



ZOO NOTIC RISKS

Limiting the Zoonotic Risks of External Parasites

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Abstract

External parasites such as ticks, fleas, scabies mites, and harvest mites can transmit a variety of diseases not only to pets but also to humans. Parasite prevention and treatment are the most important aspects of limiting the zoonotic risks of ectoparasites, and veterinary nurses are in the position of ensuring that client communication covers each individual pet's risk factors, preventive medications, comprehensive treatment plans, and specific parasite information.



Take-Home Points

- Ticks, fleas, scabies mites, and harvest mites can transmit diseases to both pets and people; therefore, parasite prevention and treatment are of great importance.
- Tick prevention and treatment are easily achieved by avoiding areas where ticks are prevalent, checking daily for ticks if there is a possibility of exposure, and using an oral or topical tick product.
- Sarcoptic mange typically affects dogs; however, other animals and humans may also be affected.
- Successful treatment of *Sarcoptes* mites is only achieved if all in-contact animals are appropriately treated, even if asymptomatic.
- Treating all flea life cycles and all in-contact animals, including their environment, is crucial to eradicating a flea population.
- The best defense against harvest mites is to avoid them. If necessary, fipronil or ivermectin may aid in reducing mite numbers on the pet.
- Confidence and knowledge when communicating with clients will help them understand and comply with the importance of protecting their pets and themselves against ectoparasites.
- A good understanding of each patient's lifestyle and demonstrating techniques for administration will help ensure the right antiparasitic is prescribed and applied correctly, resulting in better protection for everyone.

Just mentioning the word “parasite” can easily make anyone’s skin crawl. However, when parasites have the potential to cause harm to both pets and people, it is imperative to communicate that risk to clients in an effort to keep everyone safe and healthy. Understanding zoonotic transmission risks, parasite prevention methods, and effective ways to treat parasite infestations are critical to this task.

TICKS

The Ixodid family of ticks (also known as hard ticks) are very common parasites that feed on blood. Through their bite, they can transmit a variety of viral, bacterial, and parasitic pathogens.¹ This takes place when a tick ingests a pathogen from an infected animal, then drops off that host and feeds on a new host, transmitting the pathogen to the new host via its saliva in the process.

Zoonotic Disease Risks

Lyme disease, caused by the spirochete *Borrelia burgdorferi*, is the most commonly reported tick-borne disease in humans.² Other zoonotic tick-borne diseases in North America include anaplasmosis, babesiosis, ehrlichiosis, Rocky Mountain spotted fever, and tularemia.

All tick-borne diseases can cause flu-like symptoms in humans, including fever and chills, fatigue, headache, and muscle aches. Dermatitis, including papules, pustules, and urticaria, may appear at the site of the tick bite.³ In dogs, Lyme disease may cause similar

signs, but it is thought that the hair coat may hide the dermatologic signs.³ Dogs may also experience generalized pain, limping, pyrexia, and inappetence. Clinical signs may not develop for 2 to 5 months, by which time the disease has become systemic.⁴

Tick paralysis is a potentially fatal disease that may be transmitted to animals and humans by an infected tick. Ticks that can cause tick paralysis include *Dermacentor andersoni* (Rocky Mountain wood tick), *Dermacentor occidentalis* (Pacific Coast tick), *Ixodes holocyclus* (Australian paralysis tick), and *Dermacentor variabilis* (American dog or wood tick).¹ Female ticks of these species produce a neurotoxin in their saliva and, once engorged, transmit the toxin to the host. Tick paralysis causes damage to the spinal cord and cranial nerves that can ultimately result in death if not promptly recognized and treated.¹

Another emerging concern is alpha-gal syndrome, which causes a severe allergic reaction to a carbohydrate found in nonprimate mammalian tissues.⁵ Alpha-gal syndrome has been associated with lone star tick (*Amblyomma americanum*) bites and causes a variety of symptoms in humans, including dermatitis, severe pruritus, stomach pain, and other common flu-like symptoms. Severity varies among humans. If anaphylaxis occurs, it may become life threatening.⁶

Prevention and Treatment

The risk of tick infestation varies geographically; however, knowing where ticks may be encountered is



the first step in prevention of tick bites. Ticks typically live in wooded, grassy, or bushy areas; therefore, clients should be counseled to check both themselves and their pets daily for ticks if they have spent time outside. If possible, brush around the home should be trimmed or removed to minimize the tick-friendly environment.

If a limited number of ticks are seen on a pet or person, it is best to remove them right away. This can be achieved by grabbing the head part of the tick nearest the skin and pulling with a mosquito hemostat. If a pet is heavily infested, oral or topical antiparasitics will be necessary. Numerous commercial products exist for treating tick infestations. In some cases of heavily infested patients, owners may notice 1 or more ticks present on the pet's body following treatment; however, if the pet is not on a regular parasite preventive, it is possible that it has acquired new ticks, rather than the product not working correctly.⁷

Many preventive products effective against ticks are available. For example, drugs in the isoxazoline class (e.g., fluralaner, afoxolaner, sarolaner) are indicated for the treatment and control of tick infestations for 8 to 12 weeks, depending on the tick species. Flea and tick collars containing imidacloprid and flumethrin work by killing and repelling ticks, thus decreasing the contact time with the pet and the opportunity to feed. These products work continuously for 8 months. When choosing an antiparasitic product, it is imperative to follow the labeled directions to ensure its safety. Products made for dogs may be toxic to cats or contain higher levels of the active drug, making them contraindicated in cats. Antiparasitics containing permethrin are highly toxic to cats; exposed cats will likely require a visit to the emergency department.⁷

FLEAS

Fleas are not only the most common parasite around the world, but they are also arguably the most important and have been around for over 60 million years.⁸ In addition to harboring tapeworm larvae and causing allergic dermatitis, fleas play a role in causing bartonellosis (also known as cat scratch disease) in both pets and humans, as well as spreading the plague.

Zoonotic Disease Risks

Bartonella henselae is a bacterium most commonly transmitted to humans via a cat scratch that is contaminated with flea feces. Fever, lymphadenopathy,

and a papule or pustule at the site of the scratch are the most common symptoms of bartonellosis.⁹ Humans with a weakened immune system should therefore avoid flea-infested cats and promptly wash their hands if they come in contact with them. Proper flea prevention aids in avoiding bartonellosis.

Plague is caused by the bacterium *Yersinia pestis*, which can enter human skin via an infected flea bite. Rodents and cats may become infected by ingesting an infected animal and are the most susceptible nonhuman species; however, other animals may be affected. The most common type of plague is bubonic plague, which is characterized by abscesses near the site of infection. Less common types of plague include pneumonic and septicemic. In both humans and pets, diagnosis of plague is usually confirmed via laboratory testing of a blood or other sample, and treatment requires antibiotics. The prognosis is typically good if treatment is initiated immediately³; however, precautions must be taken to limit exposure of humans and other animals. Plague is a reportable disease in the United States.

Prevention and Treatment

Understanding the flea life cycle is crucial to controlling fleas. All life stages must be addressed, and indoor and outdoor environmental measures need to be taken to ensure complete resolution of a flea infestation. Indoors, this may be achieved by washing all bedding, couches, and chairs where affected pets spend their time. Vacuuming and cleaning the carpet are also beneficial to remove flea eggs, larvae, and newly hatched adult fleas.¹⁰ Flea-infested outdoor areas should be avoided, if possible. If needed, outdoor areas that pets frequent may be treated with over-the-counter flea products found in stores. Fleas typically survive in shaded grassy or leafy areas; therefore, keeping these areas clean and mowed is beneficial.¹⁰

Many parasiticides that kill adult fleas are available and, like tick prevention products, contain imidacloprid, selamectin, fluralaner, fipronil, and pyrethrins.¹⁰ Topical, oral, and spray formulations are available. Oral antibiotics with or without antifungals may be prescribed to address secondary pyoderma caused by flea bites. Glucocorticoids are often used concurrently to aid in alleviating pruritus.¹⁰

Owners must understand that flea infestations in the home cannot be eliminated immediately, due to the many life stages that are present in the environment.



Complete flea control may take several months; therefore, persistence is the key component. Because fleas are so prevalent in most areas of the world, year-round flea prevention is crucial to flea control.¹⁰

SCABIES MITES

Sarcoptes scabiei (scabies mite) is a common mite found throughout most of the United States. Classic signs of infestation by *Sarcoptes* mites in veterinary patients include erythema, crusting, and marked pruritus that is not steroid responsive. Commonly affected areas include the elbows, neck, hocks, elbows, and pinnae.⁷

Scabies mites are extremely contagious, depending on the environment.¹¹ Female mites are typically able to survive longer without a host than males, and they thrive in areas with lower temperatures and increased humidity. Indoors, all life stages can survive without a host for 2 to 6 days.⁷ Since transmission does not require direct contact with an infested animal, parks, grooming facilities, and even veterinary hospitals may be sources of infestation.¹¹

Diagnosis can be achieved via broad, superficial skin scrapings of affected areas. Since the mites can be difficult to find, a negative skin scrape does not rule out scabies infestation. If *Sarcoptes* species are suspected, a treatment trial of an approved product can help ensure the mite does not go undiagnosed.¹¹ Concurrent secondary pyoderma is often present and must be addressed to alleviate pruritus.

Zoonotic Disease Risk

In humans, scabies causes raised, papular, pruritic dermatitis.⁷ Infestation is typically self-limiting; however, the immunocompromised, young, and elderly may be at risk for more severe symptoms. If *Sarcoptes* infestation is suspected in a person, a dermatologist can provide the best treatment to eradicate the mite.

Prevention and Treatment

Decreasing the mite burden is essential to reducing the zoonotic risk of scabies. All materials that have come in contact with affected animals must be washed frequently. Vacuuming and mopping of floors will help decrease the mite burden in the home. All in-contact animals must be treated appropriately to ensure complete resolution of an infestation. It is imperative to treat all in-contact animals, even if some are

asymptomatic, since the clinical signs and severity of infestation vary.¹¹ Scabies can be prevented by applying selamectin every 30 days. This is currently the only treatment approved by the U.S. Food and Drug Administration for prevention and treatment of *Sarcoptes* infestation. If a patient has suspected or confirmed scabies, there are some reports of higher efficacy if selamectin is applied every 14 days for 3 treatments, then monthly thereafter as continued prevention.⁴ Recent studies report that isoxazolines are effective against *Sarcoptes* species after 14 days of receiving treatment, with full resolution of symptoms noted after 21 to 28 days.¹²

HARVEST MITES

Several hundred species of harvest mites exist. These mites are typically found on decomposing plant material, and they are usually encountered in late summer and fall. The larvae of harvest mites (known as chiggers) cause intense pruritus when they bite animals and humans; in dogs, they also cause dermatitis, fatigue, pyrexia, and digestive disorders.⁷ Most affected pets and people are likely to have spent time in woods and fields.⁷

Zoonotic Disease Risk

While currently of less concern in the United States,¹³ harvest mites are of great importance in other countries due to their potential to transmit the disease scrub typhus to humans. Scrub typhus is caused by the rickettsial organism *Orientia tsutsugamushi* and causes a wide range of symptoms, including fever, headache, confusion, and dermatitis. The incubation period prior to the appearance of symptoms often makes this disease difficult to diagnose.¹³ However, if this infection goes untreated, it may be fatal, making its prevention a priority. Scrub typhus is most prominent in Southeast Asia, China, Indonesia, Japan, India, and Australia.¹³

Prevention and Treatment

The best way to prevent bites from chiggers is to avoid areas of vegetation and brush. If walking through these areas cannot be avoided, wearing long pants and boots provides some protection. For people, topical products containing DEET (diethyltoluamide) can be used to prevent chiggers from adhering to the skin. DEET should not be used on pets. Parasiticide treatment of harvest mites is not necessary as the life cycle of harvest mites is not completed on animals; therefore,



SCAN THE QR CODE

for a client handout you can share during physical exams, in the waiting room, or on social media.

infestation eventually resolves without intervention. Products containing fipronil or ivermectin may reduce mite numbers on heavily infested pets but will not completely eradicate the mites.⁷ Occasionally, a short course of glucocorticoids can be used to help relieve pruritus. Tiabendazole is also effective for small, spot-on areas or within the ear canal.⁷

CLIENT COMMUNICATION TIPS

1. Routine annual examinations offer great opportunities to discuss parasites and their zoonotic potential as part of a conversation about parasite preventives. Rather than listing reasons the pet should be on a good parasite prevention plan, attempt to have an interaction with the client. If clients can gain a concrete understanding of the important risks parasites pose, they will be more likely to protect their pets and thus themselves.
2. While discussing parasites with clients, it is crucial to be knowledgeable and confident in the information you are providing. Clients will be more likely to trust your information and follow through with your professional recommendations as a result.¹⁴
3. Asking open-ended questions about the client's and patient's lifestyles will offer insights into which antiparasitic would be best for the pet, improving client compliance and protection for everyone.
4. Showing clients how to properly administer or apply each product ensures their pet is protected.
5. Clients should be advised to call their veterinarian if their pet is experiencing dermatitis or pruritus, or if they suspect their pet may have an ectoparasite, so it can be quickly and efficiently addressed.
6. The veterinary team and client ultimately all have the patient's best interest at heart; therefore, the more informed each client is, the better the outcome will be for both them and their pet.

SUMMARY

Ticks, scabies, fleas, and harvest mites all have potential to cause serious health problems in pets and humans. Since these parasites are ubiquitous and can survive in many different environments year-around, broad-

spectrum parasite products are the best defense against parasite infestation and risk of zoonotic infections. Regularly treating pets with antiparasitic products can significantly decrease the parasite burden in the home environment, decreasing zoonotic potential. **TVN**

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