



Controlling Fleas



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Fleas are small, wingless insects that feed on the blood of animals and people. Americans spend about \$9 billion a year controlling fleas – one of the biggest expenses for pet owners.

In Texas, most flea problems are caused by the cat flea, *Ctenocephalides felis*. This flea feeds on cats, dogs and wildlife. Other kinds of fleas, such as the dog flea, human flea, and rat flea, are less common on pets and in homes. Fortunately, fleas need not be a serious problem because there are many effective treatments.

Identifying the problem

Adult cat fleas are about $\frac{1}{8}$ inch long (1 to 3 mm). They are brownish-black, flattened looking, and without wings. Backward-pointing bristles help fleas move through the hairs or feathers of host animals and make them more difficult to remove by grooming. The six legs, especially the hind pair, are long and adapted for jumping.

Flea larvae are less than $\frac{1}{4}$ inch long (6 mm), legless, and dirty white in color. The most likely place to find larvae is in infested pet bedding.

Understanding fleas

During their life cycle fleas pass through four stages—egg, larva, pupa and adult. Although they can jump, adult fleas do not usually travel long distances without a host. Fleas prefer to wait and jump onto a passing animal. Once aboard, they remain until they are dislodged or groomed from the animal. Without a host, adult fleas live only a few days to 2 weeks. On short-haired cats and dogs fleas survive an average of 8 days; they live longer on long-haired animals.

The female flea begins laying eggs within 2 days of her first blood meal. Four to 9 days later she produces an average of 27 eggs per day, consuming about 15 times her body weight in blood daily. Much of this blood is excreted as partially digested feces. Flea feces are a fine, reddish-black dust seen in pet fur and bedding.

Flea larvae feed on adult flea excrement. Without it, they cannot survive, although they also may feed on organic matter such as food particles, dead skin or feathers. Larvae develop in 5 to 11 days.

Fleas do not survive well outdoors in hot, sunny lawns. Relative humidity less than 50 percent or soil temperature higher than 95 degrees F kills flea larvae. Moist, shaded spots near pet resting areas are the places to find fleas. Indoors, flea larvae are usually found under furniture and in pet bedding.

The pupa is the transition stage between the larva and adult. The pupa forms inside a cocoon spun by the larva. After a week or two the pupa becomes an adult. The adult flea may remain in the cocoon for up to 5 months, but when stimulated by a passing animal the adult can emerge within seconds. Long-vacant homes or apartments can “come alive” with such fleas when new inhabitants move in.

Animal and human health

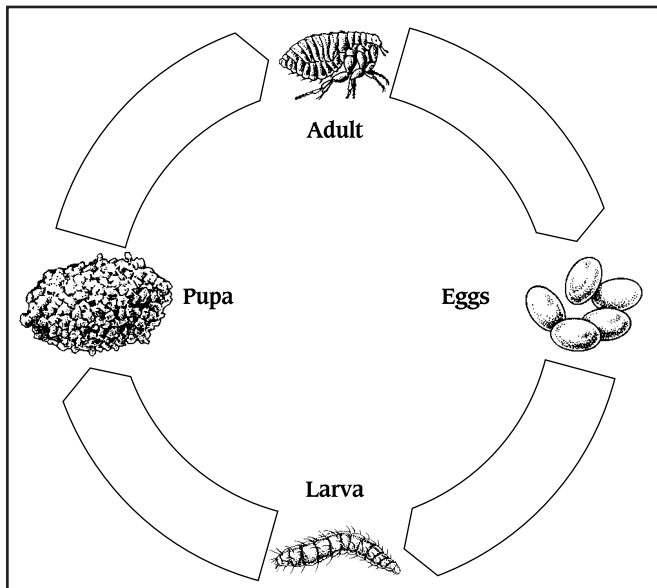
Fleas can be a source of both irritation and disease. Dogs and cats scratch constantly when heavily infested, resulting in soiled and roughened coats and, sometimes, in nervous conditions. The most serious effects occur when a pet develops an allergy to flea bites. As few as one or two bites can cause severe itching and scratching in allergic pets.

Cat fleas do not normally live on humans, but do bite people who handle infested animals. Flea bites



Cat fleas are the most common fleas on dogs and cats. They also infest raccoons, opossums and coyotes.

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Flea life cycle. (Illustration courtesy of Novartis Corp.)

cause small, red, itchy bumps, usually on the ankles and lower legs. People with allergies to flea bites suffer from hives, rashes or generalized itching. Allergic reactions usually appear 12 to 24 hours after a bite, and may last a week or more.

Fleas that have fed on rodents may transmit diseases, including plague and murine typhus. For this reason, avoid close contact with wild rodents such as squirrels, rats and prairie dogs. Their fleas can bite you and may transmit disease. Cat fleas, however, do not carry plague.

Control

An integrated flea control program includes good sanitation and treatment of the pet and environment. You can eliminate fleas from your home with proper treatment, but it may take time, especially if the infestation is heavy.

Sanitation. Change pet bedding regularly and vacuum thoroughly. Vacuuming removes up to 30 percent of the larvae and up to 60 percent of flea eggs from a carpet, as well as the larvae's food supply of dried blood.

Vacuum under furniture, cushions, chairs, beds, and along walls. Discard vacuum cleaner bags at least once a week. Fleas can continue to develop inside vacuum cleaner bags and re-infest the house.

Treating Pets. Your pet's first line of defense against fleas is a flea comb and a good bath. Soap acts as a gentle insecticide and helps control light infestations on your pet. Though time consuming, combing helps reduce the need for insecticides. Flea combs have fine teeth that remove adult fleas from fur. Most dogs and cats seem to enjoy this treatment; pay special attention to the face and neck, and the area in front of the tail. Dip the comb frequently in soapy water or an alcohol solution to kill fleas removed from the pet.

Insect growth regulators, or IGRs, are a safe preventative treatment for fleas. These products work by

disrupting the normal development of flea eggs and larvae. When exposed to IGRs, adult fleas are unable to reproduce; eggs fail to hatch and larvae die before they complete their development. Because most IGRs kill only eggs and larvae, they do not eliminate adult fleas quickly. For this reason, they are usually mixed with a mild insecticide.

Insect growth regulators are available as sprays, spot-ons, pills or food additives. One product designed for internal use is called Program® (active ingredient: lufenuron). Program® can be given as a pill (for dogs), food additive (for cats), or injection (for cats). A similar product, Sentinel®, contains lufenuron plus a heartworm preventative. These products are available only through veterinarians. They are very effective, particularly for indoor pets.

Two other insect growth regulators for topical use are methoprene and pyriproxyfen. Methoprene is sold under several trade names including Precor® and vIGRen®. Methoprene and pyriproxyfen are available at pet stores as dips, pet sprays, spot-ons and flea collars. Control requires 4 to 6 weeks.

For severe flea problems, an IGR treatment may not be quick enough. Use a product that kills adult fleas, such as imidacloprid (Advantage™) or fipronil (Frontline™). Both products have low toxicity to mammals and pose little risk to pets or people. Advantage™ and Frontline™ provide 1- and 3-month protection from fleas, respectively. Frontline™ also kills ticks for up to 1 month after application. Both Advantage™ and Frontline™ are available from veterinarians as spray and spot-on treatments.

Spot-on treatments (pesticides applied to one or more spots on the animal's back) control adult fleas effectively. Natural oils on the fur help transfer the pesticide to all parts of the pet's body. With all products, read and follow label directions carefully. Products designed for use on adult dogs should not be used on puppies or cats, unless specified on the label.

Botanical (plant-based) insecticides kill adult and larval fleas and are relatively low in toxicity. Botanical insecticides include pyrethrum (or pyrethrins) and citrus oil extracts (limonene and linalool). Use botanical insecticides with care. Though usually safe when applied according to label directions, some pets (especially certain cat breeds) are sensitive to botanicals—especially citrus oil products.

It is sometimes claimed that garlic, Brewer's yeast, cedar bedding and various herbal sachets control fleas, but there is little scientific evidence to support such

Fleas, but no pets?

Buildings sometimes become infested with fleas even when there are no pets around. Other animals such as bats, roof rats, squirrels, raccoons, and wild dogs and cats commonly nest in structures and may be the source of an infestation. An experienced pest control company can treat for fleas and seal openings through which wildlife may enter your home.



Be sure to read pesticide labels carefully. Products that are safe for dogs may not be safe for cats, puppies and kittens. Generally, pets less than 4 weeks old should not be treated directly for fleas.

claims. Volatile oils in fresh cedar chips are toxic to fleas, but the effect lasts a very short time. Tests have shown that Brewer's yeast does not protect pets from fleas.

Treating homes. The pet's living areas should be treated at the same time that the pet is treated. This kills immature and newly emerging fleas and prevents re-infestation of the pet.

Several low-toxicity treatments are available for indoor use. Citrus sprays containing limonene or linalool can be applied to rugs, carpeting and pet bedding. These products kill fleas on contact, but evaporate quickly and leave little residual protection against emerging fleas.

Boron-based products, such as disodium octaborate tetrahydrate, can be used on indoor carpeting and have little skin (dermal) toxicity. Borates kill immature fleas by contaminating their food supply. Because adult fleas feed on fresh blood only, boron insecticides do not control this life stage. Borate treatments are best applied as shampoos to avoid problems with dustiness, abrasion to carpets, and contamination of furniture or food preparation surfaces.

The insect growth regulators methoprene and pyriproxyfen can be used indoors. Although methoprene is unstable in sunlight, it is an effective indoor treatment. Pyriproxyfen sprays, available to pest control professionals under the trade names Archer™ and Nylar™, can be applied both indoors and outdoors. Pyriproxyfen controls both immature and adult fleas. Indoors, treat pet loafing and sleeping areas, and in and under nearby furniture. Outdoors, treat only flea breeding sites such as bedding areas, the ground under decks and shrubbery, and wherever pets spend a lot of time. Well maintained lawns in sunny sites are unlikely to harbor many fleas. Suitable consumer products for indoor and outdoor treatments are listed in Table 1.

Follow-up. Because flea pupae are hard to kill with insecticides, an additional follow-up treatment is usually needed 7 to 10 days after the first application. When using short-residual insecticides such as pyrethrins, two or three follow-up sprays at 5- to 10-day intervals may be required.

Biological and Mechanical Controls

Fire ants and other predatory insects eat flea larvae but they do not control fleas completely. Several kinds of predatory nematodes (a type of microscopic worm) are sold for outdoor flea control, but their effectiveness has not been well tested. Studies suggest that nematodes work best in sandy soils. Irrigate with $\frac{1}{4}$ to $\frac{1}{2}$ inch of water before and after application. This prolongs nematode survival and helps them move through the soil in search of flea larvae.

Several kinds of flea traps are available from pest control companies and pet stores. The most effective designs use a special green light that blinks occasionally to simulate the shadow of a passing host. Most attract fleas to a sticky card, where they are trapped. Place traps near pet beds and loafing areas for best control. By themselves, traps are unlikely to solve most flea problems; however, they can be a useful part of an integrated flea control program for your home.

Don't wait until fleas get out of hand. Begin your flea control program early for best results. Start a frequent and thorough sanitation program, regularly inspect your pet for fleas, carefully follow the label directions of the insecticide product you choose, and dispose of all pesticides safely. These steps will help you reduce the need for extra pesticide treatments.

Tapeworms and fleas

Cat fleas sometimes carry an intestinal parasite called dog tapeworm, *Diphylidium caninum*. The dog tapeworm has an interesting life cycle. It lives in the intestinal tracts of dogs, cats and sometimes humans. These long, flattened worms consist of up to 200 body segments (called proglottids) and may reach a length of 12 inches (30 cm). When mature, these segments detach from the main body of the tapeworm and wriggle from the anus of an infected animal. Fresh tapeworm segments are opaque white or pinkish white, flat, and somewhat rectangular. When newly emerged, they move with a stretching-out and shrinking-back motion. When dry, the segments are yellow or off-white, less than $\frac{1}{16}$ th inch long, rice-shaped sacs. Each sac contains tapeworm eggs. Tapeworm egg sacs are frequently seen attached to hairs around the pet's anus, in feces, or in the bedding of infested pets. Flea larvae feed on tapeworm egg sacs. Once inside the flea, the tapeworm eggs hatch and the flea becomes infested. Infested adult fleas carry a stage of the tapeworm that can mature and multiply if the flea is swallowed by a pet. During grooming, pets often ingest such tapeworm-infested fleas. Once released into the pet's digestive tract, tapeworms mature into adult forms. On rare occasions, small children may ingest fleas and become infested in this way. If you see proglottids in your pet's feces or bedding, you should have your pet treated. Veterinarians can prescribe pills or injections to safely treat for tapeworms in pets.

Safety Considerations

It's important to wear the proper protective clothes when applying pesticides. Long pants, a long-sleeved shirt, socks and shoes are the minimum. Check the pesticide label for additional safety requirements. When mixing liquid pesticides wear unlined, chemical-resistant gloves. Allow pesticide sprays to dry thoroughly before letting people or pets into a treated area.

Never dispose of flea dips or other unused pesticides in storm sewers, toilets or sinks. This pollutes the environment and can result in costly clean-ups for your community. Leftover flea dip may be poured onto a grassy area for biological degradation, or disposed of in some other manner as specified on the label.

Working with a Pest Control Company

Sometimes it's best to have professional help when dealing with fleas. A pest control company can treat both indoor and outdoor areas.

- Before having your home professionally treated, vacuum carpets and clear toys and clothing from areas to be sprayed. Vacuuming helps straighten fibers and prepare the carpet to receive treatment. Plan to stay off treated carpets until sprays have thoroughly dried, usually at least 2 hours.
- Ask the pest control operator to use the least toxic materials necessary to do the job. Use insect growth regulators for long-term control.

Table 1. Common, effective household insecticides for control of fleas.

Active ingredient (trade name)*	Formulation	Area of use
carbaryl (Sevin)	spray, dust	outdoor, pet treatment
chlorpyrifos (Dursban)	spray, granule**	outdoor
d-limonene (Demize)	spray	indoor, pet treatment
diatomaceous earth	dust	pet bedding
diazinon	spray, granule**	outdoor
malathion	spray, dust	outdoor
methoprene (Precor, Ovitrol, Petcor, vIGRen)	spray, wipe-on, collar	IGR indoor, pet treatment
propoxur (Baygon)	spray, dip, collar	outdoor, indoor, pet treatment
pyrethrins	spray, shampoo, dip	indoor, pet treatment
pyriproxifen (Archer, Nylar, BioSpot)	spray, shampoo, dip, spot-on	IGR outdoor, indoor, pet treatment

*Trade names are registered® or trade marked™.
 **Use liquid rather than granular formulations for best control of fleas outdoors.

Insecticide labels are subject to change, and changes may have occurred since this publication was printed. The pesticide USER is always responsible for the effects of pesticides on his own plants, animals or household items, as well as problems caused by pesticides drifting to other properties. Always read and follow carefully the instructions on the container label.

The information given herein is for educational purposes only. Reference to trade names is made with the understanding that no discrimination is intended and no endorsement by the Texas Agricultural Extension Service is implied.

Produced by Agricultural Communications, The Texas A&M University System

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Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Chester P. Fehlis, Deputy Director, Texas Agricultural Extension Service, The Texas A&M University System.