



## Ovine Progressive Pneumonia: Awareness, Management, and Seroprevalence

### Background

Ovine Progressive Pneumonia (OPP) is a slowly progressive viral disease of adult sheep caused by an ovine lentivirus. Most sheep do not show clinical signs of OPP, but the sheep that do typically don't display signs until 2 years of age or older because of the virus's long incubation period. Often, the first sign noticed is a general loss of body condition referred to as "thin ewe syndrome." Weight loss occurs despite the affected sheep having normal appetites.

Another common sign of OPP is increased breathing effort at rest; animals tire easily and may be seen trailing the flock. These sheep are often called "lungers." Secondary bacterial infection is very common and results in additional signs such as fever, cough, lethargy, and nasal discharge. OPP infection also can cause "hard bag," an enlarged, firm udder with reduced or no milk flow.

Infection with OPP virus also may cause other problems such as meningitis and encephalitis. Clinical signs include an unsteady gait, twitching, or stumbling, which can progress to hind limb or total paralysis. Arthritis may accompany OPP infection. Pain and swelling of the joints and a shortened gait are common.

Once infected, animals remain infected for life, though many will never show clinical signs of disease. Flocks infected with OPP can have lowered production efficiency because of early culling, decreased milk production, and lower weaning weights. However, a general consensus on the economic importance of OPP for individual flocks has yet to be established.

### Sheep 2001 Study Results

The seroprevalence of OPP was measured nationally using randomly selected operations during the USDA's National Animal Health Monitoring System (NAHMS) Sheep 2001 study.

For Sheep 2001, data on sheep health and management practices were collected from a stratified random sample of sheep production sites in 22 States.<sup>1</sup> Information on health-related management practices was collected from 3,210 participating operations in the first interview from December 29, 2000, to January 26, 2001. Of the original participants, 1,101 were interviewed a second time between February 5 and April 27, 2001. Of the participating operations, 682 (61.9 percent) agreed to biological sampling for OPP. Up to 40 ewes were sampled per operation, depending on flock size; 21,369 samples were tested.

### Producer Awareness and Management

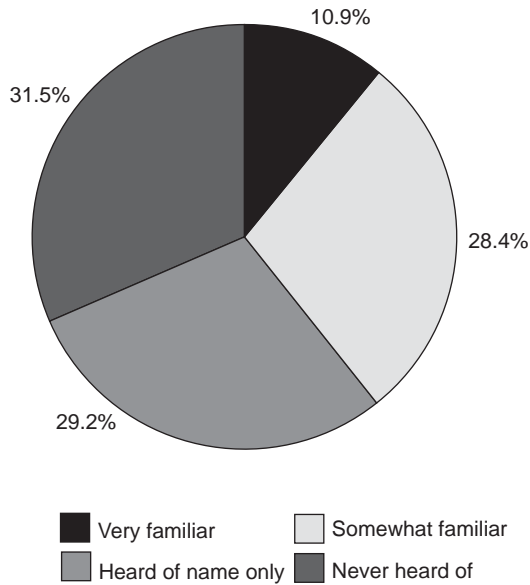
As part of the study, producers were asked to describe their familiarity with OPP. While 10.9 percent of operations were very familiar with OPP, overall nearly one in three operations (31.5 percent) reported never having heard of OPP prior to the study. Fewer producers in the West Central region reported being very familiar with OPP (6.1 percent), compared to the Pacific (12.1 percent), Central (13.0 percent), or Eastern (12.5 percent) regions (Figure 1).

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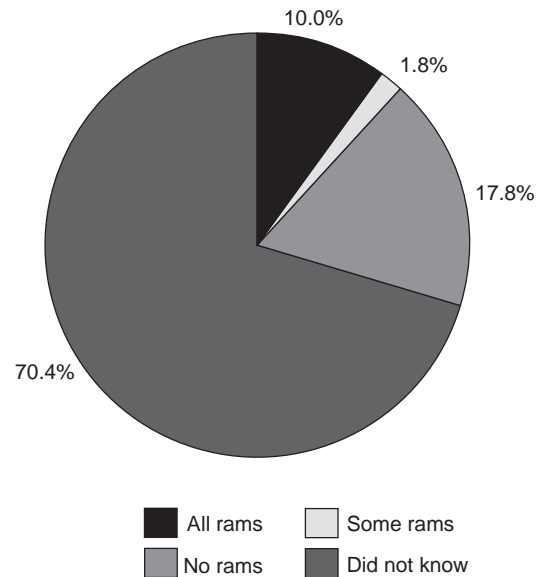
#### <sup>1</sup> Regions/States:

*Pacific region:* California, Oregon, Washington  
*West Central region:* Colorado, Idaho, Montana, Nevada, New Mexico, Texas, Utah, Wyoming  
*Central region:* Arkansas, Illinois, Indiana, Iowa, Kansas, Minnesota, South Dakota, Wisconsin  
*Eastern region:* Ohio, Pennsylvania, Virginia

**Figure 1. Percent of Operations by Familiarity with OPP Before the Sheep 2001 Study**



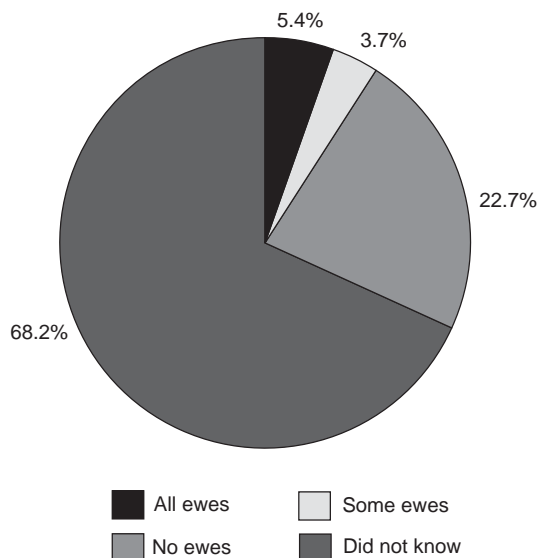
**Figure 3. For Operations That Had at the Very Least Heard of OPP and Had Acquired Rams, Percent of Operations That Acquired Breeding Rams From an OPP-Negative Flock**



## Management and Control of OPP

Participating producers who had, at the very least, heard of OPP (68.5 percent) provided further information about their efforts to control the infection. For this group, 10.6 percent had a flock health management program to control or prevent the disease at the time of the study. For producers in this group that had added ewes or rams, most did not know the OPP test status of the newly acquired ewes (68.2 percent of operations) or rams (70.4 percent of operations) (Figures 2, 3).

**Figure 2. For Operations That Had at the Very Least Heard of OPP and Had Acquired Ewes, Percent of Operations That Acquired Breeding Ewes From an OPP-Negative Flock**



The most common method used to control or prevent OPP within the flock was to keep the flock isolated from infected sheep and/or goats (18.4 percent of operations). Only 6.6 percent of operations removed all seropositive sheep and lambs from the flock. Removal of animals included either selling them and/or isolating them in separate facilities.

Most producers (92.4 percent) never tested their animals for OPP. Of the 7.6 percent that did test their animals for OPP, most (4.3 percent) tested only selected sheep. A few producers (0.1 percent) tested the majority of their sheep two or more times a year, and 1.5 percent tested the majority of their sheep once a year. The rest of the producers (1.7 percent) tested their sheep less frequently than once a year.

Very few producers (1.2 percent) believed their sheep were currently infected with OPP. The majority of producers (86.3 percent) did not know the current OPP status of their flock.

## Seroprevalence of OPP

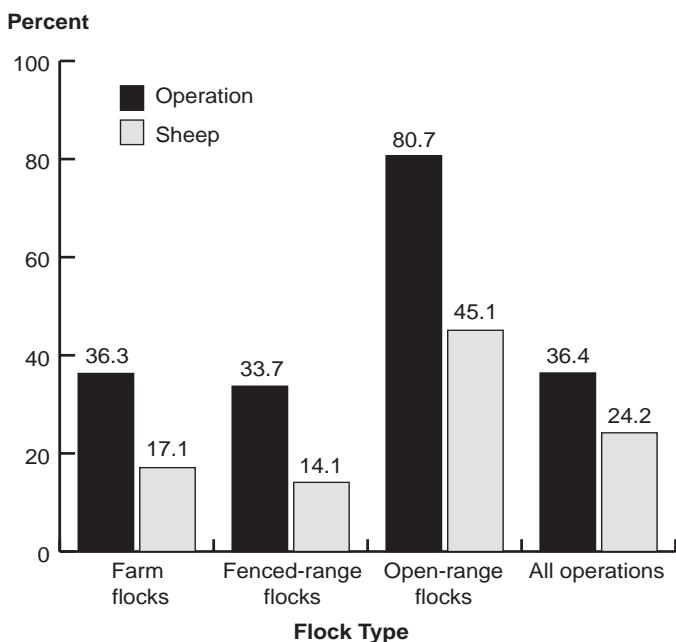
All blood samples were tested using a competitive enzyme-linked immunosorbent assay (cELISA) technique that detects antibodies in the serum of sheep sampled. The cELISA provides direct quantification of serum antibodies to OPP virus, which the commonly used agar gel immunodiffusion (AGID) test does not permit, making the cELISA a more objective method for

determining the seropositivity of a sample than the AGID.

Overall, 36.4 percent of operations had one or more animal test positive for OPP, and 24.2 percent of animals tested positive for OPP. The prevalence of infection varied depending on flock type, region, and flock size.

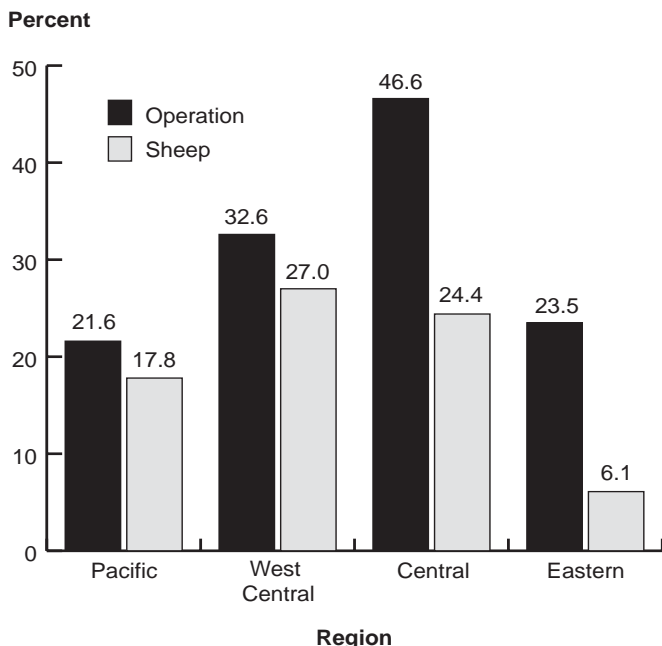
Most open-range flocks (80.7 percent) had one or more animal test positive for OPP, and 45.1 percent of sheep tested from open-range flocks were positive. Approximately one-third of flocks (33.7 percent) categorized as fenced-range operations were positive; only 14.1 percent of sheep tested from fenced-range flocks were positive. In farm flocks, 36.3 percent of operations and 17.1 percent of sheep tested from farm flocks were positive (Figure 4).

**Figure 4. Percent of Operations (and Percent of Sheep) Positive for OPP, by Flock Type**



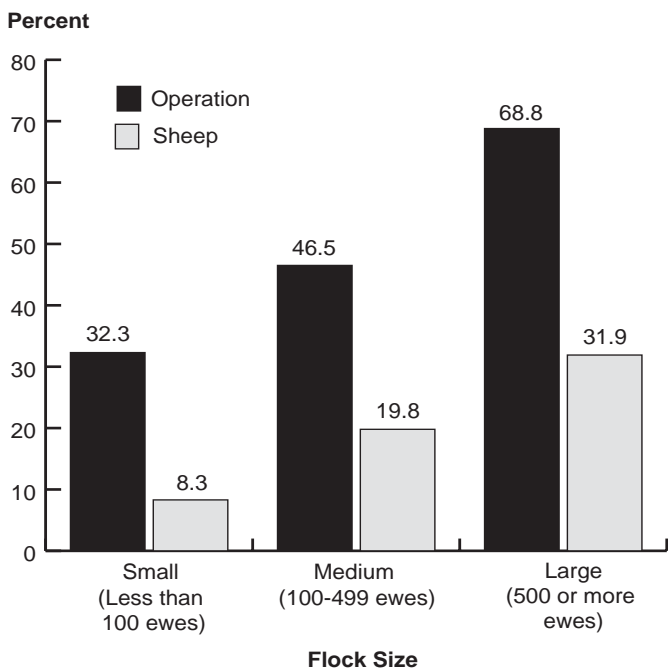
In the Pacific region, 21.6 percent of operations and 17.8 percent of sheep tested positive for OPP. In the West Central region, 32.6 percent of operations tested positive, and 27.0 percent of sheep tested positive. Of operations in the Central region, 46.6 percent tested positive, and 24.4 percent of sheep tested positive. In the Eastern region, 23.5 percent of operations, and 6.1 percent of sheep tested positive (Figure 5).

**Figure 5. Percent of Operations (and Percent of Sheep) Positive for OPP, by Region**



The percentage of large operations positive for OPP (68.8 percent) was more than twice the percentage of small operations positive for OPP (32.3 percent). The percentage of sheep testing positive for OPP on large operations (31.9 percent) was nearly four times the percentage of sheep testing positive on small operations (8.3 percent) (Figure 6).

**Figure 6. Percent of Operations (and Percent of Sheep) Positive for OPP by Flock Size**



## Conclusion

While very few producers believed their flocks were currently infected with OPP, the serosurvey indicated a relatively high level of infection (36.4 percent of operations). One explanation for this discrepancy may be that most producers (92.4 percent<sup>2</sup>) do not test for OPP on their operations. In addition, for those that acquire breeding rams or breeding ewes, only 10.0 percent and 5.4 percent of producers acquired all their rams and ewes, respectively, from flocks known to have tested negative for OPP. The economic effect of this disease varies from flock to flock and depends on a number of factors: the prevalence of infection within the flock; general management of the flock; and the production goals of the flock. Since there is no treatment for OPP, prevention is the best strategy for reducing morbidity and mortality. Introduction of OPP can be reduced through a closed herd policy or testing all newly acquired animals prior to introduction onto the farm.

<sup>2</sup> Includes only producers who had at the very least heard of OPP. It is reasonable to assume that most of the producers who had not heard of OPP would not have tested for the disease.

For operations with OPP-infected sheep, serologic testing of the flock at appropriate time intervals, with removal or isolation of infected animals, is the first step toward control. In addition, an appropriate diagnostic and control plan should be developed with a local veterinarian.

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*Reference:*  
*Cutlip RC, Lehmkuhl HD, Sacks JM, et al. Seroprevalence of ovine progressive pneumonia virus in sheep in the United States as assessed by analyses of voluntarily submitted samples. Am J Vet Res, June 1992, 53(6):976-979.*

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