

Mange of Dogs

BY EMMETT W. PRICE AND F. C. BISHOPP¹

A DOG suffering from a bad case of mange is a sorry sight, and the disease can easily have a fatal end. Three kinds of mites cause three kinds of mange; diagnosis is a job for experts, and cures are often difficult and may require long treatment. Here are the facts.

MANGE is a contagious skin disease caused by microscopic organisms, known as mites, that are distant relatives of spiders and ticks. This disease, of which there are several types, affects a large variety of animals as well as human beings. It was probably known at least as long ago as the time of Moses, who stated that cattle and sheep that are "Blind, or broken, or maimed, or have a wen, or scurvy, or scabbed, ye shall not offer these unto the Lord, nor make an offering by fire of them upon the altar unto the Lord" (Leviticus 22: 22). It seems reasonably certain that mange was one of the diseases referred to in this passage by the words "scurvy" and "scabbed."

The organisms that cause mange of dogs were not seen or described until the early part of the nineteenth century. The principal forms of the disease in dogs are sarcoptic mange, or scabies, ear mange, and demodectic, or red, mange. All three are relatively common and cause great suffering. If the sarcoptic or demodectic forms are allowed to go unchecked, they may soon reduce the most valuable dog to the level of a worthless mongrel. Early diagnosis and treatment of mange is important, and the dog owner should give prompt attention to any animal showing symptoms of the malady.

SARCOPTIC MANGE

Sarcoptic mange of the dog is caused by the mite *Sarcoptes scabiei canis*. The mites are very small, the largest specimens being little

¹ Emmett W. Price is Assistant Chief, Zoological Division, Bureau of Animal Industry, and F. C. Bishopp is Assistant Chief, Bureau of Entomology and Plant Quarantine.

more than a hundredth of an inch long. They are approximately oval in outline, and the four pairs of legs are very short, the hindmost pairs not projecting beyond the margin of the body. The female mites burrow into the upper layers of the skin, where each lays 20 to 40 eggs. The egg hatch in 3 to 7 days, liberating larvae that have three pairs of legs. The larvae grow by molting, or casting the skin, and after passing through a second, or nymph, stage become adult males and females, the entire life cycle requiring 2 to 3 weeks for completion. The larvae, nymphs, and males do not burrow into the skin, but live under crusts, or scabs, on the surface. The sarcoptic mite is not so prolific as some of its relatives, such as the ticks, but as the life cycle is very short, it has been estimated that a male and female may produce as many as 1,500,000 descendants in the course of 3 months.

Sarcoptic mange affects dogs of all ages and breeds. The disease usually makes its appearance on the head—on the bridge of the nose, around the eyes, or at the base of the ears. Sometimes, however, it is first noted on the front of the chest, on the lower abdomen, under the front legs, or on the inner surface of the thighs, and if it is not treated the entire body becomes involved.

Red points which soon develop into small blisters that are most easily seen on the unpigmented parts of the skin, such as the abdomen, are the first signs of the disease. As the female mites burrow into the skin, there is an exudation, or discharge, of serum, which dries and forms a scab. The affected parts of the skin soon become covered with branlike scales and later with grayish crusts. Itching is intense, especially in warm weather, or after exercise. As a result of the animal's scratching and of the irritation caused by the mites, the skin becomes thickened and wrinkled. The frequent rubbing and scratching favor secondary bacterial infections and the formation of sores. The hair may also become matted and fall out, leaving bare spots. Decomposition of the exuded serum gives rise to a peculiar mousy odor, which becomes more pronounced as the disease progresses. If the affection is allowed to go unchecked, the animal's digestion and other body functions become impaired, and death may follow in a few months. This form of mange is transmissible to human beings, and unnecessary handling of affected animals, especially by children, should be avoided.

Sarcoptic mange may be confused with other skin affections, such as demodectic (red) mange, ringworm, and eczemas of various sorts, and it is usually necessary to resort to a microscopic examination of scrapings from the diseased parts before a definite diagnosis can be made.

EAR MANGE

Ear mange is caused by mites (*Otodectes cynotis*) which live in the external auditory canal. These mites are somewhat similar in appearance to those causing sarcoptic mange, but they are much larger and have longer legs. They may be seen with the unaided eye, either in the ear or in material removed from it, as minute, slow-moving, white objects. The life cycle of the ear mite is not com-

pletely known, but it is probably similar to that of the sarcoptic mite.

These mites do not burrow in the skin; they are found deep in the ear canal near the eardrum, where they puncture the delicate skin and feed on the tissue juices. Considerable irritation results from their presence, and the normal production of the ear secretions is interfered with. The ear canal becomes filled with inflammatory products and modified ear wax as well as mites, causing the dog to scratch and rub its ears and to shake its head to relieve the itching. Frequently the dog will hold its head to one side, and in severe infections it will run in a circle or show other evidences of nervous disturbance. The presence of the mites and the injuries they cause may favor bacterial infections resulting in inflammation of the middle ear and even of the brain.

Ear mange may be confused with inflammations of the ear due to other causes, and it is necessary that the diagnosis be confirmed by microscopic examination of material removed from the ear canal before treatment is instituted.

DEMODECTIC (RED) MANGE

Demodectic or red mange is the most common of the parasitic skin diseases of dogs and also the most difficult to cure. It is caused by a wormlike mite, known as *Demodex canis*, which lives in the hair follicles and the sebaceous glands of the skin. The life cycle of this parasite is not well understood. The females lay eggs which hatch into young similar in appearance to the adults except that they are smaller and have only three pairs of legs. These larvae undergo molts as do other mites, acquire a fourth pair of legs, and become adult males and females. The time required for the completion of the cycle is unknown.

This type of mange may affect dogs of all ages but is most common in young animals, especially those of the short-haired breeds. The first evidence of demodectic mange is the appearance of areas from which the hair has fallen out. These spots are usually slightly reddened and commonly occur around the eyes, on the elbows, hocks, and toes, and elsewhere on the body. There is practically no itching at this time; itching may become pronounced as the disease progresses but is never so intense as in sarcoptic mange. In the course of time the hairless areas become larger and the skin has a copper color, which accounts for the name "red mange" (fig. 1); in severe cases the skin may appear lead gray or bluish. During this period the mites are multiplying in the hair follicles, and inflammatory changes become evident, with the appearance of small pustules.

The hairless, or depilatory, type of demodectic mange, due to uncomplicated mite infestation, becomes complicated in the course of time through lowered resistance and the invasion of pus-producing bacteria which lead to the formation of small pimples, or pustules, in the hairless areas. As the pustular stage progresses the skin becomes thickened and is susceptible to injury by scratching, rubbing, or contact with various objects. There is very little itching

in this stage of the disease. Poisons are formed by the bacteria in the pustules, and the absorption of this toxic material deranges the body functions and affects the general health of the animal, leading to emaciation, weakness, and the development of an unpleasant odor. The disease runs a slow course, often extending over a period of 2 years or longer. Unless it is treated, it usually terminates in death, although occasionally spontaneous recovery occurs, especially if the animal has been kept on a good, nourishing diet.

Demodectic mange may be confused with a number of other skin diseases, including sarcoptic mange, fungus infections, acne, and eczema. A definite diagnosis can be made only by microscopic examination of scrapings of the skin or of material from the pus-



FIGURE 1.—A moderately severe case of demodectic, or red, mange. The hair has fallen out over the extensive light-colored areas on the dog's body.

tules. Failure to find the mites, particularly in the early stages of the disease, does not exclude the possibility that the condition is demodectic mange, and it may be necessary to make several examinations at different times before arriving at a diagnosis.

TREATMENT OF MANGE

Medicinal treatment of mange, regardless of the type, should be undertaken only by or under the supervision of a veterinarian who is able to diagnose the condition accurately and to prescribe the proper treatment.

Ear mange is the type most amenable to treatment, since the mites are on the surface of the skin and are easily destroyed by the use of suitable insecticides. The affected animal should be restrained so that the ear canals can be cleaned and the wax and other material removed by forceps or a swab without injuring the eardrum. After

being cleansed, the canal should be swabbed with one of the following mixtures: (1) 1 percent phenol in glycerin, (2) 5 percent phenol in castor oil or olive oil, or (3) a mixture of 1 part carbon tetrachloride and 3 parts of castor oil. An oil solution of rotenone is also reported to be effective. The treatment should be repeated daily until all traces of the infestation have disappeared.

An ointment consisting of 1 part by measure of derris powder containing 5 percent rotenone in 10 parts of petrolatum or olive oil has also been found effective against the ear mange mites. The material is applied to the ears with a cotton swab. Usually two such treatments, 1 week apart, are sufficient to clear up an infestation.

Sarcoptic and demodectic mange are more difficult to treat since the mites in the skin are not easily reached with medication. Dogs affected with either of these types of mange should be clipped before treatment is attempted. The animal should be bathed and all crusts and scabs removed with the aid of a moderately stiff brush. In most instances it is advisable to apply the indicated remedy to one-fourth of the body each day, so that in the course of 4 days the entire body has been covered. After a complete course of treatment the animal should be bathed and the same routine repeated until a cure has been effected.

In most of the effective treatments for sarcoptic mange the active ingredient is sulfur. One of the simple mixtures that frequently gives good results is an ointment prepared by thoroughly mixing 1 part of flowers of sulfur with 8 parts of lard. Another ointment that has given good results consists of 2 parts of sublimed sulfur, 1 part oil of tar, 1 part potassium carbonate, and 8 parts lard. Lime-sulfur dip as prepared for the treatment of scab in sheep is likewise an effective remedy.

Derris ointment similar to that recommended for the treatment of ear mange and a wash consisting of 4 ounces of derris powder (containing 5 percent rotenone), 1 ounce of neutral soap, and 1 gallon of warm water have been found highly effective in curing sarcoptic mange. The wash should be well rubbed in with a brush. The surplus wash is taken up with a towel and the remainder of the material is permitted to dry on the animal. Two or three treatments are usually necessary to effect a cure. Exposure to sulfur dioxide gas has also been reported to give good results. The affected animal is placed in a gas-tight box from which his head protrudes, and the body is then exposed to the gas. Afterwards the head is treated with sulfur ointment. Cases have been cured after two or three such treatments.

The treatment of demodectic mange is often very discouraging because of the care, time, and expense involved. Many remedies have been used, but in spite of some cures there have been many failures. The most promising remedy appears to be a 1-percent solution of rotenone in alcohol or oil. The solution is prepared by dissolving the rotenone in a small amount of acetone and then adding the proper amount of either alcohol or a bland oil, depending on the kind of application desired; an oil solution is generally preferred because it tends to keep the skin soft and pliable. The remedy is applied daily, with a moderately rough massage, to the affected parts

or the entire body, depending on the extent of the lesions. Constant treatment for several weeks is frequently necessary to effect a cure. The derris wash recommended for sarcoptic mange, applied every other day for 2 weeks then once a week for 4 weeks, has effected cures in a number of instances. Another remedy that has been recommended widely and has given good results in some cases consists in the use, once a week, of a preparation composed of 8 ounces of kerosene, 8 ounces of raw linseed oil, 1 ounce of carbolic acid, 1 ounce of oil of tar, and $\frac{1}{4}$ pound of sulfur. This mixture is applied with mild rubbing, but in using it not more than one-fourth of the dog's body should be treated at a time, as there is some danger of carbolic acid poisoning. Two or three complete treatments are usually necessary to effect a cure. With all these treatments, care should be taken to keep the material out of the animal's eyes, as severe inflammation and even blindness may result.

In connection with medicinal treatment for either sarcoptic or demodectic mange, supplementary measures in the form of good, nourishing food containing adequate vitamins and minerals, laxatives, and warm comfortable quarters will enhance the animal's chances of recovery.

It should be remembered that the premises frequented by mangy dogs are infected, and disinfection is therefore necessary to prevent reinfection of the treated animals or the spread of the disease to healthy dogs. So far as possible all litter and bedding should be burned and the kennels disinfected with a hot, strong coal-tar-creosote solution. Where effective disinfection is impossible or impractical, as in the case of yards and large runways, dogs should be kept off such premises for at least 3 weeks to allow sufficient time for any mange mites that might be present to die.

At the time this book went to press, the drugs and other materials mentioned in various articles—chiefly as disinfectants, insecticides, and anthelmintics—were still available for veterinary and medical use. Under war conditions, however, it is possible that some of these materials may become scarce or unavailable. In that case, the reader should obtain professional advice from the Department of Agriculture, the State experiment station, a local veterinarian, or the county agent as to available substitutes.