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Popular Article

Flea Infestation in Animals

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Abstract

Fleas cause direct harm to their hosts' skin inducing discomfort and stress. They also serve as potent vectors of various diseases. Out of over 2,500 identified flea species, three primarily feed on birds and pets. The most prevalent species is the cat flea, *Ctenocephalides felis*, commonly found on both dogs and cats worldwide while dog flea, *Ctenocephalides canis* is found in dogs. The chicken flea, *Echidnophaga gallinacea* and human flea, *Pulex irritans*, are also globally distributed but at lower rates. These fleas are not highly specific to particular hosts, allowing them to infest companion animals, humans, and wildlife alike. High rates of flea infestations, known as pulicosis, are common among dogs and cats, making treatment and prevention a key focus in veterinary care.

Introduction

Fleas are small, wingless insects that rely on animal blood for sustenance. They can transmit diseases and trigger allergies or anemia. Over 2,500 flea species are identified globally, although only a few frequently infest pets and other animals. The most common species affecting pets are the cat flea (*Ctenocephalides felis*) and the dog flea (*Ctenocephalides canis*), with cat fleas most often found on both cats and dogs. Fleas cause irritation in both animals and humans and can spread various diseases, such as tapeworm and rickettsial infections, apart from causing irritation and discomfort.

Morphology

Adult fleas are small, wingless insects measuring about 2 to 4 mm, varying in colour from orange to dark brown. Fleas bodies are laterally compressed, meaning they're narrow but relatively tall. This shape enables them to navigate smoothly through an animal's fur. They possess three pairs of legs, with the last pair being highly developed, giving them their notable jumping ability.

With biting-sucking mouthparts, fleas can easily pierce the skin and locate blood for sustenance. Sticktight fleas (*Echidnophaga gallinacea*) are commonly found on ground-dwelling

animals like squirrels and poultry, with females often attaching themselves to the host's ears or around the eyes. Cat fleas and dog fleas are morphologically similar, differing primarily in the size of their combs, abdomen, and the distribution of body and leg bristles. The comb on the ventral margin of the head, the genal ctenidium, distinguish between *Ctenocephalides canis* and the cat flea, *Ctenocephalides felis*. The size of the first two genal spines also differentiates the two species. The first (or outer) genal comb of *Ctenocephalides canis* is much shorter than the second. In *Ctenocephalides felis*, the first genal comb is as long as the second.. *Ctenocephalides canis* have a head that is comparatively more rounded and about one and a half times as long as it is wide, while the head of *Ctenocephalides felis* is about twice as long as it is wide. The cat flea has four to five "teeth" on the tibia of all six legs, whereas the dog flea has seven to eight teeth on the tibia of all six legs. The sticktight flea donot have pronotal and genal combs and have a pair of hairs behind antennae.

Lifecycle

Adult fleas stay on their host to feed, mate, and lay eggs. Female fleas produce around 20 to 50 eggs daily. These small, oval, white eggs fall off the host and scatter onto surfaces in the animal's surroundings, such as bedding or carpets. Eggs hatch within 1 week. Flea larvae, have wormlike shapes, brownish heads, though they lack eyes and legs. They feed on the dried blood and waste that adult fleas produce. Larvae develop in environments spending 1-2 weeks feeding and moving about before constructing small silken cocoons where they pupate. These cocoons are usually camouflaged with pet hair or skin. Larvae grow faster in warmer conditions. In cooler temperatures, fully developed fleas can remain dormant within their cocoons for up to a year. They sense signals such as vibrations, higher CO_2 levels, and increased humidity to determine the presence of a host. Upon hatching, fleas survive for about one week without host, though this duration varies depending on humidity and temperature. When they find a host, fleas jump onto it and begin feeding right away. Under ideal conditions, the flea life cycle completes in around 18 days.

Pathogenesis and Clinical Signs

The classic clinical signs typically involve crusted, itchy skin over areas like the hips, base of the tail, and thighs. This often results in hair loss, scabbing, and secondary infections. As the condition progresses to a chronic stage, symptoms like hair loss, thickened skin, and darkened skin color are observed. Fleas also consume significant amounts of blood, and severe infestations left untreated can lead to anemia or even death, particularly in smaller animals like puppies or kittens. On average, each flea consumes about 15 microliters of blood daily.

Adult flea bites typically trigger a delayed skin reaction and irritation. Initially, lesions present as small, isolated, or clustered red spots. Each bite often forms a wheal, reaching a sudden peak within minutes, usually accompanied by itching. Over time, the lesion may harden into a papule. Repeated

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flea exposure in sensitive dogs and cats can lead to flea allergy dermatitis showing symptoms such as redness, hair loss, excoriation, papules, crusting, and intense itching, which may result in self-inflicted injuries. Cats, on the other hand, tend to develop miliary dermatitis, marked by nibbling, hair loss, severe itching, licking, scratching, and self-trauma.

Fleas, and occasionally lice, serve as intermediate hosts for the tapeworm *Dipylidium caninum*. Flea larvae consume Dipylidium eggs, enabling the tapeworm to develop to the cysticercoid stage within the flea. They also transmit *Acanthocheilonema reconditum*, a microfilaria transmitted by the flea's saliva while biting. Flea excrement, also known as flea dirt, can carry *Rickettsia typhi* or *Rickettsia felis* bacteria, which may accidentally come into contact with open wounds, including those from flea bites.The bacterium *Bartonella henselae* causing Cat Scratch Disease contracted from a bite or scratch from an infected cat, spread from one cat to another through Ctenocephalides *felis*.

Treatment

The primary goals of flea control include removing fleas from pets, eradicating environmental flea populations, and preventing future infestations. The first step involves eliminating fleas on the pet, which can be done using various insecticides like shampoos, sprays, dips, powders, or oral treatments. Environmental treatment typically uses a combination of adult insecticides and growth regulators. The dogs with flea allergy dermatitis, may be supplemented with anti-inflammatory treatments like prednisone or prednisolone to alleviate symptoms.

Spot-on flea treatments applied between an animal's shoulder blades spread across the coat or are absorbed into the skin, providing comprehensive protection. These products kill adult fleas within hours of contact and are safer than products containing carbamates or organophosphates, as they are less toxic to mammals. The insect development inhibitor Lufenuron can be given monthly to dogs or cats as an oral pill or injectable or food additive to prevent flea reproduction. Although Lufenuron does not kill adult fleas, it prevents new infestations. Nitenpyram can be another option for rapidly reducing flea populations. Flea collars containing insect growth regulators (IGRs) such as Methoprene and Pyriproxyfen, along with insecticides like Permethrin and Tetrachlorvinphos, release IGRs that spread across the pet's coat, targeting flea eggs and female adult fleas.

Fipronil, Isoxazolines and Imidacloprid are highly efficacious compounds against fleas. Selamectin has larvicidal activity as active drug is passed in flea dirt. Dinotefuran kills fleas on contact and needs to be applied every 4 weeks.

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