

Sheep Scab and Its Control

BY A. W. MILLER ¹

SCAB, which affects the skin and is caused by mange mites, can be bad enough on any animal. It is especially serious in the case of sheep because it directly damages the wool; hence the strict Federal quarantines long ago clamped on infected areas. These, and official dipping operations, have been very effective, and sheep scab is now mostly found in farming, not range, areas. Here is what you should do if scab occurs in your flock.

SHEEP SCAB, or scabies, has been known for many centuries; in fact, it is referred to in Leviticus 22:22, which forbids the use of scabbed sheep in sacrifices.

A half century ago the disease was the greatest draw-back to the sheep industry in the Western States, and it caused heavy losses to feeders in the Corn Belt States also. In fact, sheep scabies was so widespread as to deter many ranchers from engaging in the sheep business, and farmers refused to buy undipped range sheep for feeding purposes. So prevalent was the disease that in 1896 England prohibited the importation of live sheep from the United States.

The parasitic mites that cause scab in sheep are of four species—psoroptic, sarcoptic, chorioptic, and demodectic. Each kind of mite has distinctive habits, with the result that the nature and location of the lesions, or tissue injuries, are more or less characteristic. The psoroptic mites live on the surface of the skin, usually on the withers, back, sides, and rump. The sarcoptic mites burrow into the skin, usually on the head and face or other parts where there is little or no wool. The chorioptic mites live on the surface of the skin, and the lesions they cause are usually found on the legs. The demodectic mites, the smallest in the group, are found in the hair follicles and the glands of the skin, where they cause pimples or nodules.

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PSOROPTIC, COMMON, OR BODY SCAB

The form of sheep scabies of the greatest economic importance to the sheep industry in the United States is the psoroptic, or common, scab. A highly contagious skin disease readily transmitted from sheep to sheep, it usually spreads rapidly after it is introduced into a flock. The irritation and other effects of the disease make the animals unthrifty and cause loss of weight, a decrease in wool production, and in some instances the death of a large number of affected animals, especially where weather conditions are severe and adequate

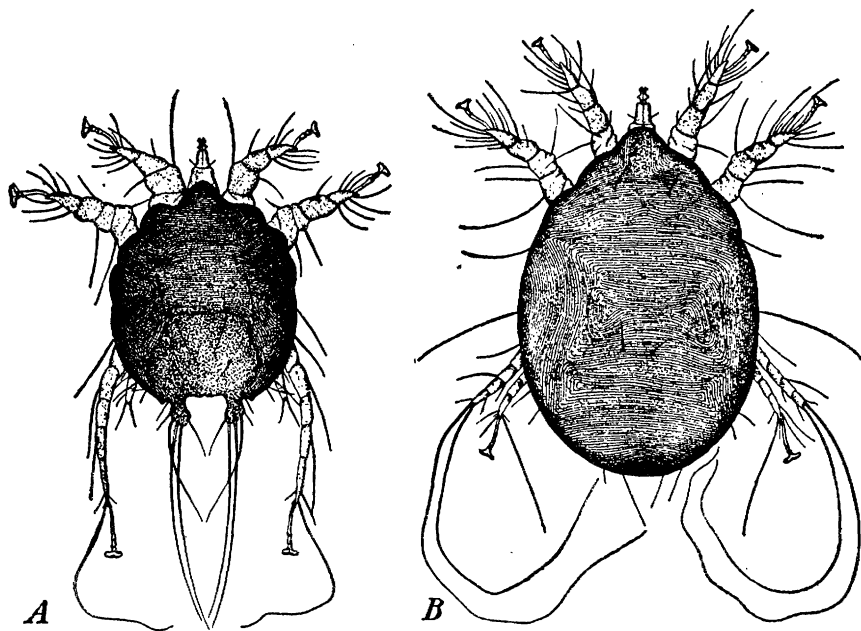


FIGURE 1.—The psoroptic mites that cause common sheep scab, viewed from above: A, Male; B, female. Greatly enlarged.

feed is not available. This form of the disease, however, is rather easily cured by appropriate treatment.

The mites (*Psoroptes equi* var. *ovis*) that cause common scab are white or yellowish and visible to the unaided eye (fig. 1, A and B). Their entire life cycle is passed on the body of the host. Each female may deposit 15 to 24 eggs, which usually hatch after 4 to 7 days' incubation. The young mites reach maturity and mate, and females deposit eggs within 10 to 12 days after hatching. These stages in the life history have an important bearing on the interval which should elapse between treatments.

The mites of common, or body, scab prick the skin of the animal to obtain food and probably introduce a poisonous saliva into the wound by this action. As the mites multiply and more wounds are made in the skin, there is itching, inflammation, and exudation of serum.

This serum, mixed with particles of dirt and other material, soon hardens and forms scabs. At first only a small pimple can be seen, but as the mites multiply they seek the healthier parts around the edges of the diseased area, and the lesion becomes larger. The affected areas of the skin become hardened and thickened, as may be observed by pinching up a portion and comparing it with the surrounding healthy skin. Infected sheep become restless, scratch themselves, and rub against fences and other members of the flock. The itching becomes more intense when the sheep are warm.

The wool is disturbed; at first slender tags come loose, then the fleece becomes matted, and the sheep pulls out pieces with its mouth. As the disease progresses larger areas become denuded (fig. 2) until in the advanced stages the skin becomes parchmentlike and greatly thickened and furrowed, and in some instances bleeding occurs in the cracks.

DIAGNOSIS

A definite diagnosis can be made only by demonstrating the presence of the mite that causes common sheep scab. In some instances it is possible to detect the mite in the wool or on the skin of the animal, but the best method is to take scrapings from a recently infected area. When the mites are producing active irritation the surface of the skin in the immediate vicinity of the lesion is greasy and appears bright and glistening or white and glossy. If the lesion is dull and dry it indicates that the mites are inactive at that point and that they will be difficult to find. This condition is usually found in the center of a scabby patch of comparatively long standing. The white glossy appearance is seen in areas of recent infestation or on the outer edges of old lesions, where mites are usually present in large numbers. Scrapings should be taken from such areas.

When the weather is cold the mites are not very active and are difficult to see. If the material taken from an infected area is warmed to about the temperature of the body and placed on a dark background, the mites become more active and can be more readily seen as they move about. A low-power hand lens is a great aid in demonstrating the presence of the mites.

TRANSMISSIBILITY

As already noted, common sheep scab is exceedingly contagious among sheep, but it is not transmissible to other animals except goats. Infected sheep are practically the only source from which sheep scab spreads. Experiments show that clean sheep seldom contract scab from so-called infectious premises. As a precautionary measure, however, such premises should not be used for clean sheep for 30 days after they have been occupied by scabby sheep. Freshly dipped sheep do not become infected from infectious premises, and flocks may safely be held on such premises between the first and second dippings. It is a good sanitary practice, however, to avoid old bed grounds, and small enclosures that have been occupied by scabby sheep should be thoroughly cleaned and disinfected. Sheep scab is trans-

missible at any season of the year, though during hot, dry weather it often remains dormant, seeming to have been cured. With the advent of cold, rainy weather, however, it again manifests itself.

TREATMENT

Contrary to the previous opinion that internal medication with sulfur or other medicinal agents would cure the disease, the only effective treatment for common scab is the external application of some medicinal agent that will kill the scab mites. This is best accomplished by dipping, but when dipping is impracticable because of cold weather or for any other reason, isolation of the visibly affected animals and hand dressing of the scabs are advisable. Hand dressing consists in soaking the affected parts with warm dip. In dipping flocks in which the disease is in the advanced stage, animals with hard scabs should be separated from the others just prior to dipping, the scabs soaked with warm dip, and the crusts broken up by rubbing with a stiff brush or stick.

Two dippings are necessary to cure common scab. The first dipping



FIGURE 2.—Stages in the development of sheep scab. A, First stage of scab, showing the wool on the shoulder disturbed by biting and scratching; B, first break in the fleece; C, an advanced case of sheep scab.

kills the mites but does not destroy all the eggs. The unkilld eggs hatch and form a new generation of mites, which must be destroyed by a second dipping before they have had time to lay eggs. The proper interval between the first and second dippings is 10 to 12 days, but in an emergency it may be extended to a maximum of 14 days.

Many medicinal agents have been used for dips. Some have been found to be useless; others have given satisfactory results in some instances but at other times failed to effect a cure. Workers engaged in sheep scabies eradication realized that a method must be found that would make it possible to maintain dips at a uniform strength throughout the entire dipping operation. After years of experimentation, tests for keeping lime-and-sulfur and nicotine dips uniform were developed. Under existing regulations of the Department of Agriculture, no dip can be used in official dipping of sheep for scabies unless the strength of the bath prepared from it can be satisfactorily determined in the field by a practical, portable testing outfit and unless dipping in a bath of definite strength under actual field conditions will effectually eradicate scabies infection without injury to the animals.

The only dips now permitted in official dipping are those made from lime-sulfur or nicotine. The liquid should be used at a temperature of 95° to 105° F. and must at all times be maintained at a strength of not less than 2 percent of "sulfide sulfur," if it is a lime-sulfur dip, and at not less than 0.05 percent of nicotine, if it is a nicotine dip.

SARCOPTIC, OR HEAD, SCAB

Sarcoptic scab is not common in the United States. It is difficult to eradicate, but it can be cured. Thorough soaking of the affected parts with warm lime-and-sulfur dip every 5 or 6 days for a month or 6 weeks will usually be effective.

CHORIOPTIC, OR FOOT, SCAB

The form of sheep scabies commonly known as foot scab is caused by a mite (*Chorioptes bovis* var. *ovis*) that closely resembles the psoroptic mite of common sheep scab. The visible lesions usually occur first around the feet but in severe cases may spread to the legs, thighs, and udder, and they are most pronounced during cold weather. The disease is distinguished from common scab by the location of the lesions. This form of sheep scab can be effectively combated with the treatment recommended for common scab. During very cold weather, wading tanks filled with dip may be used instead of dipping vats.

DEMODECTIC, OR FOLLICULAR, SCAB

Demodectic scab is not common in sheep in the United States, but cases have been reported in milk goats. The mite (*Demodex canis* var. *ovis*) that causes this form of scab is not visible to the un-

aided eye. It is wormlike in form and infests the hair follicles and the sebaceous glands, which lubricate the skin. When present in large numbers the mites cause swellings or nodules that extend deeply into the skin.

No effective method is known for the treatment of flocks infected with demodectic mange. Individual animals that are affected should be removed from the flock and treated or destroyed. Treatment consists in opening all the nodules, removing the contents, and syringing the pockets out with a 2-percent solution of coal-tar-cresote dip.

DIPPING SHEEP

The method universally practiced in the United States to combat sheep scab is to dip infected and exposed flocks. As already noted, two or more dippings are necessary to effect a cure. All the sheep in a flock should be dipped regardless of the number infected.

In dipping sheep it is most important that close attention be given to numerous details. Sheep should not be dipped immediately after shearing, and great care should be exercised not to dip in a lime-and-sulfur solution any sheep that have unhealed wounds from shear cuts or other causes. Animals with such wounds when dipped in this kind of solution usually develop blood poisoning, the mortality from which is very high. Every possible effort should be made to handle the sheep quietly and to avoid rough treatment of any kind.

Ewes and lambs should be dipped separately as there is great danger of drowning the younger animals if they are dipped together. As ewes recognize their lambs by smell and not by sight, the two groups should be turned together after dipping in order that each mother may have an opportunity to find her lamb.

Several hours before the sheep are to be dipped they should be given a moderate amount of feed and water, but care should be taken to see that they are not too full when dipped. As far as possible, dipping operations should not be undertaken on days when the weather is extremely cold and stormy. If it is necessary in an emergency to dip sheep during winter weather, the operation should be completed early in the day in order that the animals may have time to dry off and be fed before night.

The quantity of dip in the vat should be sufficient to submerge the sheep completely, and the liquid should be maintained at a temperature of 95° to 105° F. An accurate thermometer should be provided and the temperature checked frequently. The sheep should be kept in the dipping vat long enough for the wool to become fairly well saturated; in the case of infected sheep this will not be less than 2 minutes. In well-advanced cases the hard scabs should be broken up and soaked with the dipping fluid, but in dressing such areas care should be taken not to cause the wounds to bleed, as the blood may protect the mites from the effects of the dip.

While being put in the vat, the animals should be carefully watched by men with dipping forks stationed along the file of sheep to see that the dipping is properly done and to prevent accidents (fig. 3). As soon as the dip becomes dirty it should be changed regardless of

the number of sheep that have been dipped in it. When lime-and-sulfur dip is used, the solution should be changed after it is 10 days old. Only dips permitted by the Department of Agriculture should be used in the treatment of sheep against scabies. As already noted, it is essential that the dip be maintained at the required strength at all times. By frequent testing of the solution with the field tests available for lime-and-sulfur and nicotine dips it is possible to determine when it is necessary to add fresh dip to maintain the required strength.



FIGURE 3.—Dipping sheep to control scab. The dipping forks (poles with hooks) are used to control the movement of sheep through the dipping vat and also to force their heads under the surface momentarily to make sure that all the scab mites are reached by the dip.

accomplished. Accordingly, on June 1, 1905, a Federal quarantine was placed on all the territory west of the eastern border of North Dakota, South Dakota, Kansas, Oklahoma, and Texas, an area of more than 1,700,000 square miles.

Under cooperative arrangements with the livestock sanitary officials of the several States, systematic inspections by State and Federal employees were made of all sheep in infected localities, and all flocks found to be infected or exposed were dipped under official supervision. This work was supplemented by rigid inspection of

CONDUCT OF CONTROL WORK

In June 1897 the Department of Agriculture issued an order governing the transportation of sheep affected with scabies, and Federal inspectors were placed at the principal feeding points of all the railroads leading to market centers to inspect and supervise the shipping of sheep. In 1899 an order was issued requiring that all sheep shipped from stockyards to other States for feeding purposes be dipped, and in July of that year another order forbade any sheep affected with scabies to be shipped interstate that had not been dipped in a mixture approved by the Department.

The following year inspectors were stationed at a number of points in the Western range States, and various livestock sanitary officials issued dipping orders. This plan was more satisfactory to the sheep growers and transportation companies than the previous one, but still the desired results were not

sheep arriving at public stockyards and appropriate treatment or other disposition of those classed as infected or exposed. When this work was inaugurated 90 percent of all the bands of sheep in some States were infected with scabies. Progress toward the eradication of the disease continued, and from time to time the quarantine on various areas was lifted. At the present time only small areas in two States are under Federal quarantine for this disease. So successful has the eradication work been that most of the range States in which the sheep industry is important have been entirely free from the disease for several years. The remaining infection is largely confined to a few farming States where numerous auction markets and the almost exclusive use of trucks for transportation have made the eradication problem a difficult one.

Control work is conducted at present under cooperative agreement between the United States Bureau of Animal Industry and the livestock sanitary officials of the various States. The agreements specify in some detail the part that each of these cooperative agencies shall take in the work of eradication. Generally both parties to an agreement furnish trained men to make inspections and supervise the dipping of infected and exposed flocks.

In recent years the States with few exceptions have handled the quarantine of flocks and areas infected with sheep scab so effectively that it has not been necessary to impose Federal quarantines. The situation in several of the farming States has been rather serious during recent years, however. The indiscriminate movement of sheep through auction markets in these States and their uncontrolled transportation by trucks have presented a difficult problem, but it is being gradually solved by the enforcement of State regulations at the auction markets and by the active cooperation of Federal and State inspectors in locating centers of infection and enforcing appropriate control measures when diseased flocks are found.

Flock owners who plan to dip sheep of their own accord are strongly advised to have the work supervised by a veterinarian or other properly trained and equipped person who is experienced in dealing with sheep scab and prepared to test the strength of the dip. Flock owners are reminded also that for their own protection and that of the community they should report the appearance of sheep scab promptly to the nearest veterinarian, State livestock official, or representative of the Bureau of Animal Industry. These professional workers are prepared to take suitable action to eradicate the infection.