

*The insidious nature of OPP, and resulting controversy surrounding its importance, often leaves experts divided into opposite camps and producers caught in the middle. Much of this disagreement stems from studies done some 30-40 years ago at the USDA Sheep Experiment Station in Dubois, Idaho. Here we present an article written by one of those researchers, followed by abstracts from the studies that Dr Gates describes below. Turn to pages 3 and 4 to read the opposing viewpoint, presented by Drs Marie Bulgin and Bob Leder, and then to page 5 for excerpts from a recent slide show presented by Dr Cindy Wolf at the July 2018 NSIP sale in Spencer, Iowa.*

# Ovine Progressive Pneumonia— Enough Is Too Much!

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This article is the result of my personal mental and emotional stress caused by numerous articles about ovine progressive pneumonia (OPP) which, in my opinion, have seriously misled the sheep industry about this disease.

Let's go back to 1977 when it was reported that a high percentage of cull sheep had detectable antibodies to the OPP virus. That was about the first mention of OPP in recent times. I thought the report was certainly interesting and it did raise a pertinent question. Does OPP exert a significant negative economic impact on sheep production in the U.S.? At the same time, we must keep in mind that to demonstrate that an animal (sheep, humans, cattle, etc.) has antibody to a virus (in this instance OPP) is not scientifically remarkable, since all animals carry antibodies to numerous viruses and bacteria. A notable difference is that a sheep with OPP antibody is probably an infected OPP carrier which is not necessarily true for other infectious microorganisms. In 1977 I was a veterinary scientist at the U.S. Sheep Experiment Station at Dubois, Idaho. I had observed "lunger ewes" and had determined that a number of sheep at the station did have OPP. This situation provided an ideal opportunity to conduct a scientific study to answer the question regarding OPP and economic significance. We collected blood samples from 2110 ewes, analyzed them for OPP antibody, and compared reproductive performance by breed and age between OPP positive and OPP negative ewes. Approximately 51% of the total number of ewes tested were OPP positive. There was NO DIFFERENCE in number of lambs born per ewe, number of lambs born alive per ewe, number of lambs weaned per ewe, or the pounds of lamb weaned per ewe between OPP positive and OPP negative ewes. We did show that the percentage of OPP positive ewes increased with age, and that

Finn sheep had a significantly higher infection rate than other breeds. Our conclusion from the study was that: Within breed and age there was no significant difference in reproductive performance between seropositive and seronegative ewes. This information was reported in the Journal of the American Veterinary Medical Association in 1978.

Since 1978 there have been several articles published in various proceedings, sheep industry magazines, etc. that have touted OPP as a disease that will surely destroy the U.S. sheep industry. The articles, although frightening and sensational, failed to include scientific data to support the conclusions. For the most part, such articles have been inundated with emotionalism, subjectivity and theoretical conjecture. For example, a "State Veterinarian" wrote, "There is no question that ovine progressive pneumonia is a serious disease of sheep not only in the Northeast but nationally." Again, the veterinarian neglected to provide data of any kind to support his outstanding conclusion. Such statements, in my opinion, are irresponsible and are creating fear and misunderstanding among sheep producers.

After reading several articles of questionable validity for a few years, I began

**NOTE: Yellow highlights added.**

to question the observations and conclusions of the 1978 study at the U.S. Sheep Station. Maybe our data was a fluke, maybe those other folks are right! Maybe OPP really is important. Maybe we better take another look! So, in 1988 I went back to the U.S. Sheep Experiment Station, collected blood samples from 2,917 ewes as they left the shearing shed, and repeated the 1978 investigation. The results were: NO DIFFERENCE in number of lambs born, lamb viability, birth weight, number of lambs weaned, lamb growth rate, mature ewe body weight or grease fleece weight between OPP positive and OPP negative ewes. What more can I say.

OPP has been referred to by a well informed colleague of mine as one of the "hysteria" diseases. Another colleague recently stated that there is a tendency by producers to look for a reason for failed management, and OPP is the "in disease." These reactions to OPP are a little harsh but may, in fact, be reasonably accurate. There are undoubtedly a few among you who are literally frothing at the mouth by now. It was my hope to get your attention, now allow me to mollify you a bit. My position at this point in time is that, based on available scientific evidence, OPP is probably not a serious national health problem in sheep. Further research will be needed to confirm, deny, or determine the degree of seriousness that OPP poses for our industry. I accept the real possibility that OPP may have caused severe economic loss in isolated sheep flocks. I also admit that we may have overlooked some important factor in our OPP investigations and that economic significance may yet be proven. As a conciliatory note, those who continue to advocate the seriousness of OPP, I believe, are acting in good faith and are, in most instances, doing what they honestly feel is in the best interest of the sheep industry. At the same time, I believe that most of these folks have been caught up in the emotional hysteria associated with OPP. The most outspoken proponents of the devastating effects of OPP seem to be sheep producers, shepherds, technicians, etc. A question that has occurred to me is how can these folks know so much about a disease that veterinarians and scientists seem to know so little?

My goal in writing this article was to lend some balance to the controversy regarding OPP. I hope that I haven't caused further confusion. Furthermore, I understand that when one writes an article such as this, one bares his backside. Let the thrashing begin.

[J Am Vet Med Assoc](#). 1978 Dec 15;173(12):1575-7.

## **Serologic survey of prevalence of ovine progressive pneumonia in Idaho range sheep.**

[Gates NL](#), [Winward LD](#), [Gorham JR](#), [Shen DT](#).

### **Abstract**

Blood samples from 2,310 mature sheep in 3 Idaho range flocks were examined by agar gel immunodiffusion to determine the prevalence of ovine progressive pneumonia. The prevalence ranged from 58% for all ages combined in one flock to 90% of cull ewes in another flock. Age-specific prevalence rates increased from 16% in yearlings to 83% in ewes greater than or equal to 7 years old. Rambouillet sheep had a significantly ( $P$  less than 0.01) lower prevalence than sheep of 5 other breeds, whereas one-half Finnsheep crosses had a significantly ( $P$  less than 0.01) higher prevalence than sheep of other breeds. Within breed and age, there was no significant difference in reproductive performance between seropositive and seronegative ewes.

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[J Am Vet Med Assoc](#). 1990 Aug 15;197(4):475-9.

## **Prevalence and effect of subclinical ovine progressive pneumonia virus infection on ewe wool and lamb production.**

[Snowder GD](#), [Gates NL](#), [Glimp HA](#), [Gorham JR](#).

US Sheep Experiment Station, Agricultural Research Service, USDA, Dubois, ID 83423.

### **Abstract**

The prevalence of infection with ovine progressive pneumonia (OPP) virus and its effects on ewe wool and lamb production were investigated in a flock of 2,976 ewes of 6 breed types (Rambouillet, Targhee, Columbia, Polypay, 1/4 cross Finnsheep, and 1/2 cross Finnsheep). Prevalence of seropositivity was significantly ( $P$  less than or equal to 0.01) lower among Rambouillet and Targhee breeds (44 and 42%, respectively), intermediate in Polypay, Columbia, and 1/4 cross Finnsheep (approximately 53%), and higher among 1/2 cross Finnsheep (62%). Seropositivity increased with age in all breed types from 11% at 1 year of age to 93% at greater than or equal to 7 years of age. Lateral disease transmission is indicated by linear increase of seropositivity prevalence with increasing age, including that in sheep greater than 6 years old. Subclinical infection with OPP virus had no apparent detrimental effect on number of lambs born, lamb viability, birth weight, number of lambs weaned, or growth rate of single and twin lambs, compared with findings for noninfected sheep in the same flock. Mature ewe body weight and grease fleece weight did not differ between subclinically infected seropositive and seronegative ewes. Subclinical infection with OPP virus does not appear to have an adverse economic effect on ewe wool and lamb production. Culling rate attributable to clinical manifestation of infection with OPP virus must be accurately determined before the true effects of virus infection on production can be determined and an eradication program can be recommended.



*Here Dr Marie Bulgin, retired from the University of Idaho, offers another perspective. This is followed by Dr Bob Leder's review of a 1994 Dutch study documenting economic loss due to maedi-visna (OPP).*

## OPP Controversy

*by Marie S. Bulgin, DVM, MBA, DACVM*

When a lot of controversy exists about a subject, chances are that both sides are right to some degree. OPP, like any viral disease, is quite contagious and depending on breed, i.e. genetics, age, stress, management practices and astuteness of the owner, the disease can be a problem — or not.

The Dubois Sheep Station has had OPP in the flock for as long as it has been around. And because they have selected for productivity over many years, I believe they have also inadvertently selected for OPP symptomless sheep. However, that said, I do believe they don't have a clue what their losses really are from OPP in the flock. For example, they cull a number of young sheep for arthritis — which is undoubtedly OPP. They have never reported problems with hard bag, though. Gary Snowder reported on work he did grading udder size at lambing time and correlating it with weight of lambs weaned. He showed a good correlation between large udders and total lbs of lamb weaned. It turns out that large udders are a great predictor of ewe productivity. However, when we (University of Idaho) did a survey for them 20 years ago and necropsied about forty thin ewes, ages 2 years to 5, the problem was either OPP or CL, about 50-50 for one or the other. So they do have a problem, but not enough of one to get their attention. As they say, there is no disease research in their mission.

On the other hand, most of the western whiteface range flocks have OPP and other than a 1/2 to 5% hardbag prevalence, they don't recognize a problem. Those that do realize that OPP is a problem don't know what to do about it because they can't just cull their whole ewe flock. Once in a while the flock will change hands, management changes, weather conditions are particularly bad, nutrition is compromised and a wreck occurs. When the diagnostics are actually done, OPP is a large part of the problem. Ask Clay Center (USDA-MARC) what disease killed the majority of their Texels when they first imported them. Ask Cornell why they couldn't seem to raise enough replacement Finns to keep their number stable. They died of heat stress and their Dorsets had hard bag, and the cause of both was OPP.

So, in my mind, living with a chronic disease is like living with a time bomb. You never know when it is going to go off. One year of bad luck — drought, moldy hay, flooding, enforced confinement — fill in the blanks, you will start losing good middle aged ewes from what appears to be bacterial pneumonia, or they won't be able to raise their lambs or they can't bounce back after weaning, etc.

Folks with small flocks who can afford to test, should do it. At least they should necropsy their dead animals. Find out what little gremlins live under your fingernails. I'd test the oldest ewes, those 4 or older or any ewe that was having problems keeping her weight or raising her lambs. If they are negative, the flock is probably free of OPP.

But that is my opinion. My own flock of 450 animals is free of OPP. I tested years ago, removed the two positives that we found and I necropsy most of my dead animals unless they died of obvious problems i.e. dog bites, green alfalfa bloat, bad fences, etc. I have plenty of other problems but OPP isn't one of the straws on the camel's back.

*Adapted from a post to SHEEP-L and used with permission.*

**RAPID ADULT-TO-ADULT VIRAL TRANSMISSION &  
REDUCED LAMB GAINS ATTRIBUTED TO MAEDI-VISNA**

Review by Robert Leder, DVM

The effects of indurative lymphocytic mastitis caused by maedi-visna (OPP) virus were evaluated by Dutch researchers recently.

A flock of 148 three-year old Texel ewes was assembled in October. Seventy-three (73) ewes were infected but clinically normal, and seventy-five (75) ewes were from maedi-visna accredited free flocks.

The ewes were exposed to 6 rams from one sire, obtained from a maedi-visna accredited free flock for March lambing. They were kept on pasture until 2 weeks prior to lambing at which point they were housed in an open front shed. Ewes and lambs were individually penned for the first couple days then group penned for 4 days. By 2 weeks they were back out on pasture. (This is a common management practice.) No supplemental milk was provided.

The lambs' weight gains were monitored until 80 days of age - at which point they were weaned. The ewes were bled at 6 week intervals, and the lambs at weaning, and were tested for antibodies using ELISA. After weaning the ewes were sacrificed and the udders examined histologically (microscopically) for lymphocytic follicles typical of maedi-visna. The ewes were grouped in 4 groups, based on udder lesions. (Group 1 - no lesions; group 4 - severe lesions.)

Here are some of the results:

1) Within 9 months after the flock was established 76% of the ewes from the 'free' flocks had seroconverted. (The flock infection rate rose from 50% to 87%.)

2) Lesions developed soon after infection were detectable. In fact some of the newly infected ewes had severe udder lesions by the end of the experiment.

3) 14 lambs died in the first 3 weeks of age in the experiment. Seven (1/2) were attributed to starvation, and the dams' udders had severe lesions when they were examined.

4) 6 ewes died within the experiment due to clinical maedi. These were from the originally infectious portion of the flock. Remember that this was a flock of 3 year old ewes.

5) 44 of 188 lambs at weaning were seropositive. 43 of these came from positive ewes.

6) Growth rates were lowest in the lambs from ewes with the most severe udder lesions (group 1 vs group 4). The difference over 80 days was approximately 7#/lamb. When expressed on pounds weaned per ewe, the difference was approximately 12# in favor of the unaffected ewe.

This experiment documented premature ewe losses, lamb mortality, and reduced daily weight gains of lambs born to maedi infected ewes. It also documented the rapid spread of the virus in the newly assembled flock, and the usual transmission from dam to offspring.

J.J. Pekelder et al. Vet Record 134:348-350, 1994

Editor's note: "Indurative mastitis" is veterinary terminology referring to what producers sometimes call "hard bag".

*The information below has been excerpted from a slide show presented by Dr Cindy Wolf at the July 2018 NSIP Sale in Spencer, Iowa. The entire presentation is available in PDF format on our 'Library' page.*

## ***Does it really matter if sheep have OPP?***

- Some report no difference in production between positives and negatives – ***usually because symptomatic ewes are culled w/o being counted*** –
- A 40-year-old USDA study is often quoted as supporting evidence, but . .
- That study ***failed to include*** 100's of ewes unable to feed even one lamb
- Those ewes, most with hardbag, ***were culled just prior to the study***
- We know this from two who were working with the flock at the time
- Both have provided statements and given permission to quote

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### ***Brian Magee***

(former Shepherd at Cornell University in New York, retired)

*"They (researchers) failed to note that a large number of ewes from this flock were culled at lambing with hard udders unable to feed even one lamb. I don't have an exact number but it was in the range of 600 ewes both years I was in the lambing barns suckling lambs and taking them off as orphans."*

### ***Yves Berger***

(former Director of the Spooner Dairy Sheep Research Program in Wisconsin, retired)

*"I was working with Brian in Dubois in 1975-1977. My wife was working in the orphan lamb rearing area. The sheer number of lambs raised on milk replacer was certainly a reflection of the poor milking ability of many ewes that numbered about 4,500 at this time. I was also shocked by the high lamb mortality."*