Results of further experiment with nodule-disease of the intestines of sheep: "bare-lot" method of raising lambs

William Haddock Dalrymple
GRADE vs. "SCRUB."

Age, 129 days; weight, 43 lbs.  
Age, 155 days; weight, 32 lbs.

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"Bare-Lot" Method of Raising Lambs.

By W. H. Dalrymple, M. R. C. V. S.
Louisiana State Board of Agriculture and Immigration.

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RESULTS OF FURTHER EXPERIMENT WITH NODULE-DISEASE OF 
THE INTESTINES OF SHEEP.

"BARE LOT" METHOD OF RAISING LAMBS.

By W. H. DALRYMPLE.

For several seasons past, the Veterinary Department of this Station has been conducting experiments in connection with "nodule-disease of the intestines of sheep"—a parasitic ailment which seems to be quite general over the entire country—with the view of ascertaining, if possible, some practical method by which infection (a parasite: the Oesophagostoma columbianum) might be eliminated from pastures.

Experiments previously undertaken, and recorded in Bulletin No. 79 (Second Series), went to show that when sheep suffering from this disease were placed upon a, hitherto, clean pasture and allowed to remain on it for some time, the latter became contaminated, as was afterwards proved by the fact that clean lambs, when permitted to occupy this pasture, contracted the disease; while other lambs, born and raised under similar conditions, up to weaning, but not placed on the pasture, did not become affected; which was, in each instance, verified by post mortem examination. Also, that when the infected pasture was plowed up, and cropped for one season, infection was destroyed, as was later proved by placing on it other clean lambs, and which, on autopsy, showed no sign of nodules whatever.

We allude to these previous results, all of which have been fully recorded in the Bulletin above mentioned, as prefatory to those of the experiment to be given in these pages.

It was found that when endeavoring to raise clean lambs for the previous tests, we were doing so, notwithstanding the fact of their mothers being severely affected with nodule-disease. And while our object at the time was to obtain sound lambs to test the matter of pasture infection, it occurred to us that if some easy and practical method could be adopted by which lambs could be
raised, until weaned, along with their nodule-diseased mothers, and remain free, or practically so, from the parasite, it would be a considerable boon to those flockmasters whose breeding ewes were infested, and likely to afterwards transmit the disease to their progeny, through the medium of the pasture, under ordinary conditions.

Having shown by previous experiments that the parasite, in some form, evidently passes from the diseased ewe to the pasture, and is, subsequently, picked up by the lamb while grazing, we thought it feasible to presume that if no grazing should be provided, the lambs would escape infestation by the nodule-disease worm. Consequently, a "bare-lot" method suggested itself, and was adopted, and provision made for soiling (feeding cut green food in the lot) the sheep and lambs until the latter should be separated from their dams, when they could either be fed and fattened for the market in this way or placed upon a clean pasture.

The lot in which the experiment was conducted (see illustration) was prepared by hoeing, and the grass raked and removed, so as to obtain a bare earth surface and leave nothing on it that would induce the lambs to pick from the ground. The space occupied was eighty-four feet long by thirty-nine feet wide, and it was fenced round by wire netting, so as to protect the ewes and lambs from the possibility of being preyed upon by enemies, such as wandering dogs. The lot, in short, was made to represent, as nearly as possible, a bare space around the farmstead, which, probably, already existed, or which could, without much trouble, be made to meet the requirements, by plowing and harrowing, and enclosing by a fence. The size of such lot, or lots, to be according to the room required by the ewes and lambs.

The surface of the enclosure was kept reasonably free from grass. That is to say, a spear or two of grass might occasionally be seen here and there; but our object was to have the lot as clean as we might expect it to be kept by the flockmaster, even by what he might consider to be, the expenditure of a little extra effort; realizing, all through the test, that, should the results prove satisfactory, the method, even then, was only likely to be adopted if it came within the range of easy practicability. Anticipating
VIEW OF BARE-LOT.
this, then, and in order to give encouragement to those interested to give the bare-lot method a trial, in the event of its success, we endeavored to adapt our work, as nearly as we thought possible, to that which the sheepowner was likely to pursue.

The surface of the ground was made even, so as to avoid any rainwater standing in pools to become contaminated, and which might tend to produce infestation, through the lambs drinking from them. There was a slight declivity in one direction, which favored and hastened surface drainage.

A small shed of sufficient size was erected in one corner of the lot for shelter, in which was kept a light bed of sawdust.

The ewes were fed a medium quantity of concentrated food, such as oats and bran, crushed grains, etc., once a day, out of a wooden trough, mainly to stimulate milk-secretion, as we were anxious that the lambs should do well, especially at the start; and afterwards, when the lambs were able to eat, they, too, partook of the concentrated food along with their mothers.

A rack was provided, and soiling was practised all through the experiment; the green food being of different kinds, obtainable on the Station during the time. The general practice was to supply green food twice a day, and, in the interval, to have the rack replete with good grass hay.

Fresh water was always kept in quantity in a wooden trough, and the sheep had no other place at which to quench their thirst.

Around the rack, all the hay and green food which had been pulled out onto the ground, was raked up at night and removed from the lot.

In fact, all of the labor attaching to the experiment may be comprised in the following epitome:

Preparing and fencing a bare-lot; keeping the lot free of grass; feeding concentrates, or any short food, out of a trough; keeping the ground free from low places where rainwater might accumulate and remain; providing a constant supply of fresh water in a trough, or other suitable receptacle; feeding green food and hay out of a rack, and cleaning up and removing the refuse roughage from the ground around the rack, or other feeding convenience, once a day.
As a practical measure, the bare-lot method is adaptable, of course, more, if not entirely, to farm, rather than to range conditions; and we believe that there is no part of the work but what any sheep raiser would willingly undertake, provided he was interested in the production of lambs that were free, or practically free, from nodule-disease.

Six ewes, of common and mixed breeding, were purchased from a flock that was infested with the nodule-disease worm.

On February 4th, 1905, the sheep were placed in the bare-lot. February 5th, lamb No. 1 was born.

February 7th, another lamb came, but died the following day, probably through being injured. No number is given this lamb.

On March 3d, lamb No. 2 was born.

As we were anxious to secure at least six lambs for the experiment, and the remaining ewes seemed slow in giving birth, other three were purchased (somewhat younger animals), and were, on March 29th, placed in the lot with the rest.

March 30th, lamb No. 3 was born; March 31st, No. 4; April 3d, No. 5; and on April 8th, No. 6.

From the nine ewes we were able to obtain six lambs. Two of the ewes proved to be non-pregnant, and another lost its lamb, but all of them were allowed to remain in the lot to add to the infection.

The ewes being rather heavily fleeced and "burry," and in order to prevent any cockleburrs interfering with nursing, the sheep were shorn between April 10th and 29th.

On June 29th, all the lambs having, apparently, been weaned by their mothers, the latter were disposed of, and on being slaughtered, their intestines were found covered with nodules.

June 30th, lamb No. 5, which was observed to be ailing the previous day, was destroyed and examined, and found free from nodules. However, a considerable number of stomach worms (*Strongylus contortus*) were present in the fourth compartment of the stomach, which, in our opinion, largely accounted for its condition. The lamb was eighty-eight days old.

The presence of stomach worms was somewhat of a disappointment, as we were hopeful that the bare-lot method, in the
EWES AND LAMBS IN BARE-LOT.
condition in which we kept the enclosure, might prove successful in preventing infestation by these, and other intestinal parasites, as well as the nodule-disease worm.

As the lot, previous to placing these ewes on it, never had been occupied by sheep, it seems feasible to presume that the stomach worms must have been imported along with the ewes. And there seems no question that the presence of the stomach worms had a prejudicial effect on the condition of some of the lambs. In other words, if the lambs had had to contend only with the nodule-disease parasite, they would have shown a more-uniformly healthy condition.

On July 11th, lambs Nos. 1 and 2 were examined. No. 1 (a scrub male lamb), age 155 days, and weighing, alive, 32 pounds, showed no sign of nodules on the intestines, but some stomach worms were present in the abomasum (fourth stomach).

No. 2, a grade ewe lamb in good condition, 129 days old and weighing 43 pounds, showed two small “pinhead” nodules on the caecum (a portion of the large bowel) and some stomach worms in the fourth stomach.

On the same day, No. 6, the youngest lamb of the bunch, viz: ninety-three days old, was examined. Its intestines showed no sign of nodules, but harbored a tape worm (Taenia expansa) and numerous stomach worms were found in the fourth compartment of the stomach.

July 17th, No. 3, a male, was examined. This lamb weighed 42 pounds at 108 days old. Three “pinhead” nodules were found on the caecum; a tape worm in the small intestine; and numerous stomach worms in the abomasum.

No. 4, examined the same day, exhibited two “pinhead” nodules on the caecum, and stomach worms in the abomasum. This lamb weighed only 26 pounds live weight, at 107 days old. The term, “pinhead,” is not a specific one, but used simply to convey an idea of the size of the nodules.

It may be stated that all of the lambs, with the exception of No. 1 and No. 3, were grades, mostly from common ewes, probably by a Southdown ram. No. 1 was a “scrub,” while No. 3 was a pure Southdown. And, had it not been for the “handicap” imposed upon the lambs, by the presence of stomach worms, and
tapes, neither of which we had reckoned for in our experiment, the condition of the animals would, doubtless, have made a much better showing. Still, after all, the intruding parasites did not vitiate the work, which was mainly to test the possibility of raising lambs, until weaned, and in company with their diseased mothers, free, or practically so, from nodule-disease of the intestines; and, at the same time, with the minimum of trouble to the flockmaster, which we feel was accomplished in a fairly successful manner. The butcher who got the four larger lambs stated to the writer that Nos. 2 and 3 were the finest he had handled in many a day, and that the meat was the best he had ever tasted.

Being desirous of viewing the proposition from all practical standpoints, we put to ourselves the question: Would the bare-shot method, as likely to be carried out in practice by the sheep-owner, prove to be absolutely successful under all conditions? So far as the nodule-disease is concerned, we believe it would be practically so, in the case of lambs that were to be pushed and fattened for the early, or other markets.

But, helminthologists tells us, that the eggs of the nodule-worm are layed in the intestine of the sheep, and that the embryo worm, after being hatched, begins its work of penetrating into the bowel wall and producing the nodular condition. Or, in other words, reproduction seems to take place in the intestine of the same host, after an animal once becomes infested with the parasite, although, doubtless, those that have been picked up from off the ground by the previously clean animals, must have escaped with the bowel discharges of a former host.

As it would seem probable, then, from the experience of those who have made a careful study of the life-history and habits of this worm (Oesophagostoma columbianum), that auto-infestation does occur; and, if so, there would be the possibility of ewe lambs, kept for breeding purposes and placed on pasture, still further infesting themselves and contaminating the pasture, provided, of course, they were affected to the extent of even one or two nodules to begin with.

We refer to this as a possibility, although, from our own experience with six weanling lambs, only three of which showed
any nodules, and the greatest number found, being only three about the size of a pin's head, there can hardly be any question as to the great reduction in the source and amount of infection, as compared to what it is when lambs are raised along with their mothers on badly-infected grazing.

It should be mentioned, also, that, in our experiment, we depended entirely upon the bare-lot method to prevent infestation, and no medicinal agents, or drugs, of any kind, not even common salt, were used as vermiluges. Had we allowed the lambs free access to some good worm mixture, our results would, doubtless, have been much more satisfactory.

But in that case, it would have been difficult to know whether to attribute the good results to the method or to the mixture. Consequently, the method, alone, was depended upon. At the same time, we would recommend, in practice, that, in conjunction with the bare-lot method, a suitable vermifuge mixture, or even common salt, should always be supplied.

A useful study in comparisons may be seen by referring to the frontispiece, which is a good object lesson for the sheep raiser. This shows lambs Nos. 1 and 2; the one a "scrub," the other, a fairly good grade lamb; both having been raised under identically similar conditions.

No. 1 (the scrub) weighed, alive, only 32 pounds at 155 days old; while the grade lamb weighed 43 pounds at the age of only 129 days. This is surely evidence enough of the fact, that it pays to raise sheep of improved breeding.

From the results of our experiment, we believe we are justified in making the following deductions:

1. That, by the bare-lot method, it is possible to raise lambs, up to the period of weaning, and without separating them from their affected mothers, practically free from nodule-disease of the intestines.

2. That, in the absence of intestinal parasites, other than the nodule-disease worm, lambs, intended for feeding for the early, or other, markets, may be raised in this way, without their health being impaired, or their general condition affected by the disease.

3. That, in the case of ewe lambs to be kept for breeding
purposes, and which may have become only slightly infested, there is the possibility, owing to the life-history of the parasite, as given by helminthologists (those who make a special study of worms), of auto-infestation and subsequent infection of clean pastures on which the lambs may have been placed.

(4) That, although, the previous deduction as to such possibility, may be correct, there can hardly be any question as to the great reduction in the primary infestation by the bare-lot method, as compared to that brought about where the lambs are permitted to graze on pasture infected through the droppings of their diseased mothers.

(5) That, the method is so simple, and is so free from technicalities, that any flockmaster, who will take the trouble to observe ordinary care as to the few details, can obtain, at least, fair results from its adoption.

(6) That, with the supply of some good vermifuge mixture, to which the sheep can have free access at all times, in conjunction with the method, more satisfactory results might be looked for, than was even obtained in our experiment.

(7) That, when the lot becomes infected with other intestinal parasites, such as stomach and tape worms, etc., the method, alone, will not prevent infestation of the lambs by such parasites.

(8) That, the method is worthy of trial by flockmasters owning breeding ewes affected with nodule-disease of the intestines.