

PSOROPTES SPP.

Aetiology Epidemiology Diagnosis Prevention and Control Potential Impacts of Disease Agent Beyond Clinical Illness References

AETIOLOGY

Classification of the causative agent

Psoroptes spp. of mites cause psoroptic mange in several different animal species. The mites are problematic in domestic animals, especially sheep, though they do not cause significant disease in wildlife. It was previously thought that there were several species of these astigmatid mites afflicting specific animal species. For example, *P. equi* was thought to infest horses, and *P. cuniculi* infested rabbits. However, this classification is debatable. It is currently thought that there may only be two species of *Psoroptes*: *P. ovis*, which afflicts animals' bodies, and *P. cuniculi*, which infests animals' ears.

Resistance to physical and chemical action

Temperature:	Survives for longer periods of time off host at cooler temperatures; under experimental conditions adults survive 7-8 days at 24-26°C, 15-18 days at 2-9°C
pH:	Not well determined
Chemicals/Disinfectants:	Disinfestation consists of treating the host with medications such as organophosphates and macrocyclic lactones; flea products may be used to clean fomites (e.g. rabbit cages)
Survival:	Variable environmental stability under experimental conditions; adults survive longer in environments with higher humidity

EPIDEMIOLOGY

Hosts

- Domestic and wild sheep
 - Domestic sheep (*Ovis aries*)
 - Bighorn sheep (*Ovis canadensis*)
- Domestic and wild goats
 - Domestic goats (*Capra aegagrus hircus*)
 - Ibex (Genus *Capra*)
 - Mountain goats (*Capra ibex nubiana*)
- Domestic and wild rabbits (*Oryctolagus cuniculus*)
- Domestic equids (rarely)
 - Horses (*Equus ferus caballus*)
- Domestic and wild bovine species
 - Cattle (*Bos taurus*)
 - Uncommon in dairy cattle breeds
 - African buffalo (*Syncerus caffer*)
 - Water buffalo (*Bubalus bubalis*)

- Domestic camelids
 - Alpacas (*Vicugna pacos*)
 - Camels (*Camelus sp.*)
 - Llamas (*Lama glama*)
- Domestic and wild cervids
 - Blackbuck antelope (*Antilope cervicapra*)
 - Elk (*Cervus canadensis*)
 - Mule deer (*Odocoileus hemionus*)
 - White-tailed deer (*Odocoileus virginianus*)
 - Wild Southern huemul (*Hippocamelus bisulcus*)
 - Pronghorn antelope (*Antilocapra americana*)
- Giraffes (*Giraffa camelopardalis*)

Transmission

- Direct contact with infested animal
- Contaminated fomite

Sources

- Infested animals
- Fomites
 - Fence posts, bedding, fur, trucks, chutes

Occurrence

Psoroptes spp. have a worldwide distribution. They have been eradicated from domestic sheep in several countries, including Australia, New Zealand, United States, Canada, Sweden, Norway, and Denmark. In these countries, however, the mite may still infest other animal species. The mite was once eliminated from sheep in the United Kingdom, but was reintroduced with importation of infested domestic sheep. It is thought that it became endemic to the country in the 1990s once dipping sheep in a bath of pesticides or acaricides for the mite was no longer government mandated. In 1978, the mite caused high morbidity and mortality in a population of bighorn sheep in New Mexico, United States. Outbreaks in beef cattle herds have occurred in the Southwest and Central United States.

Sheep infestation occurs most often during the fall, while the disease progresses slowly during the summer. The disease may self-resolve, but scabs containing the mites may re-emerge with another infestation up to two years later.

For more recent, detailed information on the occurrence of this disease worldwide, see the OIE World Animal Health Information System - Wild (WAHIS-Wild) Interface [http://www.oie.int/wahis_2/public/wahidwild.php/Index].

DIAGNOSIS

The mites feed on serum and dead skin cells, and scabs form over the mites. The severity of the inflammation and scab formation depends on how sensitive the host is to mite presence.

While transmission most commonly occurs when animals come into direct contact with each other, mites may

live 10-14 days in the environment and may be spread when an animal comes into contact with the infested environment. It has been shown that adult mites can live up to 40 days on a host. The life cycle is 11-19 days. The incubation can range anywhere from a few weeks to several months.

Clinical diagnosis

Sheep have several symptoms associated with *Psoroptes ovis* infestation, including: pruritus, alopecia, wool loss, weight loss, scratching and biting at scabs, and death in severe cases. Scabs start on the back but may eventually cover the entire body. Other symptoms include a “nibble reflex”, hyperaesthesia, and seizures. Sheep with these mites can be unthrifty, with ewes giving birth to small lambs and producing less milk. Secondary effects of the infestation include bacterial infection. Lambs are susceptible to death if infested with the mite.

Symptoms of *P. ovis* infestation in cattle are similar to sheep, including pruritus, alopecia, and dermatitis, which begin on the back and rump but may eventually spread over the whole body. Cattle may bite scabs and scratch against fence posts. Calves may die if untreated. Wild ungulates tend to be carriers with only mild symptoms of infection except for bighorn sheep.

Rabbits infested with *Psoroptes cuniculi* develop thick, brown crusts on their ears, and they may shake their head and scratch their ears. The mites may eventually reach the inner ear canals and travel to the central nervous system, resulting in torticollis. Debris may build up and block the auditory canal. If severe enough, the mange can spread over their whole body.

Lesions

- Sheep
 - Alopecia
 - Small, erythematous macules
 - Hyperkeratosis, 5-20 mm diameter abscesses
 - Mites located in moist area at edge of lesion
- Cattle
 - Alopecia
 - Papules
 - Lichenification and excoriation of skin
- Rabbit
 - Ear canker with thick brown crusting and crumbly exudate

Differential diagnoses

- Cattle and sheep
 - Pediculosis
 - Ringworm
 - Dermatophilosis
 - Mange caused by other mites (*Sarcoptes*, *Chorioptes*)
 - Photosensitization reactions
 - Tick infestations
 - Sheep: sheep keds, sheep pox, fleece rot
- Rabbits
 - Ear infection from fungal or bacterial sources
 - *Encephalitozoon cuniculi*

Laboratory diagnosis

Samples

For isolation of agent

- Skin scraping
 - Take scraping from edge of lesion with the dull end of a scalpel blade
 - The lesion may be covered in paraffin, then scraped
 - Skin scrapings are enhanced when immersed in 10% KOH

Serological tests

- Not used for diagnostic purposes

Procedures

Identification of the agent

- Microscopic inspection of adult mites or their eggs
 - Adult female *Psoroptes* mites have an oval-shaped body and are approximately 750 μm in length, and the males are slightly smaller
 - Both males and females have trumpet-shaped tarsal suckers at the ends of their legs and have long, 3-segmented pedicels on their legs
 - Eggs are oval, anisotropic, and approximately 70 μm in diameter

Serological tests

- No serological tests have been developed for clinical diagnostics, though there have been experimental serological surveys performed on cattle, sheep, and rabbits

PREVENTION AND CONTROL

Sanitary prophylaxis

- Quarantine animals suspected to be infested
- Treat animals for this mite before allowing them to join another herd or flock
- Regularly change bedding/substrate
- Practice proper sanitation and change personal protective equipment, especially when handling infested animals

Medical prophylaxis

- Medical prophylaxis is generally not practiced, except in domestic sheep
- One study on wild bighorn sheep tried several methods for *Psoroptes* spp. control over various years, including amitraz collar, injectable ivermectin, cyfluthrin-impregnated cattle ear tag, and injectable

- doramectin. The results of this study were generally unsuccessful.
- Diazinon total-immersion plunge dip (organophosphate) confers protection for up to 63 days
- Injectable 2% moxidectin (macrocyclic lactone) confers protection for up to 60 days

POTENTIAL IMPACTS OF DISEASE AGENT BEYOND CLINICAL ILLNESS

Risks to public health

- There is a lack of evidence to suggest this mite poses a risk to human health

Risks to agriculture

- *Psoroptes* spp. cause a large economic burden to farmers due to production loss and cost of treatment

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The OIE will periodically update the OIE Technical Disease Cards. Please send relevant new references and proposed modifications to the OIE Science Department (scientific.dept@oie.int). Last updated 2020. Written by Samantha Gieger and Erin Furmaga with assistance from the USGS National Wildlife Health Center.