

# The Establishment of Ovine Progressive Pneumonia (Lungers) Free Sheep From Infected Herds

M. R. Light, I. A. Schipper, T. W. Molitor,  
J. E. Tilton and W. D. Slanger

Progressive pneumonia is a chronic disease of adult sheep that can cause serious economic losses in affected sheep flocks. The clinical symptoms of OPP include a slow progressive weight loss, physical weakness, a lack of fever, increasing severe respiratory distress with a chronic cough and labored breathing and ultimately death (Siggurdsson *et al.*, 1952; Ressang *et al.*, 1968).

The incidence of ovine progressive pneumonia was first described by Marsh (1923) who reported that 1 to 2 per cent of sheep in affected Montana range flocks developed the disease. Since that time, affected individuals have been reported throughout world sheep producing areas including South Africa, Britain, France, Germany, India and America (Palsson, 1976). Cutlip *et al.* (1977b) surveyed cull slaughter ewes and reported up to 68 per cent of old ewes were infected with OPP. Gates *et al.* (1978) after testing blood sera from Idaho range sheep reported an incidence of 58 per cent in all ages to 90 per cent of cull ewes had been infected. Light and Schipper (1979) surveyed seven North Dakota flocks and demonstrated through blood sera analyses that all had been infected. Incidence of infection ranged from 18 to 85 per cent. Published reports concerning chronic progressive pneumonia together with personal communication to the author from purebred breeders throughout the United States leads to the speculation that chronic progressive pneumonia (lungers) is endemic within sheep flocks in the United States.

The North Dakota Agricultural Experiment Station imported 26 Border Leicester ewes from Canada in 1970-71 and purchased a number of Columbia ewes from Colorado in 1971. These ewes were found to be highly susceptible to the ovine progressive pneumonia virus already present in the university flocks. In fact, the losses in these strains to OPP were greater than the female replacement stock raised. Because of the high incidence of OPP in these sheep and also the possibility that semiconfined enterprises might encounter similar problems, an experiment was initiated in 1974 to attempt the establishment of sheep flocks that were free of OPP.

## Procedure

To establish OPP-free flocks of the Hampshire, Columbia, Suffolk and Border Leicester breeds, the following procedures described by Light *et al.* (1979) were utilized. (1) Lambs were immediately removed from dam at birth. Ewes were not allowed to lick or suckle lambs. All selected lambs were bottle fed within 4 hours of birth approximately 6 ounces of cows colostrum that had been

collected, frozen and stored prior to the lambing season. (2) Each lamb was routinely administered enterotoxemia antitoxin, sodium selenite and vitamins A, D, and E on day of birth. (3) Each lamb was administered C and D type enterotoxemia toxoid at 28 and 90 days of age. (4) All lambs were transferred within 18 hours from the premises where infected flocks were housed to experimental barns that were disinfected and had been free of sheep for six months and were located one-half mile from infected sheep. (5) All lambs were housed from a period of at least 30 days in an area where temperatures were maintained at 60-65°F. (6) Lambs were reared on high protein, high fat lamb milk replacers plus suitable high protein (18%) and high energy lamb rations. All additions to the initial flock, either ewes or rams, have been made following the procedures described. No unusual precautions have been made to restrict traffic by personnel from barns housing parental or experimental flocks; however, separate caretakers are assigned each unit.

## Results

The present experimental flock of approximately 120 sheep (four breeds) has developed from the initial lambs raised according to the described procedures. Blood samples of all ewes are withdrawn *via* jugular puncture annually. Sera from the blood samples are analyzed for the presence of precipitating antibodies using the agar-gel immunodiffusion technique described by Cutlip *et al.* (1977a) as modified by Molitor (1978). All sera samples collected from 1975 through 1979 have shown negative response with this test. Necropsy reports from all sheep deaths within this flock together with AGID test results indicate that the isolated flock has remained free of progressive pneumonia.

The procedure outlined appears to provide a method whereby sheepmen can establish sheep flocks free from progressive pneumonia. The immediate isolation and rearing of newborn lambs from infected parental stock may be a great help in preserving valuable bloodlines in pure breeds. The effects of OPP-free sheep upon total ewe productivity and lamb growth are not known at this time. Our observations are that they may be considerable and will be critically evaluated in future experiments.

## Literature Cited

- Cutlip, R. C., T. A. Jackson and G. A. Laird. 1977a. Immunodiffusion test for ovine progressive pneumonia. *Amer. J. Vet. Res.* 38:1081.
- Cutlip, R. C., T. A. Jackson and G. A. Laird. 1977b. Prevalence of ovine progressive pneumonia in a sampling of cull sheep from western and midwestern United States. *Amer. J. Vet. Res.* 38:2091.

---

*Light and Dr. Tilton are professors and Dr. Slanger is assistant professor, Department of Animal Science; Dr. Schipper is professor and Molitor is Laboratory Technician, Department of Veterinary Science.*

- Gates, N. L., L. D. Winward, J. R. Gorham and D. T. Shen. 1978. Serological survey of prevalence of ovine progressive pneumonia in Idaho range sheep. *J. Amer. Vet. Med. Assoc.* 173:1580.
- Light, M. R., I. A. Schipper, T. W. Molitor, J. E. Tilton and W. D. Slinger. 1979. Progressive pneumonia in sheep. Incidence of natural infection and establishment of clean flocks. *J. Anim. Sci.* 49:1157.
- Light, M. R. and I. A. Schipper. 1979. Unpublished data.
- Marsh, H. 1923. Progressive pneumonia in sheep. *J. Amer. Vet. Med. Assoc.* 15:458.
- Molitor, T. W. 1978. Immunologic aspects of ovine progressive pneumonia. M. S. Thesis, North Dakota State Univ., Fargo.
- Palsson, P. A. 1976. Maedi and visna in sheep. P. 17. *In* Kimberlin (Ed.) *Slow Virus Diseases of Animals and Man.* Noth Holland Publishing Co.
- Ressang, A. A., G. F. DeBoer and G. C. DeWijn. 1968. The lung in zweegerziekte. *Pathol. Vet.* 5:353.
- Sigurdsson, B., H. Grimsson and P. A. Paulsson. 1952. Maedi, chronic progressive infection of sheep lungs. *J. Infect. Dis.* 90:223.

### Guest Column Continued from Page 2

- a) Interested predation of sheep flocks, primarily by the coyote.
- b) Ever increasing value of farmable land.
- c) Increasing fertilizer costs which enhance the value of natural fertilizers, green manure crops, and legumes in rotations.
- d) Some operations are not large enough to support both the fathers' and sons' families till Dad retires and the son assumes leadership of the family farm enterprise. A livestock operation for the son in the early years gives autonomy to the son and his family.
- e) Increased prices for petroleum will certainly increase demand for production of the natural fibers which will also tend to be more comfortable when lower thermostat settings were required.

At the initiation of the Hettinger Branch Station Advisory Committee with support of area legislators and statewide producers support, the 1979 Legislative session provided \$75,000 for construction of a total confinement sheep barn at the Hettinger Branch Experiment Station. This research tool will be a tremendous aid in determining the potential for expansion of the sheep industry through confinement and intensification in North Dakota and the surrounding states.

Plans for use of the barn will include:

- 1) Measuring labor and feed requirements for confined sheep.
  - 2) Evaluating breeds and crosses comparing confinement to conventional systems of management.
  - 3) Attempt to measure economic feasibility of total confinement of sheep.
- If initial indicators point to an advantage for confinement as opposed to conventional systems, later research will investigate:
- 1) Proper building environment for optimum health and production of sheep.
  - 2) Nutritional needs of confined sheep.
  - 3) Regulation of day length for optimum reproductive efficiency of sheep.
  - 4) Attempt to increase lambing frequency.

There are many pluses for expansion of the sheep industry. However, it will require a carefully guided effort through research and extension to channel the information that is needed to the producers with the funding that is available to sheep research and extension activities. North Dakota is one of the few states to maintain an active program in sheep research and extension, and North Dakota will be looked to for information if expansion of this industry is to become a reality.