Scrapie Awareness and Prevention on U.S. Sheep Operations

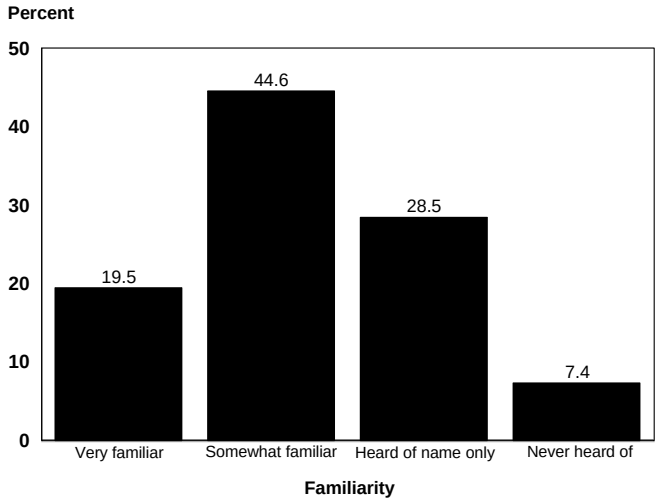
Scrapie is a fatal, progressive neurological disorder of sheep. Belonging to a group of neurodegenerative diseases called transmissible spongiform encephalopathies, scrapie is thought to be caused by an infectious protein or prion. Once infected, an animal is infected for life, and the disease is always fatal. Scrapie has a very long incubation period. Infected animals rarely show clinical signs of scrapie before 2 years of age, with the average age being 4 years. Scrapie is difficult to eradicate because: transmission of the organism is not completely understood; the live animal test for scrapie requires a biopsy of the lymphoid tissue from the animal's third eyelid and can result in significant numbers of "no tests" and is very labor intensive and expensive; it is resistant to most disinfectants; and it can be transmitted by sheep that display no clinical signs of the disease. Therefore, to reduce the risk of scrapie, sheep producers should purchase new animals from known scrapie-free flocks and focus on management practices such as flock certification, genetic testing for resistance, and hygienic lambing management.

The USDA's National Animal Health Monitoring System (NAHMS) collected data on sheep health and management practices from a stratified random sample of sheep production sites in 22 States (see map) as part of the Sheep 2001 study. These States represented 87.4 percent of the U.S. sheep inventory and 72.3 percent of U.S. sheep producers with one or more sheep. Overall, 3,210 operations participated in the first interview from December 29, 2000, to January 26, 2001. A second interview was completed by 1,101 of these operations with 20 or more ewes between February 5 and April 27, 2001.

Producer Awareness

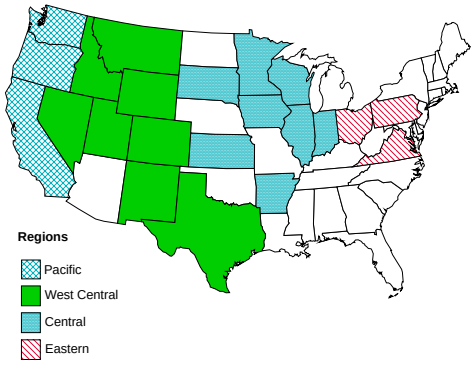
Producer awareness of scrapie was high. Overall, 92.6 percent of producers had at the very least heard of scrapie (Figure 1).

Figure 1. Percent of Operations by Familiarity with Scrapie



Two-thirds (66.9 percent) of producers who had at least heard of scrapie reported being moderately or highly concerned about the disease, yet only 3.4 percent participated in the National Scrapie Flock Certification Program in 2000, and nearly half (49.8 percent) had never heard of the program.

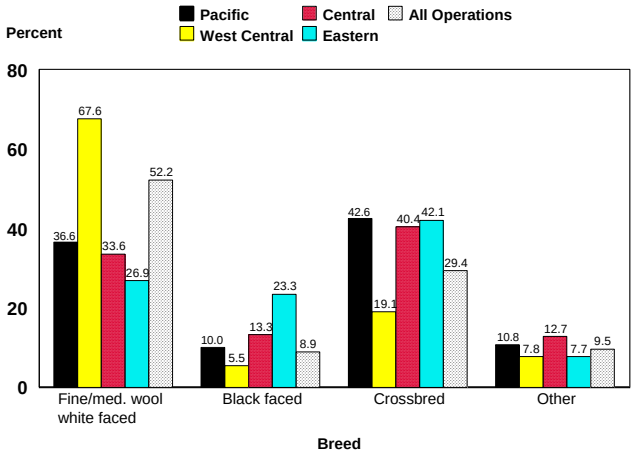
States That Participated in Sheep 2001 Study



Breed

Historically, black-faced sheep have accounted for the majority of known scrapie-infected sheep in the United States. However, at the time of the study, the U.S. sheep population was comprised primarily of fine or medium wool, white-faced breeds (52.2 percent of sheep). Crossbred sheep (which may have black, white, or mottled faces) accounted for 29.4 percent of U.S. sheep; black-faced breeds accounted for only 8.9 percent. There also were regional breed differences, with nearly one-fourth (23.3 percent) of sheep in the Eastern region (see map previous page) being black-faced breeds, compared to only 5.5 percent in the West Central region (Figure 2).

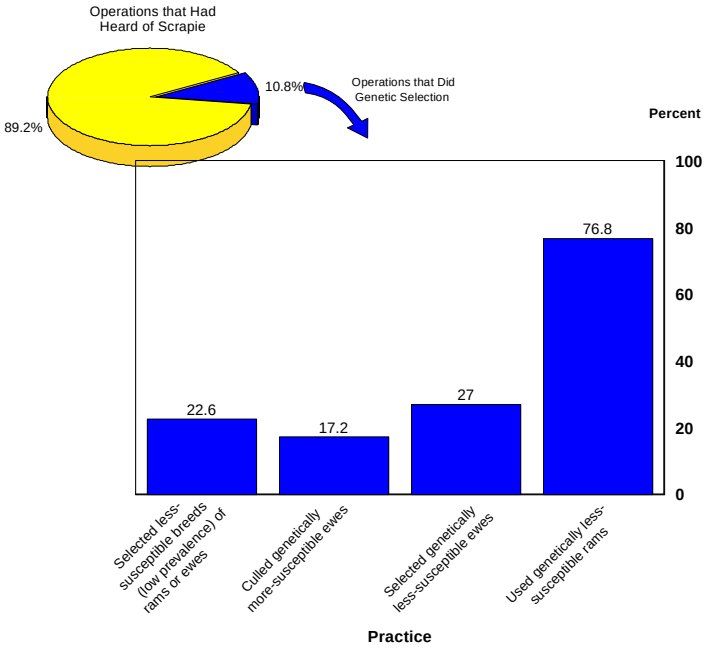
Figure 2. Percent of Sheep and Lamb Inventory by Breed Category and by Region.



Genetic Testing for Scrapie

If exposed to scrapie, sheep with specific genetic variations at codon 171 have been found to be either susceptible or more resistant to developing clinical signs of scrapie. As part of the NAHMS Sheep 2001 study, 13,199 samples were genotyped at codon 171. Results are available in the NAHMS information sheet *Distribution of Genotypes at Codon 171 in U.S. Sheep* (November 2003). Overall, 10.8 percent of operations that had heard of scrapie used genetic selection to control or prevent the disease (Figure 3).

Figure 3. For Operations that Had Heard of Scrapie and Did Any Genetic Selection for Scrapie Control, Percent of Operations that Carried Out the Listed Practices



Of those operations, 22.6 percent selected less-susceptible breeds (low prevalence breeds) of rams or ewes; 17.2 percent culled genetically more-susceptible ewes; 27.0 percent selected genetically less-susceptible ewes; and 76.8 percent selected replacement rams that were genetically less susceptible to scrapie (e.g., RR alleles).

Lambing Management

Even though infected animals most often do not show signs of scrapie until they are 2 years of age or older, the highest risk period for infection appears to be at birth or soon after. Because transmission is thought to occur primarily through the environment and because placentas are a source of infection, careful management of the lambing environment is crucial in preventing exposure and infection of neonatal lambs (see Table 1 following page).

Table 1. Percent of Operations Using the Following Lambing Management Practices

Practice	Percent Operations
Use lambing area as sick ewe pen during lambing season	23.0
Use lambing area as sick ewe pen other times	32.3
Remove placentas	75.2
Time to removal of placentas	
Less than 6 hours	68.4
6 to 12 hours	23.7
More than 12 hours	7.9
Clean manure and waste bedding from lambing areas	
Between each ewe	24.8
Between 2 or more ewes	16.2
At the end of lambing season	51.4
Never	7.6

Removing placentas from pens or lambing areas also decreases the amount of environmental contamination. Overall, 75.2 percent of operations removed placentas from pens or lambing areas. More farm flocks (81.0 percent) removed placentas than either herded/open range flocks (49.3 percent) or fenced-range flocks (55.5 percent). Of those operations that removed placentas from lambing areas, most (68.4 percent) removed placentas sooner than 6 hours after birth. However, 7.9 percent of operations left placentas on the ground for more than 12 hours, on average. The most common way of disposing of placentas was composting (29.4 percent of operations), followed by landfill/dump (17.9 percent of operations), and carnivores (15.4 percent of operations).

In addition, cleaning lambing areas is very important in preventing disease exposure to newborn lambs. One-fourth (24.8 percent) of operations with a lambing structure cleaned manure and waste bedding from the area between each ewe. The majority (51.4 percent) of producers cleaned lambing areas at the end of the lambing season, and an additional 16.2 percent of operations cleaned lambing areas between two or more ewes, leaving 7.6 percent of operations that never cleaned lambing areas.

Flock Additions

New additions to the flock are a potential source of infection. Separating new arrivals (quarantining) may allow identification of sick animals for many diseases and prevents exposure to the rest of the flock. Because of scrapie's long incubation period and the increased risk of transmitting scrapie during lambing, lambing new additions separately is a more important scrapie prevention tool than quarantining. Over one-third (34.1 percent) of operations added ewes or ewe lambs during the previous year, while 19.8 percent had not added ewes or ewe lambs for 10 or more years. A total of 14.3 percent of operations that added bred ewes separated these new additions from the flock until they lambed.

The rams' role in scrapie transmission appears to be small, since they have not been implicated in transmission. Only 4.3 percent of operations had not added either rams or ewes to their flocks in the last 4 years.

Knowing the health status of the source flock for replacement ewes and rams can reduce the risks associated with introducing new animals. Flocks that participate in the National Scrapie Flock Certification Program are a source of low-risk replacement sheep. For operations that had heard of scrapie and had acquired ewes or rams during 2000, 9.6 percent obtained some or all of their ewes, and 11.0 percent obtained some or all of their rams, from flocks participating in this program.

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