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Fleas

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Common Name	Scientific Name
Cat Flea	<i>Ctenocephalides felis</i> (Bouche)
Dog Flea	<i>Ctenocephalides canis</i> (Curtis)
Northern Rat Flea	<i>Nosopsyllus fasciatus</i> (Bosc)
Oriental Rat Flea	<i>Xenopsylla cheopis</i> (Rothschild)
Rabbit Flea	<i>Cediopsylla simplex</i> (Baker)

Fleas (Order: Siphonaptera) are very important pests on domestic dogs and cats, especially during the warm months of July through October, but fleas may persist all year indoors. It is estimated that pet owners alone spend over \$1 billion each year controlling these ectoparasites.

There are over 2,000 described species of fleas worldwide, however the most common flea encountered in and around homes is the cat flea. The dog



Cat flea

flea, while very similar to the cat flea, is relatively rare in North America. Most dogs infested with fleas have cat fleas! Adult fleas are not only a nuisance to humans and their pets, but can cause medical problems including flea allergy dermatitis (FAD), transmission of tapeworms, secondary skin irritations, and, in extreme cases, anemia. Although bites are often felt as a sharp pricking sensation, it is the resulting irritation caused by flea salivary secretions that varies among individuals. Some may experience a severe reaction (general rash or inflammation) that results in secondary infections caused by scratching the irritated skin area. Others may show no reaction after repeated bites over several weeks or months. Bites on humans are usually found on the ankles and legs. The typical reaction to the bite is the formation of a small, hard, red, slightly raised (swollen) itching spot, surrounded by a red halo. Flea bites on sleeping people typically occur in clusters or lines of two or more bites. On pets, fleas tend to concentrate their bites to the neck, shoulder blades, and base of the tail regions. However, with heavy infestations, the fleas can be seen running across the sparse hair areas of the belly.

While rare in North America, fleas are known to transmit bubonic plague from rodent to rodent and from rodents to humans. Oriental rat fleas can transmit Murine typhus (endemic typhus). Tapeworms use fleas as intermediate hosts to infest dogs and cats. The flea larvae may consume tapeworm eggs, the eggs develop into a larva that incysts in the flea

muscles, and if an infested flea is eaten by a cat or dog, the tapeworm completes its development in the cat or dog gut. Rarely, children can be infected with tapeworms if parts of infested fleas are accidentally consumed.

Identification

Adult fleas are approximately 1/8-inch long, dark reddish-brown, wingless, hard-bodied insects, with enlarged hind legs, and are flattened laterally (from side to side) allowing easy movement between hair, fur, or feathers on the host. Fleas are excellent jumpers, leaping vertically up to seven inches and horizontally thirteen inches. They have piercing-sucking mouthparts and spines on the body projecting backward. They also have a distinct row of spines on the face known as a genal comb. These backward-facing spines lock into hairs, which makes fleas difficult to pull out of the fur of animals. Eggs are smooth, oval, and white, approximately (0.5 mm). The worm-like larvae are 1/4-inch long (1.5–5.0 mm long), slender, translucent white, and sparsely covered with hairs. Larvae are blind and legless with chewing mouthparts. Flea larvae are typically active at night and tend to avoid light by hiding in carpet fibers, bedding, lawns or other protected areas. Pupae are enclosed in silken cocoons covered with particles of debris.

Life Cycle and Habits

Fleas pass through a complete life cycle consisting of egg, larva, pupa, and adult stages. Completion of the life cycle varies from two weeks to eight months depending on the temperature, humidity, food, and species. Normally, with regular blood meal access, the female flea can lay 15 to 20 eggs per day (up to 600 in a lifetime) on the host (dogs, cats, rats, rabbits, mice, squirrels, chipmunks, raccoons, opossums, foxes, chickens, humans, etc.). Eggs are loosely deposited in the hosts' skin, fur, or feathers and usually drop out where the host sleeps and frequents (rugs, carpets, upholstered furniture, cat or dog boxes, kennels, sand boxes, lawns, etc.). Eggs hatch in approximately two to 14 days.

Larvae pass through three instars and take a week to several months to develop. Their diet consists primarily of organic debris but the mature flea larva requires a blood meal that is supplied by the adult fleas. Adult fleas suck out more food than they need

to digest. The excess blood is excreted which dries and falls from the host animals as small black pellets. These pellets can be detected by placing the pet in a white sink or bath tub and combing the fur. When the dark pellets are moistened with water, they will turn the water bright red. Pupae mature to adulthood



Flea larva

within a silken cocoon woven by the larva, to which pet hair, carpet fiber, dust, grass cuttings, and other debris adhere. In about five to fourteen days, adult fleas emerge or they may remain resting in the cocoon until they receive a signal that a host is near. Signals may include vibrations (pet and people movement), pressure (host animal lying down on them), heat, noise, or carbon dioxide. Most fleas overwinter in the larval or pupal stage. Survival and growth are most successful during warm, moist winters and springs. Newly emerged adults will live for about a week without a blood meal, but can survive two months to several years between meals. Optimum conditions for the flea's life cycle are 70°F to 85°F and 70% humidity.

Control Measures

The best way to approach flea control is using integrated pest management (IPM) techniques. This involves cleaning and removing food for the flea larvae while targeting both adult fleas and the larvae with pesticides. Flea control is best achieved with simultaneous, coordinated efforts involving strict sanitation, pet treatments, and premise treatments (both indoors and outdoors).

Prevention

Trim lawns and weeds to create a less habitable environment for flea larvae and adults. Restrain cats and dogs so that they can't roam freely in heavily infested areas or contacting other infested animals. Discourage nesting or roosting birds and other mammals on or near the premises. Screen or seal vents, chimneys, crevices, etc., where rats, mice, squirrels,

raccoons, chipmunks, etc., may enter crawlspaces and buildings. Regularly wash or destroy pet bedding, and regularly groom pets and vacuum frequently. Frequent vacuuming has been shown to remove up to 95 percent of the flea eggs, some larvae, and adults.

Inspection

Pets usually display signs of discomfort when they are infested with fleas. Frequent scratching and biting of the legs, belly, and back areas often are signs of flea infestations. Fleas can be difficult to find in the fur of animals. Try to separate the fur on the shoulder blades and at the base of the tail to see if you can observe fleas running about. If the pet will allow, place it in a large sink or bath tub and comb the back and sides of the body. If any small black specks fall off, wet them with some water. If they turn red, they are the blood fecal pellets of adult fleas. Before treatment, observe where the pet prefers to rest. Research has demonstrated that these areas will contain the highest amount of eggs, larvae, and pupae even after vacuuming. Hot spots for homes with dogs are usually areas where the pet goes in and out of the house, eats, sleeps, and spends time with the family at the base of furniture. For cats, check carpets and furniture where the pet frequents. Blood pellets from infested cats may also be found on the tops of refrigerators, tabletops, bookcases, and higher locations.

Sanitation

Vacuuming carpet thoroughly with a beater-bar type vacuum where the pet rests and sleeps will help control flea larvae by removing eggs and dried blood feces (larval food) plus opening up the carpet's nap for more effective insecticide treatment. Vacuuming must be performed on a regular basis (every other day) to be effective. Concentrate on areas where lint and pet hairs accumulate along baseboards, around carpet edges, on ventilators, around heat registers, in floor cracks, and under and in furniture where the pet sleeps. After vacuuming, place the vacuum bag in a plastic bag capable of being tightly sealed and discard in an outdoor trash container. If the cleaner uses a liquid water medium in a plastic pan (rather than a dust bag) discard dirty water far away from the house or flush.

Repellents

Repellents applied to the skin or clothing will only mask flea problems. However, if you are visiting a site where fleas are common and they are biting people, treatments can be useful. Most repellents that repel mosquitoes and ticks will also repel adult fleas.

Biologicals

Diatomaceous earth (DE) absorbs lipid from the cuticle of insects, causing dehydration of fleas and other common household insects. DE can be sprinkled in the corners of rooms and near furniture where pets often sleep, then vacuumed thoroughly. Parasitic nematodes, especially *Steinernema carpocapsae*, are labeled for use against flea larvae and pupae in yards and gardens.

Botanicals

There are numerous plant-based products on the market that claim to be effective against fleas. The most common of these are pyrethrum-based products. Unfortunately, many flea populations are resistant to natural pyrethrum as well as the synthetic versions, pyrethrins. Many websites recommend feeding pets garlic, brewer's yeast, or B vitamins but none of these home remedies have been shown to be effective against fleas. Also, pennyroyal, eucalyptus, rosemary, tea leaves, and citronella have not provided effective control. In fact, overdosing of any of these materials can be irritating or even toxic to pets.

Mechanical/Cultural Control

Flea combs are commonly sold and can assist in removal of adult fleas from an infested animal, but this only deals with one small component of the flea population. There are also light traps that use sticky cards to trap adults, but, again, these trap only a small portion of the total possible flea populations and they do nothing to control the flea larvae. Flea adults and larvae do not hear ultrasonic sounds, so these are not useful in deterring fleas. The use of dehumidifiers with air conditioning and vacuuming can assist in reducing flea populations within the home.

Chemical Control

There are literally hundreds of products on the market for flea control on pets and the premises. For successful flea control, infested pets and the premises need to be treated at the same time.

Regular, preventive treatment of cats and dogs is the most reliable way of keeping the pets clean of fleas and to avoid development of a complete flea infestation that includes the larvae and pupae. When this approach has not been followed, it is strongly recommended that a veterinarian and a licensed professional pest control operator be consulted or hired, as both have the experience, training, equipment, and most effective insecticides for overall flea control.

Pets

There are many formulations as shampoos, aerosols, dips, sprays, dusts (powders), collars, dab-ons, spot-ons, and monthly tablet or oral liquid treatments. Usually, the most effective pet treatments are available through licensed veterinarians. Some pet owners prefer to use shampoos and other topical treatments, while others prefer the convenience of the spot treatments or monthly oral treatments.

When using pesticides applied to pets, be sure to read, understand, and follow the instructions on the label. Products need to have the pet type on the label. Some products that can be used on dogs cannot be used on cats and vice-versa. Applications

more frequent than on the label or used at higher than label rates can result in pet illness or even death!

Homes

Total release aerosols (often called “bug-bombs”) are not recommended as the vapors rarely get to the location of flea larvae or pupae. Sprays and dusts are not normally recommended or labeled for interior use against fleas. Those that are effective usually have a knock-down pyrethroid (a chemical ending in “-thrin”) and an insect growth regulator. The insect growth regulators interfere with the development of the larvae and egg production by the female flea.

Outdoors

If the cat or dog regularly goes outside, especially to rest or sleep, treatment will be useful. Treat outdoor areas frequented by pets during the summer months. Animal pens, kennels, doghouses, crawlspaces, and turf areas used by the pets are important to spot treat with a hand sprayer. Clean and sweep porches, mow the grass, and soak dry soil with water before treating to bring the flea larvae up to the surface. Additional treatments at intervals, according to label directions, may be needed.

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