



Beef Cattle Handbook



BCH-3820

Product of Extension Beef Cattle Resource Committee

Cattle Scabies

Carl D. Patrick, Extension Entomologist, Texas A & M University, Amarillo, Texas

The terms "scabies" and mange are often used interchangeably, but are defined by the US Department of Agriculture in the following way:

Mange is any skin condition of man or animals associated with a mite; scabies is a particularly serious, debilitating, reportable mange condition. The causative organisms, mites, are minute arachnids related to the ticks and spiders.

Three varieties of mite infestation are grouped together under the term scabies: (1) psoroptic, or common scabies, (2) sarcoptic scabies, and (3) chorioptic scabies. *Demodex bovis*-cattle follicle mite, and *Psorergates bos*-cattle itch mite, are other mites that infest cattle, but are not included with the species considered by the term "scabies" mange or scab.

When either psoroptic or sarcoptic mites are detected, the infested cattle are required by law to be quarantined and treated. Some states require chorioptic mites to be reported.

Scabies has been known since ancient times in man as well as in animals. Cattle scabies is a universal parasitism; infestations have been and are today reported from all areas of the world. In the US, the disease constituted a serious threat to the cattle industry, particularly on the open ranges of the West before the turn of the century. In 1905, stringent federal control measures were instituted in an effort to arrest its spread. By 1919, US Bureau of Animal Industry officials were able to state with pride that cattle scabies was "almost eliminated." In each year since then, several minor infestations have been detected. No cattle scabies of the psoroptic, or common, variety was reported anywhere in the nation in

1952, 1963, and 1967. In 1970, only a single outbreak was reported in a Texas feedlot; but late in 1971, a violent outbreak occurred in Oklahoma. From that time until the mid-80's, common scabies was a threat to cattlemen and animal health agencies. In recent years, very few cases of scabies have been reported.

Scabies Mites of Cattle

Psoroptic scabies. Scabies has come to mean psoroptic scab, common scabies, or its equivalent to most livestock producers. It is caused by *Psoroptes ovis*, a parasite that spreads quickly and easily among cattle of all ages, classes, and condition.

Some external parasites, like many kinds of lice, are said to be "host specific"; that is, they parasitize only a single species of host and cannot survive on any other. *Psoroptes ovis* is host specific to a degree; it lives only on sheep (which it prefers to other animals), on cattle, on horses, and on the American Bighorn. These mites may transfer from one of the above species of host to another, but are unlikely to do so in nature. When they do, they rarely survive to produce disease on the second, or recipient host.

The common scabies mite may attack any part of the body thickly covered with hair; the first lesions usually occur on the withers, along the back, or around the root of the tail. Mites pierce skin causing the serum to exude. As a lesion increases in size a dry scab forms in the middle surrounded by successive zones of moist crust and reddened skin. Mites are most active at the edge of the scab. Infestations cause loss of weight and failure of young stock to thrive and gain normally, and

they may cause death to calves or to range cattle exposed to inclement weather.

The mite is pearly white, barely visible to the naked eye, and about 0.6 mm (1/40 of an inch) long when an adult. All stages have four pairs of legs except the larval, which has only three. Each female in her lifetime deposits perhaps 15-30 eggs that hatch after an incubation period of less than one week. The young mites feed, moult, reach maturity, and mate. The females deposit eggs in 10-12 days. The entire life cycle, from egg to egg, is spent on the host.

Psoroptic scabies is by far the most injurious form of cattle scabies and requires immediate quarantine and control measures where and when found.

Sarcoptic scabies. Another form of scabies is caused by the sarcoptic scab mite, *Sarcoptes scabiei*. As a species, this mite is a common parasite of swine and also infests many other kinds of animals including household pets, wild carnivores, ungulates (both wild and domestic), horses, monkeys, and humans. Oddly enough, it has never been isolated from sheep in the US.

Sarcoptic mites from various animals are physically indistinguishable from one another, and they are known to transfer from one species of host to another, as from cattle to swine to humans. But infestations from such interspecies transfer are only temporary in nature and survive for only a few weeks. Thus, there is biological evidence that visually indistinguishable mites are, in fact, different. Therefore, the mites from different host species are usually considered to be different varieties of the same species of mite. For example, *Sarcoptes scabiei* var. *scabiei* infests humans, *Sarcoptes scabiei* var. *suis* infests swine and *Sarcoptes scabiei* var. *bovis* infests cattle.

In establishing themselves on cattle, sarcoptic mites usually congregate where the hair is thin and the skin tender. Sarcoptic mites are not confined to the surface of the skin, but penetrate through the upper layer and excavate burrows or galleries in which the sexes mate and eggs are laid. The first lesions are frequently found above the scrotum or udder and on the inner surface of the thighs. If the disease is not checked, infestations may cover the entire body. Affected areas lose hair and become covered with heavy crusts or scabs. The sarcoptic mite resembles the psoroptic mite, but is slightly smaller, is round rather than oval, and has shorter legs. Like the psoroptic mite, there are three pairs of legs in the larval stage and four pairs on the adults and nymphs.

Each female is thought to lay 40-50 eggs during an egg-laying period of nearly two months. After depositing her eggs, the female dies in her burrow. When the young mites emerge from their eggs in from 3-7 days, they readily escape from their shallow burrows and are believed to spend at least a part of their lives on the skin surface. New generations of mites require about two weeks to complete the cycle from egg to egg.

Sarcoptic, like psoroptic, scabies is a disease subject to quarantine and control measures wherever found.

Chorioptic scabies. The third scabies mite of cattle is *Chorioptes bovis*. In some literature, especially of the 19th century, it is the mite that causes "leg mange" or "foot mange."

Like psoroptic mites, chorioptic mites have rather strong host preferences. They are normally found on only four host species: the cow, horse, goat, and sheep. In all animals, the feet and lower hind legs are the important sites of infestation. There is some scientific evidence that chorioptic mites are capable of transfer between, and reproduction on, different host species of hooved mammals, as from goats to cattle. Under usual farm conditions, however, these infestations do not spread from goats or sheep to cattle, or vice versa.

Chorioptes bovis lives in colonies on the surface of the skin where it does not usually produce severe or conspicuous lesions. It is not likely to spread as rapidly over the body as does the *Psoroptes* mite. The mites feed on sloughed skin debris and hair. Their presence on the skin is thought to induce an allergic response, and exuding serum dries to form crusts under which the mites live in huge numbers. The lesions are most commonly found on the escutcheon, scrotum, and udder, inside the thighs and under the flanks, and inside the hocks. Chorioptic mites cause considerable itching, and infested animals lick, bite, and scratch themselves with characteristic persistence. The mite closely resembles the psoroptic mite in both appearance and life cycle and is intermediate in size between *Psoroptes* and *Sarcoptes*.

Chorioptic scabies is considered a "reportable" disease in some states, and its existence is brought to the attention of the state veterinarian. Imposition of quarantine and control measures are usually left to the discretion of state animal health agencies.

Mange Mites of Cattle

Psorergates bos, the cattle itch mite, was first isolated in New Mexico in 1963 and has been reported only a few dozen times since, mostly from the Southwest. The skin condition with which it is associated is of minor importance; the disease appears to be self-limiting and exists for perhaps no more than two years even on once heavily infested animals.

Demodex bovis, the hair follicle mite, is found everywhere in the world. One or more species of *Demodex* mite are known to infest most species of mammals, including man. The microscopic, cigar-shaped, worm-like parasites live in hair follicles and sebaceous glands, resulting in nodules within the skin. The injury they inflict, confined to the skin, is of primary concern only to the hide and leather industry and in show ring competition.

Spread of the mites from host to host. All of the scabies mites are one-host parasites; they normally live, mate, deposit eggs, and die on the same host. Some, however, drop off or are rubbed off the skin and hair-coat of the infested host and establish themselves on a new host. In this elementary way, all of the forms of scabies become highly contagious diseases, and extreme

care must be exercised to prevent dissemination. Cattle scabies may be borne from farm to farm on newly purchased stock and through the medium of infested cars, trucks, and enclosures.

Seasonal nature of the disease. Assuming that the life cycle of scabies mites is about two weeks from egg to egg, a female theoretically could have more than a million descendants in six generations, or 90 days. Fortunately, nature limits the population growth of parasitic mites. Climate and weather are among the most effective barriers to unrestricted population expansion of scabies mites. These mites, rapidly multiply and produce the most severe skin lesions during the fall, winter, and spring. In the summer, however, this process is reversed; cattlemen have observed that the lesions appear to clear up spontaneously when an infested herd is turned out to pasture. In range cattle, the shedding of long haircoats and exposure of the skin to the hot summer sun are curative. But some mites, usually on small calves or on areas of the body protected from direct sunlight, do manage to survive the summer. Then, with the return of cool weather, populations are rejuvenated and infestations often become serious again.

Survival off the host. Mite survival depends upon humidity, temperature, and other environmental factors. In cool, damp weather, scabies mites protected by hair, skin debris, soil or straw may survive for up to one month. However, direct sunlight and exposure to drying wind may destroy them in 48 hours or less. Mites or their eggs may persist on barn walls, stanchions, fence posts, railway cars, and cattle trucks, but cattle are not very likely to become infested in this way. Infestations are more often spread by such objects as curry combs, brushes, ropes, and halters. Recent studies indicate that vehicles, enclosures, and pastures kept vacant for two weeks after use by diseased sheep (presumably cattle as

well) may be regarded as entirely safe for occupancy by clean animals.

Control of Cattle Scabies

Scabies infested cattle, those exposed to the disease and those moving interstate from areas placed under federal restrictions, must meet the requirements of Title 9, Code of Federal Regulations Ch. 1 Part 73. Reporting sarcoptic and psoroptic or common scabies is mandatory, but, as noted earlier, attitudes concerning chorioptic scabies depends on the state. In any event, when reported, scabies control measures must be supervised by federal or state designated officers. The regulations specify the chemicals to be used for scabies control. The state veterinarian must approve the chemicals used in his state. Each state may have approved all or a portion of the following for scabies control: amitraz, coumaphos, ivermectin, permethrin or phosmet. The conventional methods of application are by dipping or spray-dip machine and, more recently, by injection in the case of ivermectin.

State and federal animal health agencies cooperate very closely and effectively in the detection, quarantine, and control of scabies. When individual animals or herds are scabies infested, but remain within state confines, the office of the state veterinarian is responsible for the necessary regulatory procedures. On the other hand, when two or more states are involved in a scabies outbreak and infested animals are moved across the state boundaries, or when livestock are brought into the US from outside the country, the Animal and Plant Health Inspection Service of the US Department of Agriculture determines the course of action to be followed. This usually consists of inspection and/or treatment of livestock shipped interstate from states having scabies outbreaks.

Author:

Carl D. Patrick, Extension Entomologist, Texas A & M University, Amarillo, Texas

This publication was prepared in cooperation with the Extension Beef Cattle Resource Committee and its member states and produced in an electronic format by the University of Wisconsin-Extension, Cooperative Extension. Issued in furtherance of Cooperative Extension work, ACTS of May 8 and June 30, 1914.