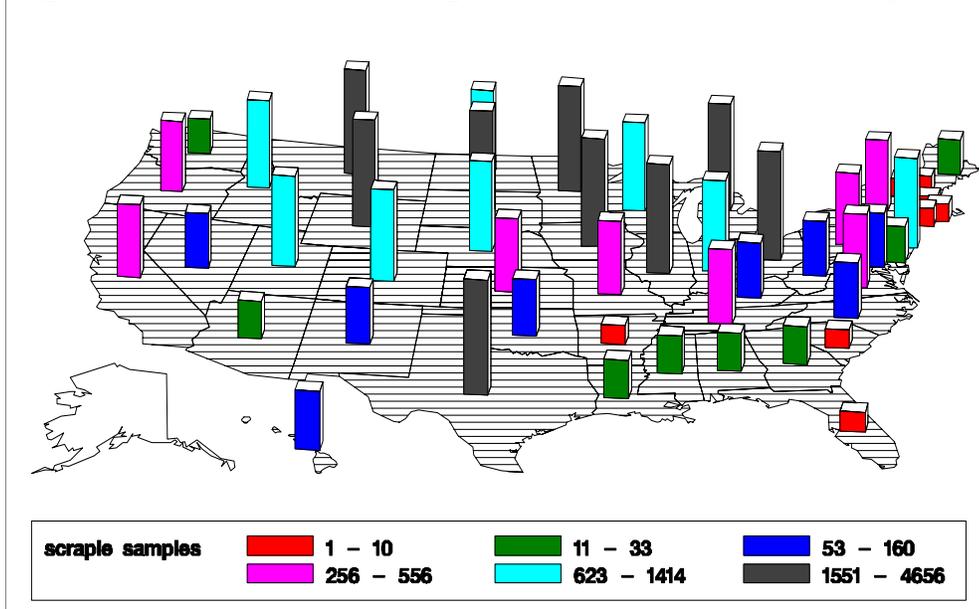
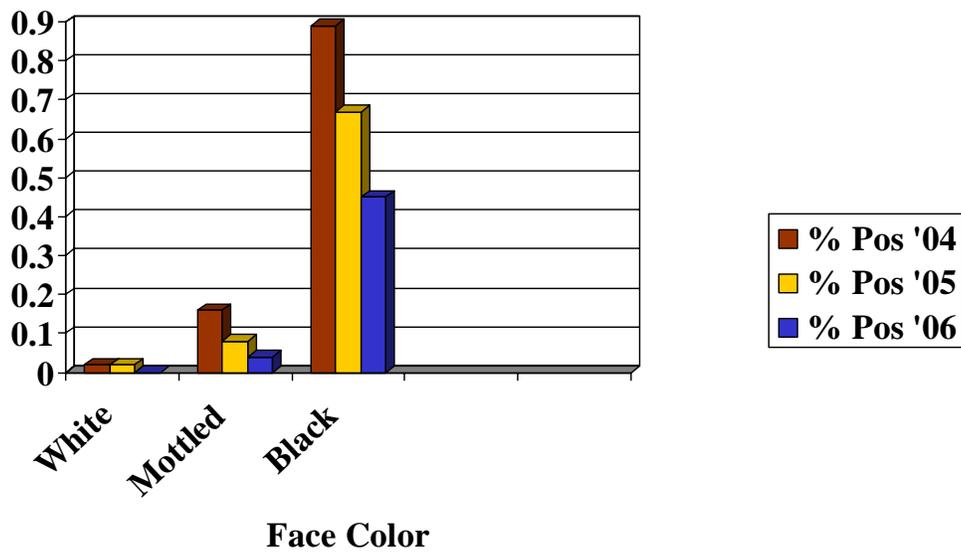


Figure 3. Percent of Samples Positive by Face Color FY 2004-2006



Descriptive Analysis and Scrapie Infected/Source Flocks and Investigations in FY 2006.

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Infected and Source Flocks

On average, Scrapie Infected/Source flocks identified in FY 2006 had an inventory of 98 animals (1,044), 23 animals indemnified on average (1-279), 3.45 positive animals found per flock upon flock cleanup plans. Of all these Infected/Source flocks for which data are available, 4,441 animals were involved in trace forward investigations. The primary breed of these flocks was predominantly black-faced breeds, however there were 12 white-faced flocks identified (one Shetland, four Polypay Cross, four Southdown, three Dorset) and one flock whose primary breed was Dorper. Most of these flocks (89.7%) underwent a standard genetics based flock plan (flock genotyped and QQ animals removed). Other flock plans included variations on the standard genetics based flock plan (e.g. some high risk animals retained separately from the genetically less susceptible or resistant animals after lid testing “negative”, other flocks removed QRAV animals in addition to all QQs, and four flocks underwent a whole flock depopulation. These flocks were primarily identified because of a positive found at slaughter (43%). Other detection methods included trace forward of exposed animals (30%), trace back to birth flock of positive animals (19%), investigation of clinical suspects (7%) and voluntary surveillance (1%).

Investigations

Attempts were made to trace 4,889 high risk sheep out of these Infected and Source flocks. While some of these investigations are still ongoing (9%), 16% were untraceable and 75% were traceable to a flock. Almost 30 (27) clinically suspicious sheep were investigated in FY 06. Seven of these animals were ultimately diagnosed with scrapie resulting in five newly discovered Infected or Source flocks. Nearly 37,000 (36,891) samples were collected at slaughter. Of these, 55 positive animals were detected, and 31 were successfully traced back to their flock of origin, resulting in 27 newly discovered Infected or Source Flocks. Over 20 (22) traces are still ongoing, and two of these positives were untraceable.

Scrapie positive animals

Of the Scrapie positive animals that were found, 75% (116) were female, and most (90%) had lambed or aborted in their flock of origin. Most (65%) were still in their flock of birth at the time of diagnosis. Nearly all (99.2%) of all positive animals found were QQ, of those that were QQ, most (89.2% were QQAA). One animal has initially tested QRAA; the genotype of this animal is being confirmed. One QRAV positive was detected in FY 2006. Most positive animals were found as part of an Infected or Source flock depopulation (45%). Other methods of detection included RSSS traceback (28%), traceforward investigations (20%), investigation of clinical suspects (5%), and Voluntary Surveillance (2%). The breeds of these positives was predominantly black-faced breeds (99), but there were 63 White-faced breeds identified (40 Southdown, 11 Polypay Cross, two Dorsets, and 10 non-specified white-faced or white-faced crosses). The average age of scrapie-positive animals was 3.9 years, ranging from six months to 12 years of age.