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CONTROL OF SHEEP DISEASES[1]

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INTRODUCTION

Control of sheep diseases is essentially a problem of prevention rather than of treatment. The prevention of livestock diseases is often more useful in minimizing losses than the rather uncertain procedure of treating those individuals that are obviously sick. Furthermore, a number of ailments can be controlled only by appropriate preventive measures, for no treatment is effective. The individual grade sheep has a rather nominal value which does not justify very much of a fee for a veterinarian's services. Sheep as a class of livestock do not have a very large margin of safety in their physical make-up and many times they do not respond satisfactorily to medical treatment. The owner often comments that the sick sheep usually dies.

Sheep respond to good care and management as satisfactorily as does any class of livestock and yet none will deteriorate more quickly from neglect. The flock is the unit, as with hogs and poultry, rather than the individual, from the standpoint of prevention of disease. The prevention of losses among sheep, therefore, for many conditions, is primarily a matter of management and sanitation rather than of medicine for an ailing sheep. This does not imply by any means, however, that the services of a competent veterinarian will not be needed at times to aid in minimizing sheep losses. Some diseases, for example, can only be recognized by a careful post mortem examination of an obviously sick sheep or one which has just died. The experience and advice of the veterinarian therefore will prove useful in many instances in helping to correct unsatisfactory conditions which would otherwise result in considerable loss. Scab, for example, requires the supervision of a veterinarian for its effective control.

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THE WINTER CARE OF EWES

Provision should be made for an opportunity for abundant exercise for the ewe flock prior to lambing time. Probably there is no other single factor that will contribute so much in obtaining a crop of good vigorous lambs as will ample exercise. On the other hand, when lambs are born weak, even though they are fully developed in size, and refuse to take any interest in life, it is then too late to correct matters. It is not enough merely to have a fair sized lot available in which the ewes are at liberty to move about for heavy ewes in advanced pregnancy are not inclined to exert themselves providing their feed is readily accessible. They may be permitted to range over the pasture or green wheat fields, or their forage may be hauled some little distance from the buildings so that the ewes are induced to take the necessary daily exercise. This does not imply that the bare prairie is likely to provide sufficient feed in itself.

EXERCISE

Ewes should be fed a sufficiently adequate ration along through the gestation period so that they gain in weight up to lambing time. Further information on proper feeding is available in Bulletin No. 287 —Feeding Range Lambs in Kansas, Agricultural Experiment Station, Manhattan, Kansas. There is little danger of ewes becoming too fat providing they are required to take abundant exercise. The fleece in winter often misleads an owner to assume that his ewes are in fair to good condition while in reality they are thin. Pregnancy disease is common in such ewes.

The death losses which occur among ewes for the main part in the last month of the gestation period and prior to lambing time are due to a rather characteristic condition known as pregnancy disease. A variety of names has been applied to this disease, but this term seems the more aptly descriptive of the condition. It is consequently more common in the winter months with early lambs for it is seldom encountered after the ewes are out on grass. The losses may vary from an occasional ewe to as high as one-fourth of the flock. It is, no doubt, the most serious condition encountered among ewes.

PREGANANCY DISEASE

It is not an infectious or contagious disease, although the presence of several cases simultaneously in a flock might suggest it. Most of the affected ewes are carrying twin lambs. It develops ordinarily in flocks which are inadequately fed, so that the ewe does not have a sufficient nutritional intake for herself and the developing lambs, and so the maternal mechanism is overloaded. Flocks which are fed on straw, corn fodder, prairie hay, leached dry drass, timothy hay or

sorghum fodder with perhaps little grain are likely to have trouble. Pregnancy disease seldom occurs when the ewes have alfalfa hay with enough grain to keep them gradually gaining in weight. There may be trouble, however, when well fed flocks are underexercised or when a good ration is changed to one of lesser quality or when they are shut in the shed on account of bad weather when they are accustomed to plenty of exercise.

There is seldom any difficulty in identifying pregnancy disease. The ewes lose appetite and become dull. They remain apart from the flock and are unaware of their surroundings. They blunder into objects and appear as though blind. They frequently lie with the head turned back on the shoulder. They are unable to rise and invariably die within a few days.

Little success can be expected from the treatment of ewes which are obviously sick. The changes of disease are then too extensive to be corrected by any medicine. The losses can in most instances be checked, however, by suitable changes in the feed. There is usually little further trouble in the well fed flock providing the ewes are obliged to travel half a mile for their daily feed. Exercise is extremely important. For the flocks which are thin, poor and on a starvation basis, it may be too late for complete success. Alfalfa hay should be substituted, if it is available, for the feed of more inferior quality. A pound to a pound and one-half of grain per day per ewe should likewise be provided. Beet molasses may be used to supplement feed of low nutritive value, but those ewes are likewise in need of protein when fed on the usual inadequate ration. One-half pound of cottonseed meal or of bran daily will help the deficiencies in sorghum grains. Prevention through an adequate feed intake combined with liberal exercise is the most effective solution of the problem.

ABORTION

Abortion in ewes is at times a source of considerable loss. The number of flocks involved in an area is rarely significant although the loss in the individual flock may be serious, for one-fourth of the ewes may lose their lambs. There is not only the loss of the lambs, but some of the ewes die from the accompanying infection, and the filthy discharge and the gaunt appearance of the aborting ewes present withal a disgusting sight. No return from such ewes except their wool can be expected for a year, and because many of them will be sterile, they probably should go to market.

The cause of the trouble does not involve the feed but rather an infection which probably has its source in other infected ewes either directly or indirectly. The causative or-

ganism is entirely distinct from the one responsible for Bang's disease in cattle. The problem must be handled from the standpoint of sanitation in the yards and sheds so that the likelihood of spread from the aborting ewes to those apparently normal is reduced to a mimimun. If the ewes which are about to abort can be separated from the flock before that process occurs, so much the better. It is important that those ewes which have aborted should be segregated from those which are still apparently normal. The dead lambs and soiled litter should be collected and destroyed. A clean supply of water should be available for a surface supply is readily contaminated and should not be accessible to the pregnant ewes.

THE HYGIENE OF SHELTER

Sheep with an abundant coat of wool will endure considerable inclement weather providing they are dry. They should appropriately, therefore, have some shelter from the cold winter rains. A wet fleece with exposure in cold weather may very well be followed by pneumonia. An open shed which gives protection from rain and north winds is more suitable than a closed building for sheep in winter. A closed barn may become entirely too damp unless suitable precautions are made for ventilation and losses from pneumonia may easily occur. Wet or damp sheds in which the ceiling is dripping with moisture favor the development of an eczematous condition of the skin with consequent loss of a considerable portion of the wool clip. The accumulation of manure and wet filth in sheds and yards serves as a source of trouble and a reservoir of infection for new born lambs. (See scours, navel ill, etc., in succeeding pages.)

DISEASES OF YOUNG LAMBS

SANITATION AT LAMBING

Sanitary management at lambing time includes many factors. Adequate lambing space and equipment should be planned before the lambs start to arrive. The pregnant ewes should be separated from the rest of the flock. The tags and long wool should be clipped from the udders. A shed or barn should be available, and the refuse and manure thoroughly cleaned out. If the building has a concrete floor, this and the lower walls can be readily disinfected with a hot lye solution (one pound can lye to twenty-five gallons hot water). If the floor is dirt, the lye solution may be used provided the weather is dry and the barn is allowed to dry out before use; otherwise, it may be advisable to scatter airslacked lime on the floor, and then bed with dry bedding.

Shortly after, or just before lambing it is advisable to put the ewe in a lambing pen. These pens are usually made by

using hurdles, and hinging or tying them together to make individual pens about four feet square, or larger for the larger ewes. Ewes with twins should have the larger pens. These pens should have a dry floor well bedded, and be protected from draft.

The ewes should be carefully watched because usually the exact breeding dates are unknown. Labor and delivery is usually preceded by a period of restlessness or excitement, easily recognized by the experienced shepherd. If the ewe can be penned without undue excitement at this period, that is well; however, after labor begins she should not be disturbed if normal delivery can be made. When the lamb is delivered the ewe and lamb may be penned. Some animal husbandmen find that it is a good plan to mark each ewe and her lamb or lambs with a number to correspond. This helps to identify the lambs and eventually in culling the ewes.

Lambs in normal position for delivery are presented with the two front feet lying on the floor of the vagina, with the head partially between and upon them. Usually ewes with lambs presented normally require very little if any assistance.

When the lamb is delivered, free breathing should be established, and it is a good plan to clip the navel cord, leaving one to two inches, and dip or paint this stump with tincture of iodine. The lamb should be made comfortable and have some of the ewe's milk within a short time after arrival. After all of the lambs have arrived, and are identified and owned by their mothers, the individual penning system may be gradually discarded. Early lambs are desirable as there is a lessened loss from stomach worms and they are the ones that are most profitable; consequently, lambs should be creep fed while running with the ewes so they will be ready for market on or before June 15.

SCOURS OR DYSENTERY IN LAMBS

Scours or dysentery is an infectious disease, usually of the newly born lambs within two or three days of age, although lambs up to two or three weeks of age may become infected. As indicated by the name, one of the main symptoms of the disease is shown by diarrhea and extreme exhaustion. The lamb lies down continuously, is depressed, and has no appetite. The feces may be tinged with blood, or of a yellowish white, brownish, or gray color. They may be semifluid and usually have a fetid odor. Three types of dysentery may appear: namely, the acute, subacute, and chronic type. With the acute type, lambs die quickly, some of them lasting only twelve to twenty-four hours, so very few, if any, symptoms are shown. Lambs suffering from the subacute or chronic types of the disease live longer, death or recovery usually taking place sometime during the first week. If re-

covery takes place, development is usually retarded.

The cause of lamb dysentery has stimulated considerable research, both in Montana and California, but as yet, although many organisms have been implicated, none have been definitely proven to be the specific cause of the disease. The disease is not a pasture problem but is associated with damp, filthy, wet sheds and pens.

Farm flocks in Kansas are relatively small, and as many farmers have not kept flocks until the past few years, the barns and pens are not badly contaminated. This is especially true where new flocks have lately been purchased, or on farms where only a few sheep are kept and they have almost unlimited range. With the increased and continuous use, more sanitary precautions will have to be exercised, so that the lambs are not unduly exposed at birth.

From what has been said it will be seen that lamb dysentery is largely a filth borne disease; that newly born lambs are most susceptible; that sick lambs should be isolated for at least three weeks, and those which die should be burned or buried under lime or crank case oil; that the ewe of a sick or dead lamb usually carries the infection on her teats and udder and should not be used for suckling other lambs; that when an outbreak occurs it can often be controlled by moving out all the pregnant ewes to new quarters. Thus far medicinal treatment for sick lambs has not been very satisfactory, especially in outbreaks of acute sickness. After an outbreak has occurred, before the next lambing season, the pens and sheds should be thoroughly cleaned and disinfected. If possible, a complete change of yards and barns is advisable.

BLACKLEG

Blackleg, an infectious disease which is occasionally seen in Kansas lamb flocks, seems to occur more often where lambs and cattle occupy the same corrals. The cause of blackleg is a specific infectious organism which usually gains entrance to the body of infected animals through shearing wounds, or by way of the digestive tract. The organism causes the same kind of lesions in lambs and sheep that it does in cattle, but when once infected lambs usually die more quickly. Usually lambs and sheep appear to have more resistance to blackleg than cattle, but occasionally it does occur.

Prevention and control consist first in preventing injuries, cuts and sores from occurring, or in thoroughly cleaning such wounds if they occur. A good disinfectant such as tincture of iodine should be available for use in such cases. Pens where death from blackleg has occurred should be avoided, or if this cannot be done, the lambs should be vaccinated with the same blackleg products that are used on cattle. These products can be obtained from the local veterinarian.

CLEANLINESS IN DOCKING AND CASTRATING

Lambs should be docked and castrated, as it usually assures better health for the lambs and a better market for the producer. In docking and castrating, regardless of the particular methods used, cleanliness is of prime importance. Enough help should be available so the operator handles only the instruments used and the parts to be operated upon. The hands of the operator and his instruments should be washed in good soap and warm water before starting and frequently between operations, then disinfected in a 1 percent creolin or other suitable solution. If a disinfectant is used on the scrotum, it should not be of an oily or greasy type as this collects dust and dirt and may do more harm than good. Immediately after castration or docking the lambs should go into a clean pasture or lot so the open wounds will not become contaminated. If they stay in the same lots, fresh bedding should be put down so the dock and scrotum will have time to scab over before contacting filthy floors. This procedure will help materially in preventing malignant oedema, tetanus, so called stiff lamb disease and polyarthritis.

MALIGNANT OEDEMA

This is an acute infectious disease, caused by a specific organism, which usually gains entrance to the body through wounds such as docking or castrating. The organism is widely distributed and many premises may be contaminated. When infection takes place, it causes rapid and profuse swelling of the affected parts. The swelling is usually firm and will pit on pressure. Sometimes a slight crackling sensation may be felt, which may confuse this disease with blackleg. If this disease is suspected, a veterinarian should be called so that a definite diagnosis may be established and the proper control measures taken.

Prevention consists in using the proper precautions with newly docked or castrated lambs as previously outlined under castrating and docking, applying a good disinfectant, such as tincture of iodine to all wounds, changing the flock to new quarters, or thoroughly cleaning and freshly bedding their old quarters.

POLYARTHRITIS STIFF LAMB DISEASE AND NAVEL ILL

These are a group of diseases which may affect young lambs. These diseases, although different, usually have a similar origin of infection, because they are usually filth borne. Polyarthritis and stiff lamb disease are sometimes classed as the same disease because they cause inflammation of the joints. Navel ill is so named because the source of infection comes through

the navel. Usually when these troubles appear the young lambs are affected, but occasionally the condition carries over until the lambs are one to two months old without causing symptoms to appear. Apparently some time is required for a small amount of infection to become organized or troublesome.

Usually the sources of the infections are through the navel cord, the castration wounds, or the dock wounds. Therefore, in preventing these troubles it is imperative that new born lambs should have their navel cords dipped in tincture of iodine or two percent formalin, that newly docked and castrated lambs should be placed on clean pasture until their wounds are healed, and that sanitary quarters for the lambs should be provided if this cannot be done. This is especially essential since lambs once badly affected with any of these infections usually die.

TETANUS (LOCK JAW)

This is a specific infectious disease that has been observed in Kansas lamb flocks. Occasionally ten or fifteen lambs of a lot may show infection at the same time. The disease is caused by a specific organism *(Clostridium tetani)* which is almost always present around barn yards, especially those in which manure has been allowed to accumulate. The organisms usually gain entrance to the lamb's body through wounds. These wounds may be from ear tagging, shearing, docking, or castrating, or infection may occur through the navel. Tetanus germs may even be carried on the hand and instruments of operators if these are not carefully washed and disinfected.

After the tetanus organisms have become established at a point of infection, it requires several days to a week before the lamb shows symptoms. These are usually manifested in first, a nervousness, and stiffness in gait; later, the muscular contractions become spasmodic and continuous, the lamb goes down with legs stretched stiff, and head usually extended or drawn backward. Handling increases the intensity of the muscular spasm, and causes the lamb to expose the white of the eye. Usually the jaws are set, due to muscular contraction. Death may occur during a spasm as the result of exhaustion. After the lamb is down there is no cure. A veterinarian should be called to definitely diagnose the case and establish prevention measures for the remainder of the flock.

Since tetanus is one of the diseases which frequently follows docking, castration and shearing, the precautionary measures previously mentioned under those operations are the minimum requirements in preventing this disease. The

saving of a few lambs will more than pay for carrying out precautionary measures. Although lambs could be immunized to tetanus by giving them protective vaccination, their economic value would have to warrant such treatment. Probably better returns would be obtained by placing more emphasis on clean barns and corrals.

SORE EYES

There are a number of factors which may cause disorders of the eyes. The trouble may be mechanical and infectious, or infectious and contagious. Mechanical injuries may occur such as those arising from contact with chaff, dust, seeds, weeds or pollen, or from irritation from inward rolling of the eyelashes and eyelid. When foreign particles are caught in the eye, these can often be wiped out with a moist piece of cotton. If removed within a reasonable time, no permanent damage will be done. Occasionally lambs have inversion or turning in of the eyelids. The lashes and hair of the eyelids irritate the eyeballs, and will often cause blindness if the condition is not rectified. One or both eyes on a lamb may be affected. The condition can be handled by pinching up the loose skin of the lid until the lid is pulled straight and flat against the eyeball, then tying a heavy thread tightly around this surplus skin. If properly done, this will hold the eyelid in place until the extra skin sloughs off and scab formation takes place, which continues to hold the eyelid in place. All injured eyes can be aided by irrigating them with a saturated solution of boric acid two or three times daily.

Sore eyes may be caused by an infectious agent which is frequently transmitted by contact. So called "pink eye" is of this nature. This type of sore eye can be readily transmitted from lamb to lamb in the eye discharges. A whole flock may become infected in the course of ten days to two weeks, as the incubation period is usually from two to five days.

It has been demonstrated that the infectious agent may be conveyed to lambs while grazing from forage tall enough to contact their eyes, this forage having been previously grazed upon by infected sheep or lambs.

At least three different stages of this disease have been described. The early stage of the infection is shown by excessive watering of the eyes. This eye fluid wets the eyelashes and streaks down over the face. Bright sunlight is irritating. The eye membranes are red and inflamed, indicated by the engorged blood vessels. The second stage which follows or sometimes overlaps the first stage shows that the eyeball is becoming affected, the membranes of the eye becoming badly inflamed, the eyeball first appearing smoky and finally opaque, and eventually sight may be completely

lost. The animal may remain in this stage for one or two weeks, and then recovery usually begins to take place, or the third stage develops. If the third stage develops, it usually appears as an ulcer on the eyeball, and this may persist for ten days or more, either ending in rupture of the eyeball with blindness, or the formation of a spot in the eye but practical recovery of sight.

Prevention and control consist first in keeping known infected animals away from the flock. Vaccination with keratitis bacterin may be recommended in some cases where exposure is imminent, but it is not 100 percent successful. If the disease appears in a few lambs, these should be isolated, and if treated carefully an outbreak in the rest of the flock may be avoided. In affected lambs the disease will run a rather definite course and ultimately most of the lambs will recover, but growth and development is retarded and some of this can be prevented if the lambs are managed properly and treatment is given. Several different treatments may be used which are helpful. Naturally the animals should be protected from strong sunlight, winds, dust, and tall vegetation covered with pollen or weed seeds. A two and one-half percent zinc sulphate solution has been found to be beneficial when instilled into the eyes. This solution can usually be obtained from your veterinarian, and should be used four or five times, at intervals of two or three days until recovery takes place.

Pink eye or keratitis is not transmitted from cattle to sheep or from sheep to cattle. This is apparently an infection peculiar to the species. It is a good plan to dispose of those sheep that fail to clear up after two to three months. Such animals might serve to retain the infection in the flock.

SORE MOUTH, DOBY MOUTH, OR POX

Pox is a contagious disease of sheep and goats due to a virus. Lambs are most susceptible to it. The disease usually affects the lips and nostrils, and later the teats and udder but may extend to the inside of the mouth, the thighs, and under the tail. During the onset these parts become reddened, followed by the appearance of small blisters and small pustules. These soon rupture to form scabs. In about twenty-four days the scabs drop off leaving no scars. Occasionally all of these symptoms become aggravated by rubbing and scratching.

Affected animals usually recover, even when untreated, in less than a month. However, during this time lambs fall off in condition, and some deaths may take place because of the severe secondary infections that result from scratching and rubbing.

It is best in order to control the trouble to separate the

healthy from affected animals, and to wash the diseased areas two or three times a week with five per cent water solution of permanganate of potash.

In those flocks where the disease shows a tendency to make its appearance annually it is recommended that the veterinarian be asked to immunize lambs and kids when they are a few days old with the ovine-ecthyma vaccine.

PASTURE PROBLEMS

STOMACH BLOAT

Stomach bloat is the accumulation of gas in the rumen. The consumption of certain roughages such as alfalfa, the clovers, and some other green feeds, especially when these are pastured, may result in bloating. These feeds are most dangerous when animals are not accustomed to them, and when they are wet with dew, frost or rain, and where they are wilted because of having undergone a sweating process. Occasionally the consumption of cured roughages and grain is followed by bloating.

The bloating is most pronounced in the region of the upper left flank, though because of a heavy fleece it frequently is not observed until it is in an advanced stage. In such a stage the accumulation of gas may be so intensive that the rumen presses forward against the lungs, compressing the latter so seriously as to cause quick death from suffocation.

In a consideration of the handling of this problem its prevention must be stressed. Care in the feeding of bloating roughages controls most of the trouble. Fields of alfalfa, clover and other legumes should not be pastured when wet, nor should the cut wilted material be used. Neither should sudden changes to unaccustomed green roughages be practiced; first fill the animal up on its accustomed feed and then some of the new feed may be permitted; thus from day to day the change may gradually be made.

Curative treatment is not nearly so satisfactory as the prevention of bloating. In cattle it is customary to "tap" the animal by means of a sharp hollow instrument — the two parts of the instrument are known as a canula and trocar — passed through the upper left abdominal wall into the rumen, but in sheep because of the wool coating such an operation usually terminates in a malodorous non-healing wound. Furthermore the gas is almost always in the form of millions of little bubbles mixed with the paunch contents, and this frothy mixture is impossible to evacuate through the trocar. Veterinarians frequently attempt to accomplish the same result — though without its harmful effects — by means of a stomach tube passed by way of the mouth and gullet.

When a bloated animal is observed it may be advisable to

administer some substance that will control the further fermentation in the paunch. Such a common household agent as one or two teaspoonfuls of turpentine mixed with six ounces of raw linseed oil is very effective. All of this is to be administered at one dose, and kneaded through the paunch contents by slow boring movements with the closed fist in the left flank. Tying a stick in the animal's mouth so that it is placed in a manner comparable to a bridle bit stimulates tongue movements with resulting belching of gas.

In the drenching of sheep be very careful to give the medicine very slowly, permit the animal to lower its head frequently and always lower it at the first sign of strangling, and never raise the animal's mouth to a higher level than its eyes while the medicine is being administered. A disregard of these simple precautions may cause the medicine to flow into the lungs so that lung fever and death are likely to follow.

BIG HEAD IN SHEEP

Big head, a peculiar ailment, affects lambs in particular, though older sheep are occasionally affected. The first noticeable symptoms of the disease are that the animal throws its head up in a peculiar jerking manner and tries to rub or scratch it. The animal sometimes runs into other sheep and objects in its path because its eyesight is affected. In a very short time the ears become of a reddish color and greatly enlarged. At the same time the face becomes swollen, and little drops of serum of a light yellow color make their appearance on the swollen parts. The animal is always feverish. The foregoing symptoms may develop into severe forms of the disease in from thirty minutes to one hour's time. In very severe cases the tongue may become swollen so that the animal will struggle, become exhausted, and soon die. The symptoms are not so intense in all cases, so that occasionally there are spontaneous recoveries.

This disease has been observed for many years in Utah and the surrounding states, causing losses in those sections. It is spoken of by sheep men as "Big Head." It has also been observed in the plains states.

The cause of the condition is not known, though it seems that climatic conditions and the consumption of certain sensitizing plants have something to do with its appearance. It is quite readily handled if affected sheep are carried to a shady place immediately after they show the first symptoms. **Absolute rest,** protection from the direct sunlight, and anointing the swollen parts with olive oil are followed by recovery in from eight to twenty hours, the animal appearing as well as ever.

Foot rot is an ailment affecting the tissues of the foot. Because of it affected animals lose weight, and the wool clip is reduced. The disease is caused by germs — particularly the germs of necrosis — that gain entrance through small scratches, especially when the animal is confined in poorly drained corrals or pastures that contain many stagnant pools.

FOOT ROT

Usually the first noticeable symptom is lameness. Depending upon the stage of the condition the skin between the claws and just beneath the dew claws may be reddened, or ulceration may have developed. Frequently the horn of the hoofs is undermined by the infection. The feet become so sore that the animal when grazing attempts to walk on its knees. There is a foul odor associated with the disease.

Prevention and control of the trouble consists in keeping the animals out of dirty low wet areas. Corrals especially should be on the higher, well drained places. As soon as the disease is observed in a flock those members of it that are still free from it are to be moved to higher, clean places. Before doing this compel the animals to walk through a shallow foot bath consisting of a one-half per cent water solution of blue vitriol. This will destroy the superficial infection.

Badly affected animals should have all the diseased tissues surgically removed. If the horn of the hoofs is distorted it should be trimmed as nearly as possible to a normal shape, and all horn that is undermined should be removed. Pure tincture of iodine may be applied, or a good antiseptic powder may be dusted on the wound and bandaged in position. Taken as a whole, the curative treatment must be varied depending upon the nature and extent of the diseased process, and therefore most owners depend upon their local graduate veterinarian for this service.

THE PREVENTION OF LOSSES IN THE FEEDLOT

Shipping fever, stockyards pneumonia, and croupous pneumonia, are terms used synonymously to describe a diseased condition which develops among livestock that have been recently shipped. The disease or malady occasionally develops among native lambs that have not been shipped but to a lesser degree. Occasionally hemorrhagic septicemia or shipping fever develops among native stock that have not been in transit. In most of these cases the cause can be attributed to changes and irregularities in watering and feeding, or to damp, cold sheds or barns.

HEMORRHAGIC SEPTICEMIA

The state of Kansas is traversed by numerous railroads and highways. Sheep shipped from distant points may be placed in local stockyards where it is a simple matter to drive them but a short distance to their destination. Hemorrhagic

septicemia or shipping fever is not a serious problem in shipments from the producer to the central livestock markets for immediate slaughter because this disease or malady does not have time to develop.

The incidence of hemorrhagic septicemia or shipping fever is greatest following distant rail or truck transportation during wet, cold weather. This is particularly true during changeable fall and spring weather. The length of rail transportation during wet, cold weather apparently has some correlation with the severity of the disease as it appears among lambs on the farm. The disease usually develops within one to ten days after sheep have reached their destination. Affected animals are first noticed to lose their appetites and to develop a discharge from the nose and eyes, occasional coughing and a rise in temperature. If the disease continues to progress, pneumonia will usually terminate in death of the animal.

Hemorrhagic septicemia is difficult to control since lambs must necessarily be subjected to severe weather, and changes and irregularities in feeding and watering from the point of origin. However, careful attention to feeding, watering and driving has a tendency to minimize losses when such measures are resorted to. Purchasers should select the best conditioned, thriftiest lambs, avoid "hard driving," sudden chilling, "over-eating," "over-loading" on cold water, and in addition should avoid irregularities in feeding and watering. When possible the owner should time the arrival of his sheep so that proper facilities will be ready when they reach their destination.

Since hemorrhagic septicemia or shipping fever is primarily an exposure disease, prevention is essential, because sheep do not respond readily to medication. Avoid damp, poorly ventilated quarters since this has a tendency to favor the spread of respiratory disorders in sheep.

It is a good plan to isolate any sheep that are visibly sick. This will tend to prohibit the spread of infection. Livestock owners should keep in mind that hardships encountered in transportation tend to lower the vitality of animals and make them more susceptible to disease. This is particularly true with sheep.

It is a good plan to ask the assistance of a veterinarian in determining the cause of disease in livestock, as an early diagnosis is necessary in handling diseases of livestock.

OVEREATING

Many of the losses of lambs in the feed lots are associated with the overeating of grain. The fattening of lambs is an abrupt change in their nutrition, for they develop on grass with the milk of the ewes, so they rarely have had any grain prior to their arrival in the feed lots. Trouble is sometimes encountered

when hungry lambs are unloaded and turned on stubble fields. They sometimes secure too much grain and stiff foundered lambs are the result.

Serious losses are often encountered when grain is fed too liberally at the start or when the quantity is increased too rapidly. The lambs have not yet become accustomed to the ration. The object in feeding lambs is to secure a prime fat individual weighing about 90 pounds and in order to secure maximum gains in the minimum time it is necessary to feed rather liberally on starchy grains. The difference in the amount of grain between a fattening ration and one which will endanger the lambs is often a rather narrow one. Of the heavy grains, corn is usually the more troublesome. The losses may attain a twenty per cent mortality, and that jeopardizes the profits. It is usually the larger, fatter, greedier lambs rather than the lighter individuals which die under these conditions.

The lambs which die seldom show much in the way of characteristic symptoms. Many are found dead in the mornings, although they may have appeared normal on the previous day. Some walk in circles, stagger, the head may be turned to one side, and other signs of intoxication may be in evidence. Stiffness, diarrhea and loss of appetite are further evidences of digestive derangement. In few instances is an infectious disease involved after the lambs have recovered from shipment, although the magnitude of the losses sometimes suggests that possibility.

These losses in the feed lot may be minimized by proper management of the feeding operations. It is a question of securing a balance between the maximum quantity of grain which the lambs can handle with a minimum death loss. The losses can usually be stopped by reducing the amount of grain which is fed. Sometimes the feeder neglects to reduce the feed when a portion of the heavier lambs go to market. There should be plenty of trough space so that all of the lambs may eat at one time. An increase in the bulk of the ration through the use of more hay, fodder, oats, or bran to replace part of the corn will help in reducing the losses.

THE CONTROL OF EXTERNAL PARASITES

BLOW FLIES AND SCREWWORMS

Usually it is impossible for any one but an expert to distinguish between the true blow fly or flesh fly and the screw worm after a wound or area of the body has become infested with maggots. As a matter of fact, very commonly both types of flies are found in the same area. Usually the true screw worm causes more actual tissue damage than the other types of maggotsbut this is not always the case. Any type of bloody discharge or evil smelling area on the animal's

body from any cause will attract flies. These flies will lay eggs, and if conditions are right the eggs will hatch and larvae or maggots will develop in the involved area. Control of these infestations can be best carried out by careful handling of the sheep during fly time, making sure that their wool does not become soiled by excreta, and that any injured areas on their bodies are covered with a fly repellent. As a rule only weakened animals are infested with maggots in sufficient quantities to cause serious damage. Therefore, keeping the flock free of internal parasites and keeping them on an adequate diet is an important factor in the control of screw worms. After the maggots have become established, the procedure to be followed depends on the type of infection. Very severe cases should always be treated by a veterinarian and his advice should be followed. Mild cases can be treated by the farmer himself by using the benzol-pine tar method. This involves the application of a cotton plug soaked with benzol to the infected area and covering the plug and the surrounding tissues with pine oil tar. The plug should be so adjusted that it will roll out after several hours and the animal should be examined within at least two days and the repellent reapplied.

Burning, burying or shipping out carcasses of dead animals to rendering plants will result in a small blow fly hatch in any given area, hence will reduce the chances of sheep or other livestock becoming seriously bothered by these maggots.

SHEEP SCAB

Sheep scab is caused by the tiny scab mite. It is spread by diseased sheep alone, and by stock cars, corrals, etc., that have been used to handle scabby animals, so that its presence in a community is a menace to every flock in that area. There is no condition which will cause a flock to go to pieces more rapidly than scab. It strikes without warning and spreads like wildfire. Because of this, at the first suspicion of scab the flock owner should get expert veterinary assistance at once and see that the proper livestock sanitary officials are notified so that the spread of the disease can be stopped.

Scab can be diagnosed with certainty only after the mite causing the condition is actually demonstrated. The signs of scab are symptoms of an intense itching exhibited by the sheep, loss of their wool, and formation of scabby areas both under the wool and in the denuded spots.

The disease can be controlled by various agents, the most common of which is lime and sulphur dip. The condition can be checked if proper methods are used, and if it is observed early, not much loss will be suffered by the flock.

Ticks, lice and sometimes biting flies can cause excessive restlessness of sheep and loss of blood, all of which results in a markedly poor condition if these pests are allowed to proceed too far. Ticks and lice may be easily controlled by dipping in coal tar creosote or nicotine dips. Dipping for ticks must be repeated in 24-28 days. Only approved commercial preparations should be used, and the directions on the labels must be closely followed. If flies are causing serious annoyance to the sheep, a shed to which they can run if the flies become numerous will prevent losses.

TICKS, LICE BITING FLIES

INTERNAL PARASITES OF SHEEP

In Kansas only some types of internal parasites are apt: to cause trouble in farm flocks or in feeder lambs. In order of importance they are stomach worms, lungworms, nodular worms and tapeworms. From the standpoint of the sheep-raiser, the problem of the internal parasites of sheep has two aspects. (1) What to do if parasites are already causing losses in a flock. (2) How to prevent such losses.

LUNG WORMS. NODULAR WORMS. ETC.

The diagnosis of the diseases of sheep is a difficult task and requires training and experience such as only a graduate veterinarian is equipped to give. The wise flock owner calls his veterinarian the instant any of his sheep begin to show signs of illness. Sheep die readily and ofttimes if the correct cause of the trouble is ascertained excessive losses will be prevented. It is important, therefore, to determine definitely whether parasites are responsible for loss of condition or deaths in a flock of sheep. Once internal parasites have reached such proportions in a flock as to cause disease, expert assistance on the spot is the best way to clear up the trouble. However, there are certain measures which may prove helpful to those unable to summon such help.

First: If at all possible remove the sheep to clean ground. Sometimes a pasture will have a low spot or pond which is the chief source of contamination of the sheep. In such a case fencing off of this area may be all that is required.

Second: Immediately provide the sheep with the best ration that can be afforded. At the Kansas Agricultural Experiment Station adult sheep have actually been caused to discharge most of their worms by taking them from a pasture and feeding them good grade alfalfa hay and a little corn.

Third: Treat the whole flock. Not too much should be expected from a treatment for worms particularly if the two first measures are not carried out. The best treatment will sometimes fail to rid the animal of parasites. It should be

remembered that all worm remedies are poisons which are much more liable to kill a weak than a strong animal.

There is no satisfactory treatment for lungworms and nodular worms. Losses can be decreased and even stopped if the very best care and ration are provided for the sheep. No drug is known which has proved adequate in the treatment of lungworm disease in sheep.

The newly developed drug phenothiazine is effective in the removal of certain adult nodular worms from the intestines. Most nodular disease observed in Kansas is of the chronic form, which is due to the nodules formed in the intestinal wall by the larvae. These nodules cannot be removed, and since they are the cause of the trouble removal of the adult worms is merely a control measure and does little toward stopping the symptoms of the disease.

For stomach worm diseases in sheep a 1.7 per cent solution of blue stone (copper sulfate) is recommended. This is made by dissolving one ounce of the blue crystals of copper sulfate in three pints of water. Adult sheep should receive two ounces of this solution. Sheep from six to twelve months of age should receive one ounce, and lambs under six months of age should receive one-half to three-fourths of an ounce depending upon 'their size. In case tapeworms are also infecting the flock add one-half ounce of Black Leaf 40 to each three pints of the 1.7 per cent copper sulfate solution, the dosage remaining the same. Other drugs can be recommended for stomach worm disease in sheep, but they are safely and effectively administered only by a veterinarian.

The following recommendations will help prevent excessive losses from the internal parasites of sheep.

1. Treat all new sheep brought onto the farm for internal parasites.
2. Treat farm flocks regularly at 21-30 day intervals during the warm months with copper sulfate solution.
3. Observe proper pasture management methods.
4. Keep the sheep supplied with an adequate ration at all times.

GRUB IN THE HEAD

This condition is due to the larva of the sheep bot fly which lives in the nasal cavity and sinuses in the head of the sheep. It is not often that it causes severe damage in flocks in Kansas, but it is always wise to start preventive measures if the sheep show signs of being pursued by appreciable numbers of these flies. When pursued by the flies the sheep tend to mill around and try to protect their noses by holding them close to the ground, and by stamping and raising a dust cloud. If the owner observes the sheep acting in this manner it is

a good plan to bore a series of two inch auger holes in a log and fill the bottom of the cavities with salt. Then around the edges of the holes some sticky fly repellent such as pine tar can be smeared. When the sheep attempt to get the salt from this log they will smear their noses with the fly repellent and thus prevent themselves from becoming heavily infected with the grub. If a flock is already heavily infected and requires treatment for the condition, it would be best to procure the services and advice of a veterinarian.