

## Common Mites (Arachnids) of Rabbits and Their Treatment

Rabbits can be infested with **ear** mites, **fur** mites (cheyletiellosis), or **burrowing** mites (mange). Visual examination is not always sufficient to confirm the presence of mites. One can use the tape method, skin scraping (shallow if fur mites are suspected, deep if burrowing mites are suspected), or the vacuum aspiration method on a filter paper. Samples from scraping or aspiration should be spread on a microscope glass, dissolved in KOH, and examined under a microscope. The chance is great that one will discover at least one mite or a larva or eggs. Hair can also be sampled, dissolved in KOH, and examined under the microscope for the presence of eggs. If no mite is found in the first sample, one should check other places on the body. If the presence of burrowing mites is suspected, but not found after a deep skin scraping, it is best to do a biopsy on the area suspected of mite infestation.

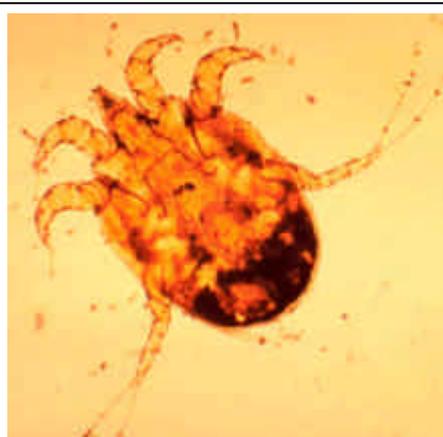
Both fur mites (live on the surface of the skin) and burrowing mites (live on/in the skin) can fall off and contaminate the environment. While treating for mites, careful cleaning of the cage and environment is recommended.

If any mite problem is not solved, consider the presence of dogs and cats (both can be asymptomatic carriers) or of parasites that survived the treatment.

### Ear Mite: *Psoroptes cuniculi*

The ear mite is the universal parasite *Psoroptes cuniculi*. It has different life stages: egg, larva, protonymph, adult mite. The cycle lasts about 21 days, depending on environmental conditions, with eggs hatching after 4 days.

*Psoroptes cuniculi* is mainly found inside the rabbit ear pinnae, and it is not uncommon to discover that only one ear is affected. In older or sick animals, or if not treated properly, the parasite may spread and infest the head, neck, legs, ventral abdomen, and perianal region. The mucus and fecal material of the parasite induce an inflammatory reaction that leads the rabbit to scratch its ear. The blood that comes out of the scratched lesions serves as a source of nutrition for the parasite.



[www.parasitology.org/Arthropods/Arachnida/Psoropte.htm](http://www.parasitology.org/Arthropods/Arachnida/Psoropte.htm)

*Psoroptes cuniculi*

### Symptoms and clinical signs

Itching ears, frequent shaking of the head, and scratching up to the stage of automutilation. In the beginning, small, tightly adherent skin scales appear deep in the ear canal and the earlobes and are surrounded by alopecic (balding) regions. Those yellow-gray scales can be rather thick; they carry large numbers of the parasite, mite feces, skin cells, and blood.

If no treatment is started at this stage, the scales will grow to crust and may reach a thickness of 2 cm in extreme cases. The ear is no longer able to stand up, and falls. The scales/crust should absolutely *not* be removed; if removed, they leave bloody eroded skin.

Pain of the external ear canal and broader areas is often observed.

The wounds caused by ear mites can become infected, although such infection is not inevitable. If not treated, the bacteria will spread and cause hyperkeratotic (abnormal thickening of the skin) otitis externa (outer ear infection). If left untreated, the infection can spread inward, causing rupture of the tympanic membrane and subsequent inner ear infection.



Christine Macey

Infestation with *Psoroptes cuniculi* before and after treatment with ivermectin

## Treatment

Ear mites are eliminated by avermectins:

- ivermectin: 400 µg/kg, PO (oral) or SC (subcutaneous injection), 3 times at intervals of 14 days (life cycle of *Psoroptes cuniculi* is 21 days); 200 µg/kg has been found ineffective.
- selamectin: Revolution® (US) or Stronghold® (Europe) - Pfizer, 18 mg/kg. A single topical (local) dose should be sufficient; if not, repeat in 30 days.

A further avermectin is efficacious in treating ear mites: moxidectin (Quest® or Equest® - Fort Dodge). It has so far not been shown to cause secondary effects in rabbits when administered orally, while secondary effects have sometimes been observed after subcutaneous administration. These three avermectin compounds are non-ovicidal (will not kill the eggs), but the drug remains in the tissue long enough to kill the larvae that emerge from the eggs.

The crust will resolve itself without the need to clean the ears, generally falling off within 10 days after the first administration of oral or injected ivermectin.

Ivermectin diluted in mineral oil, applied directly on the ear, is less effective than injected or oral ivermectin.

Extracts of *Artemisia verlotorum* have been shown to be effective against *Psoroptes cuniculi*.

If the rabbit is in pain, an analgesic (pain relief medication, e.g., carprofen, ketoprofen, meloxicam) *should* be administered.

Secondary bacterial infection, if present, should be treated with antibiotic ear drops if the infection is small and the eardrum not ruptured (drops given if the eardrum is ruptured can have a fatal outcome). Outer ear infection does not cause head tilt.

For a more severe case of middle ear infection, eardrops *and* oral antibiotics are recommended. If pus is seen, a bacterial culture is strongly recommended, followed by a sensitivity test to determine the most efficacious antibiotics.

For inner ear infection, appropriate oral antibiotics should be administered.

## **Fur Mites: *Cheyletiella parasitovorax* and *Listrophorus gibbus***

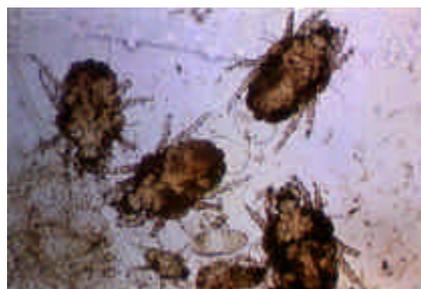
Very common non-burrowing skin parasites, *Cheyletiella parasitovorax* and *Listrophorus gibbus* are encountered around the world and affect mainly rabbits but also cats and dogs. *Cheyletiella parasitovorax* has a zoonotic potential, causing a transient itching dermatosis in humans.

The *Cheyletiella parasitovorax* parasite lives in close association with the keratin layer of the skin but does not burrow itself into the skin. It is suspected that mites may be present asymptotically on some healthy rabbits.



Human arm attacked by *Cheyletiella parasitovorax*

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*Cheyletiella parasitovorax*, an egg stuck to a hair; *Listrophorus gibbus*

The development from egg to adult mite takes place on one rabbit host. The female lay eggs and sticks them to the hair about 3 to 4 mm above the skin. The life cycle takes about 5 weeks.

**Symptoms and clinical signs**

Fur mites seem associated with spring when weather becomes milder, with a lack of vitamin C in the diet, or with the presence of an underlying disease, which weakens the immune system.

The presence of fur mites is not always easy to determine. When present, *Cheyletiella parasitovorax* is most likely to be found on the dorsum and neck of the rabbit, where it causes dandruff, seborrheic lesions (lesions from abnormally increased secretion of fatty matter), and



Ils Vanderstaey

Lop rabbit heavily infested with skin mites: characteristic V-shape on the dorsum

a pruritic (itching) condition. *Listrophorus gibbus* is found mainly on the dorsum and abdomen. Fur mites can cause a hypersensitivity reaction.

### **Treatment**

Fur mites are eliminated by ivermectin, PO or SC, 3 times at intervals of 10-14 days. Ivermectin can also be used topically (directly on the skin). Dips (Aludex® - Hoechst; Seleen® - Sanofi; LymDyp® - DVM) can be used to treat the seborrhea (excessive secretion of fat by the skin) and remove the keratin layer on which the mites feed; they will not kill the parasite.

Although fipronil (Frontline® - Merial) is effective in eliminating *Cheyletiella* sp., the manufacturer *strongly* advises against using it on rabbits. Serious adverse effects (depression, anorexia, seizures, death) have been observed in rabbits, especially young or small rabbits.

Imidacloprid (Advantage® - Bayer) is ineffective against *Cheyletiella* mites.

Treatment of the environment is important (boric acid such as Fleabusters®; Vet-Kem Acclaim Plus® - Sanofi; Staykil® - Novartis; Indorex® - Virbac; acaricide spray). When treating a carpet, vacuum first in order to further penetration of the spray or powder. Shampooing and steam cleaning are not ideal; their residual humidity can increase the mite problem. During treatment of the environment, rabbits should be kept in another part of the home to avoid the danger of contact with the products.

### **Less Common Fur Mites: *Trombicula autumnalis* and *Dermanyssus gallinae***

Both parasites specifically infest other species but can be hosted by rabbits. *Trombicula autumnalis*, or harvest mite, in the same genus as the "chigger," is found in rabbits that have free access to a yard. The female mite lays eggs in the soil. The hatching larvae, barely visible with the naked eye, move into the grass and wait till a suitable host is found. Only larvae will attack a rabbit, cat, dog, or human; further developing stadia proceed in the soil. The parasite will suck body fluids up to 3 times its body size, after which it will fall down on the soil to complete its life cycle.



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*Trombicula autumnalis* and *Dermanyssus gallinae*

*Dermanyssus gallinae*, also called red mite, may accidentally be hosted by rabbits living in the presence of birds.

### **Symptoms and clinical signs**

The larvae are commonly found on the head of rabbits (ears, inner and outer corners of the eyes, chin), the neck and shoulder regions, under the front legs and between the toes, and in the perianal region.

Both lead to intense pruritis and the formation of macules and pustules. Scratching will lead to self-mutilation, wounds, and secondary bacterial infection.

### **Treatment**

Treatment of *Trombicula autumnalis* is difficult and sometimes it is sufficient to remove the affected animal from the source of infestation. While fipronil, permethrins, and organophosphates are used on other animals to treat these mites, all can cause serious adverse effects in rabbits and should be avoided. The manufacturer of fipronil (Frontline® - Merial) strongly advises against using it on rabbits. Serious adverse effects (depression, anorexia, seizures, death) have been observed in rabbits, especially young or small rabbits.

*Dermanyssus gallinae* is best treated with carbamates, but care should be taken. This type of insecticide can trigger toxic reactions in rabbits. It is best to use a powdered product, to avoid absorption through the skin.

Treatment of the environment is important (boric acid such as Fleabusters®; Vet-Kem Acclaim Plus® - Sanofi; Staykil® - Novartis; Indorex® - Virbac; acaricide spray). When treating a carpet, vacuum first in order to further penetration of the spray or powder. Shampooing and steam cleaning are not ideal; their residual humidity can increase the mite problem. During treatment of the environment, rabbits should be kept in another part of the home to avoid the danger of contact with the products.

### **Burrowing Mites: *Sarcoptes scabiei* and *Notoedres cati***

*Sarcoptes* spp. is encountered all over the world, though not with equal frequency. Rabbits in northern Europe and England are barely affected by burrowing mites; in Israel and subtropical regions, they are the number one cause of skin disease in rabbits. In the US it varies from region to region. Burrowing mites present a zoonotic danger; they can affect dogs, cats, and humans, causing a transient itching dermatosis. The burrowing mange *Notoedres cati* is observed in rare cases.

These parasites spread rapidly from one rabbit to another, through nymphs and larvae that lie on the surface of the skin. Only the adult female will dig into the skin and make tunnels where it lay up to 5 eggs, with a maximum of 5 for its whole life. The larvae that hatch from those eggs live the first stages of their life in those tunnels. Only the male adults and older larvae live on the surface of the skin. The complete life cycle from egg to adult lasts about 2 to 3 weeks. This should be taken into account when treating a rabbit.



### **Symptoms and clinical signs**

Wounds appear first on the lips and nose, later around the head, neck, and sometimes around the genitalia. Burrowing mites (mange) will lead to heavy scratching by the rabbit, which will also lick the affected areas. This leads to alopecia (loss of fur). Often one can observe the secretion of a watery stuff that forms crusts upon drying. Self-mutilation will lead to wounds and secondary bacterial infection.

Severe infestation leads to anemia and leucopenia (decrease of white cells in the blood). The rabbit becomes lethargic and can die within a few weeks.

### **Treatment**

Mange is treated with 3 injections of ivermectin, one every 14 days. The environment should be thoroughly cleaned, as the mite can survive for weeks without the presence of the rabbit host. *Sarcoptes scabiei* can infest dogs, cats, and humans. Wounds can be treated with benzyl benzoate every 5th day.

Moxidectin (Quest® or Equest® - Fort Dodge) has proved efficacious in treating sarcoptic mange in rabbits. It has so far not shown secondary effects in rabbits when administered orally, while secondary effects have sometimes been observed after subcutaneous administration.

Treatment of the environment is important (boric acid such as Fleabusters®; Vet-Kem Acclaim Plus® - Sanofi; Staykil® - Novartis; Indorex® - Virbac; acaricide spray). When treating a carpet, vacuum first in order to further penetration of the spray or powder. Shampooing and steam cleaning are not ideal; their residual humidity can increase the mite problem. During treatment of the environment, rabbits should be kept in another part of the home to avoid the danger of contact with the products.

### Further Information

- Beck W. Farm animals as disease vectors of parasitic epizoonoses and zoophilic dermatophytes and their importance in dermatology. *Hautarzt*. 1999 Sep;50(9):621-8.
- Bowman DD, Fogelson ML, Carbone LG. Effect of ivermectin on the control of ear mites (*Psoroptes cuniculi*) in naturally infested rabbits. *Am J Vet Res*. 1992 Jan;53(1):105-9.
- Cerny V, Rosicky B. Mammals as source of ectoparasites in towns. *Folia Parasitol (Praha)*. 1979;26(1):93-5.
- Cutler SL. Ectopic *Psoroptes cuniculi* infestation in a pet rabbit. *J Small Anim Pract*. 1998 Feb;39(2):86-7.
- Isingla LD, Juyal PD, Gupta PP. Therapeutic trial of ivermectin against *Notoedres cati* var. *cuniculi* infection in rabbits. *Parasite*. 1996 Mar;3(1):87-9.
- Kirwan AP, Middleton B, McGarry JW. Diagnosis and prevalence of *Leporacarus gibbus* in the fur of domestic rabbits in the UK. *Vet Rec*. 1998 Jan 3;142(1):20-1.
- Nfi AN. Ivomec, a treatment against rabbit mange. *Rev Elev Med Vet Pays Trop*. 1992;45(1):39-41.
- Pap L, Sarkozy P, Farkas R, Bleicher E, Szego A. Efficacy of some pyrethroids against a strain of the rabbit ear mite (*Psoroptes cuniculi*): an unusual cross-resistance pattern. *Parasitol Res*. 1997;83(2):203-5.
- Perrucci S, Cioni PL, Flamini G, Morelli I, Macchioni G. Acaricidal agents of natural origin against *Psoroptes cuniculi*. *Parassitologia*. 1994 Dec;36(3):269-71.
- Perrucci S, Cioni PL, Cascella A, Macchioni F. Therapeutic efficacy of linalool for the topical treatment of parasitic otitis caused by *Psoroptes cuniculi* in the rabbit and in the goat. *Med Vet Entomol*. 1997 Jul;11(3):300-2.
- Perrucci S, Flamini G, Cioni PL, Morelli I, Macchioni F, Macchioni G. In vitro and in vivo efficacy of extracts of *Artemisia verlotorum* against *Psoroptes cuniculi*. *Vet Rec*. 2001 Jun 30;148(26):814-5. No abstract available.
- Pinter L. *Leporacarus gibbus* and *Spilopsyllus cuniculi* infestation in a pet rabbit. *J Small Anim Pract*. 1999 May;40(5):220-1.
- Sanders A, Froggatt P, Wall R, Smith KE. Life-cycle stage morphology of *Psoroptes* mange mites. *Med Vet Entomol*. 2000 Jun;14(2):131-41.
- Smith KE, Wall R, Berriatua E, French NP. The effects of temperature and humidity on the off-host survival of *Psoroptes ovis* and *Psoroptes cuniculi*. *Vet Parasitol*. 1999 Jun 30;83(3-4):265-75.
- Wagner R, Wendlberger U. Field efficacy of moxidectin in dogs and rabbits naturally infested with *Sarcoptes* spp., *Demodex* spp. and *Psoroptes* spp. mites. *Vet Parasitol*. 2000 Nov 10;93(2):149-58.