

Chapter 10 - Lesson 4



Infectious Diseases: Integumentary System

Skin

Dermatitis is an inflammation of the skin. A bacterial infection is one cause of dermatitis. During warm, humid weather, the skin and haircoat is more susceptible to bacterial infection and the prevalence of skin diseases is highest. The most common sign is pruritus (itching). This can be followed by skin lesions that progress from reddening and thickening of the skin to bumps, blisters, and crusts or scales. Other causes of dermatitis include viruses, parasites, fungi, and allergens.

Pyoderma is dermatitis characterized by the presence of purulent exudate (pus). Dermatitis can develop into pyoderma due to the invasion of pus-forming bacteria. These infections can be superficial or deep pustules with draining tracts. Bacterial dermatitis and pyoderma are commonly associated with skin allergy and mange conditions.

Dermatophytosis, or ringworm, is a result of a pathogenic fungus. This fungus infects the skin of dogs, cats, horses, cattle, pigs, humans, sheep, and goats. The normal habitat is in the skin but can survive in dark humid environments of soil, bedding, carpet, furniture, tack, blankets, brushes, and clippers. Transmission of ringworm occurs through direct contact with infected animals and humans or contaminated environment. The fungus is transmitted through skin contact from a carrier dam to her nursing young. The most susceptible hosts appear to be the young and they often display the characteristic lesions. The fungal infection may not be evident until several months



Puppy with cellulitis.



Wood's lamp used to diagnose ringworm.

after exposure. The cutaneous disease begins as focal alopecia (hair loss). These round areas of hair loss become scaly with circumscribed edges that may be raised and reddened. Pruritus may or may not be present.

Use direct microscopic examination of skin scrapings and skin fluorescent examinations with a ultraviolet lamp (Wood's lamp) to make ringworm diagnosis. Confirm the diagnosis using culture techniques. Since spontaneous recovery after several months is common, the primary objective of topical or oral therapy is to prevent spread of the lesions and spread of infection to other animals and humans.

Dermatophilosis, or rain gall, is a result of a fungus (*Dermatophilus* spp.). This disease is common in horses, cattle, sheep, and goats that live in warm, humid, damp climates. During the rainy season, biting flies may help transmit the disease from infected animals and from wet contaminated soils by acting as a mechanical vector. The cutaneous disease is an exudative dermatitis with scabs. Typical lesions are raised, crusty lumps covered with hair that can be pulled off. Removal of the crust with a tuft of hair (paintbrush lesions) leaves a bare spot. These lesions commonly develop on the lower legs, chest, back, and hips. Use cultures, biopsies, and scrapings to make a definitive diagnosis of this fungal disease.

Warts are fibrous tumors of the skin and occasionally of the mucous membranes of animals (especially cattle, dogs, rabbits) and humans. They can be caused by many strains of viruses. The virus is transmitted by direct contact and possibly by arthropods. The cauliflower-type growths occur primarily on the head, neck, and shoulder, in the mouth, and on the vulva and penis.

Pox diseases cause skin lesions by replication through poxviruses in the skin. Animals acquire the virus through the skin or by biting arthropods. Bumps, blisters, pustules, and crusts are the types of skin lesions present in the course of the disease. The pox diseases are named after the affected animals, such as fowlpox, swinepox, and cowpox.

Arthropod parasites are external parasites, or ectoparasites. Their presence, or the dermatitis they cause, is referred to as an infestation instead of an infection.



Ringworm detected under Wood's lamp.



Dog with alopecia (hair loss). Photo: Joel Mills.

Therefore, external parasites infest an animal. Parasitic infestations of the skin affect the health of animals by causing tissue damage, blood loss, and annoyance. Annoying pests interfere with the animal's ability to eat and sleep, which may result in weight loss. In addition to the skin diseases directly caused by arthropods, many ectoparasites are vectors of infectious diseases, transmitting disease agents from carrier animals to other susceptible animals.

Some flies, such as houseflies, do not suck blood but annoy animals. Other flies, such as horseflies, deerflies, stableflies, and hornflies, are blood-suckers and cause anemia, as well as, annoyance. Blood-sucking flies, mosquitoes, and gnats aid the transmission of diseases, such as anaplasmosis, bluetongue, leukosis, equine infectious anemia, and heartworms.

Heelflies have larval stages, called cattle grubs that migrate through the body and emerge through the skin on the backs of cattle. Large numbers of cattle grubs may cause migratory damage to internal tissues and the hide.

Ticks are subdivided into two groups: hard ticks and soft ticks. The hard ticks attach and feed on animals by sucking blood for several days; many types serve as vectors of diseases. Hard ticks help transmit anaplasmosis and Lyme disease to other animals. Soft ticks common in fowl are intermittent feeders. The immature stages of spinose ear tick, a soft tick, develop in the external ear canal of animals, especially cattle, but the adult ticks are free-living.

Dogs and cats are commonly infested with fleas. Fleas are blood-suckers and can be vectors of the tapeworm, called the flea tapeworm. Fleas are extremely annoying to pets and may cause severe anemia.

Lice infestations of animals are more common during the cool and cold months of the year, especially in late winter and early spring. During this time animals are in close contact with one another, their skin has less oil, and lice reproduction is greater. Lice are more common on cattle, swine, and poultry than on other animals. Both biting lice and sucking lice annoy animals and cause skin allergies and hair loss. In large numbers, the sucking lice can cause anemia. Lousy is the condition of an animal with a lice infestation. Lice and their eggs are easily visible on animals with the naked eye.

The entire life cycle of mange mites is completed on or in the skin and ear mites in external ear canals of animals. Transmission occurs through direct contact. Mites infesting the skin of animals cause a condition called mange. Mange is more common in the winter and during times of stress. Mange is common in dogs and swine, occasionally in cattle, and rarely in other animals. Types of mange conditions with hair loss and dermatitis are sarcoptic mange, scabies, and red mange. Ear mites common in dogs and cats do not cause mange but do cause extreme annoyance. Microscopic examination of skin scrapings from infested animals reveals the presence of surface mites or burrowing mites and ear swabs the presence of ear mites.



Deer tick.



Flea.



Louse.



Ear mite.



Dog with mange.

Nematodes, or roundworms, infect the skin of animals. Examples of nematodes include habronema, onchocerca, stephanofilaria, and dipetalonema. Houseflies and stableflies help transmit habronema larvae that infect wounds and external mucous membranes of horses. They can cause excessive granulation (proud flesh), a condition called summer sores. Onchocerca larvae, transmitted by mosquitoes and gnats, can cause an allergic skin reaction on the face, neck, chest, and underline of horses. Hornflies transmit stephanofilaria to cattle and cause local circumscribed lesions on the underline. Fleas transmit dipetalonema to the skin of dogs but it causes no harm.

Reference

Kahn, C. M. (Ed.). (2010). *The Merck veterinary manual* (10th ed.). Whitehouse Station, NJ: Merck.

Questions

Fill-in-the-Blank

1. Arthropod parasites of animal skin are called, _____, or external parasites.
2. _____ have larval stages called cattle grubs.
3. The _____ tick is a soft tick that develops its immature ticks in the ear canals of animals.
4. Fleas can be the vector of _____.
5. Mite infestations on the skin of animals are called _____.
6. Nematode infections of the skin of animals are transmitted by _____.
7. Differentiate the appearances of ringworm and rainfall lesions.
8. Purulent dermatitis is _____.
9. Match the list of characteristics with the fungal diseases.
 - a. Dermatophilosis
 - b. Dermatophytosis_____ Paintbrush lesions
_____ Circumscribed lesions
_____ Biting flies
_____ Rain gall

Activity

1. Observe a variety of animals diagnosed with integumentary infections and infestations and record the presence or absence of clinical symptoms.