should spray as soon as possible after shearing. All the animals should be treated, and attempts should be made to wet all parts of the body. Particular attention should be paid to the underline. If the animals are in full fleece, more spray is required than on newly shorn sheep.

The amount of spray required varies with the size of the animals, the length and density of the fleece, and the circumstances under which they are sprayed. The amount usually will run near a gallon for one animal.

When infested sheep or goats cannot be sprayed or dipped because of unfavorable weather, as is often the case in areas where the winters are severe, the animals can be dusted, either by hand, if the flocks are small, or treated with a dusting machine. These devices are usually set up in a runway leading from a corral. The insecticide most often used for dusting is cube powder containing approximately 5 percent of rotenone. The cube powder is formulated for treatment so that it contains 0.5 percent of rotenone.

Goats producing milk for consumption by people should not be treated with DDT, toxaphene, TDE, chlordane, benzene hexachloride, or lindane, because of possible contamination of the milk.

Methoxychlor or rotenone can be used to treat milk-producing animals.

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**Sore Mouth in Sheep and Goats**

C. L. Davis

SORE MOUTH, or contagious ecthyma, is a highly contagious disease of sheep and goats.

It is common in lambs and kids but rare in animals more than a year old, although lesions have been seen on the udders of nursing ewes and goats. It is most prevalent among lambs being fattened for market but it may appear in range bands and farm flocks. Feeder lambs frequently develop the disease, usually within 7 to 10 days after arrival in the feed lots.

Sore mouth occurs in spring and summer wherever sheep are raised.

The lesions appear mostly on the lips and sometimes on the face and ears and near the eyes. Vesicles, pustules, ulcers, and scabs form. The lesions in severe cases may reach the mouth, where extensive ulceration of the cheeks, hard palate, and tongue may develop.

The disease in the ordinary outbreak runs a rather benign course, with few or no fatalities, unless complications set in. The greatest loss results from debilitation due to inability of the animals to eat for long periods and from stunting of growth at the age when normal gains should be greatest.

Uncomplicated cases heal spontaneously in about a month, usually without treatment. The scabs fall off within 3 or 4 weeks. Healing takes place without formation of scars. The dried scabs retain the virus, which is resistant to heat and cold and can survive in the soil from year to year. The disease may therefore recur an-
nually on premises where it previously existed, unless the new crops of lambs are protected by vaccination.

When the lesions on the face become infested with maggots or secondary infection has resulted in deep ulceration, many fatalities may occur—particularly in the Southwestern States, where the screwworm larvae invade the tissues through the lesions of sore mouth.

Complications from secondary infections, chiefly by *Psorophora necrophorus*, occur in the more northerly States where the screwworm does not exist. The bacterial infections may result in necrotic lesions in the lung, liver, stomach, and intestines. Fatalities may range from 10 to 50 percent of the animals so affected.

**Prevention of screwworm infestations and secondary infections are of chief concern to avoid complications.**

Lesions should be cleansed of maggots and a fly repellant should be applied to prevent further infestation. Secondary infections can be avoided for the most part by local antiseptic treatment. Deep-seated ulcerations and secondary lesions in the lung and gastrointestinal tract are harder to treat.

The value of antibiotics and the sulfa drugs in the treatment of such cases has not been established.

A live vaccine for the prevention of sore mouth was developed in 1935. It is applied to the skin in a manner similar to the technique used in vaccinating against smallpox in man—that is, by rubbing the vaccine in scratches made in the skin. The common sites for vaccination are in places where the wool is absent, such as inside the flanks or under the tail. A successful inoculation, or "take," is indicated in susceptible animals by the formation of a local pustular lesion at the site of application. The scab that forms afterwards dries and falls off in several weeks. The immunity thus conferred lasts up to 2 years or longer. Animals that recover from natural infection and those vaccinated are considered, from a practical viewpoint, to be immune for life.

In places where contagious ecthyma occurs regularly, it is advisable to vaccinate all lambs or kids before the pasture season begins.

Some ranchers may find it more convenient to vaccinate at the time when castration, docking, and earmarkings are done.

Because exposure to infection may occur during shipping, range lambs consigned to feed lots should be vaccinated at least 10 days before shipment to allow time for immunity to develop.

Ordinarily it is advisable to vaccinate animals before the disease appears, but some beneficial results may be expected even when vaccination is done as an outbreak impends—the normal course of the disease in animals already showing symptoms is usually shortened.

**Man is susceptible to the virus of contagious ecthyma.** Ranchers, sheepherders, and others who may handle infected sheep are subject to infection, usually through abrasions on the hands. Those who treat or vaccinate lambs therefore should wear rubber gloves.

The lesions in man consist of one to several rather large vesicles, or blisters, with painful reddening and swelling of the skin. There may be a slight rise in temperature and some swelling of the lymph glands in the armpits.

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