FLEAS

Integrated Pest Management In and Around the Home

Cat fleas *(Ctenocephalides felis)* are frequently encountered in homes and are common pests on domestic cats and dogs. Dog fleas *(Ctenocephalides canis)* look like cat fleas, but are rare in California. Sticktight fleas *(Echidnophaga gallinacea)* can become a problem when pets frequent areas near poultry. Female sticktight fleas firmly attach themselves around the ears and eyes of their host. Fleas on either cats or dogs in California are most likely cat fleas.

IDENTIFICATION

Adult fleas (Fig. 1) are very small insects (up to 1/8 inch), so it is difficult to see a number of the characteristics used to describe them. These reddish brown to black, wingless insects are compressed from side to side so that they look like they are walking "on edge." They have piercing-sucking mouthparts through which they obtain blood meals from their hosts. Flea larvae are tiny (up to 3/16 inch long), hairy, and wormlike with a distinct, brownish head, but no eyes or legs.

LIFE CYCLE

Female cat fleas remain on the host (unlike most other fleas) and lay about 20 to 30 eggs per day on the animal. Cat flea eggs are pearly white, oval, and about 1/32 inch long. The eggs are smooth; they readily fall from the pet and land on surfaces like bedding and carpeting in the animal's environment. They hatch in about 2 days. The whitish, wormlike larvae (Fig. 2) feed on dried blood and excrement produced by adult fleas feeding on the pet. Larval development is normally restricted to protected places where there is at least 75% relative humidity. They feed and crawl around for 5 to 15 days at 70° to 90°F before they build small silken cocoons in which they develop into adult fleas (pupate). The pupae are usually covered with local debris for visual camouflage. Flea larvae develop more quickly at higher temperatures. At cool temperatures, fully formed fleas may remain in their cocoons for up to 12 months. Warm temperatures and mechanical pressure, caused by walking on the carpet, vacuuming, and so on, stimulate emergence from the cocoon. At room temperatures, the entire life cycle may be completed in about 18 days. An adult cat flea generally lives about 30 to 40 days on the host; it is the only stage that feeds on blood. Fleas may be found on pets throughout the year, but numbers tend to increase dramatically during spring and early summer.

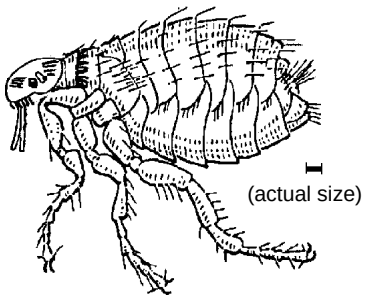

Figure 1. Adult flea.

PROBLEMS ASSOCIATED WITH FLEAS

The cat flea is suspected of transmitting murine typhus to humans, but its primary importance is in its annoyance to people and pets. Cat fleas readily try to feed on almost any warm-blooded animal. Some people are bothered by the sensation of fleas walking on their skin, but bites are the major nuisance. Bites tend to be concentrated on the lower legs but can also occur on other parts of the body. The bite consists of a small, central red spot surrounded by a red halo, usually without excessive swelling. Flea bites usually cause minor itching but may become increasingly irritating to people with sensitive or reactive skin. Some people and pets suffer from flea bite allergic dermatitis, characterized by intense itching, hair

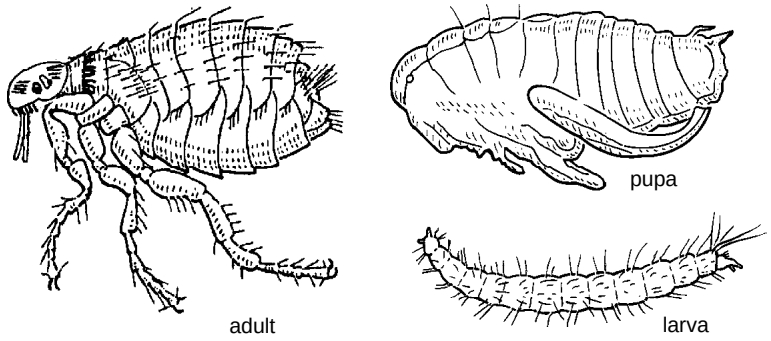

Figure 2. Life stages of the flea (egg not shown).

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loss, reddening of the skin, and secondary infection. Just one bite may initiate an allergic reaction, and itching may persist up to 5 days after the bite. Cat fleas may also serve as intermediary hosts of dog tapeworms. Cats or dogs may acquire this intestinal parasite while grooming themselves by ingesting adult fleas that contain a cyst of the tapeworm.

MANAGEMENT

The best approach to managing fleas is prevention. New, safer, and more effective products aimed at controlling fleas on the pet have made flea management without pesticide sprays feasible in many situations. Management of fleas on the pet must be accompanied by regular, thorough cleaning of pet resting areas indoors and outside. Once fleas infest a home, control will require a vigilant program that includes cleaning and treating infested areas indoors, eliminating fleas on pets, and cleaning up and possibly treating shaded outdoor locations where pets rest.

On the Pet

Several types of products are available to control fleas on dogs and cats. The most effective and safest products inhibit normal growth or reproduction of fleas. Use of these products must be supplemented with good housekeeping in areas where the pet rests. Contact your veterinarian for advice and assistance in selecting the best flea control product for your situation.

Preferred On-pet Flea Treatment Products. New product innovations have made it possible to effectively, conveniently, and safely prevent flea populations from building up on pets. These products are more effective and safer than the traditional insecticide dusts and sprays, which until a few years ago were the only choices for pet owners. The new products contain insect growth regulators (IGRs) such as methoprene (Precor) or pyriproxyfen (Nylar), and insect development inhibitors (IDIs) such as lufenuron (Program). The IGRs are available as flea collars or spot-ons applied to one or two places on the pet's coat. IDIs come formulated as a systemic treatment that must be administered orally and are available from veterinarians. These products work by either preventing the larvae from turning into adults (IGRs), or the eggs from hatching (IDIs), and are virtually nontoxic to pets and people. Two other new types of safe and effective chemicals are fipronil and imidacloprid, which are used as spot-ons. If properly applied before flea season begins and reapplied as necessary, any of these products can prevent a flea infestation.

Spot-on Formulations. Imidacloprid (Advantage) and fipronil (Front-Line) are available from veterinarians and are applied to the animal's skin; a single application provides flea control for 1 to 3 months. These spray and spot-on formulations are much easier to use than baths and are more acceptable to the animal. A few drops of the spot-on formula applied to the animal's shoulder blades move through the animal's coat, providing whole-body treatment. Both materials kill adult fleas within hours of the flea jumping on the animal. Also, these compounds have lower mammalian toxicity than traditionally used flea control products containing carbamates and organophosphates and are safer to use on pets. Generally the spot-on formulations can withstand bathing; check the label for specific instructions.

Systemic Oral Treatments. Several flea control products are internal medications that are administered on a regular basis in the form of a pill or food additive. Older types of medications contained insecticidal materials, mostly organophosphates, that were transported to all skin areas through the animal's blood. Newer products contain insect development inhibitors that do not have the toxicity of the older materials and are much safer to use. The insect development inhibitor lufenuron (Program) can be given as a pill (dogs) or as a food additive (cats) once a month to suppress flea populations. It can also be administered as an injection every 6 months. While this compound does not kill adult fleas, it does prevent flea reproduction. If its use is initiated early in the year before flea populations begin to build, it can prevent the establishment of a flea population in the home, though an occasional adult flea may be sighted on the animal.

Flea Collars. Flea collars containing the insect growth regulators methoprene and pyriproxyfen are virtually nontoxic to pets and humans and can be used on both cats and dogs. The growth regulator is released by the collar and distributed throughout the coat of the pet. Adult fleas coming in contact with the growth regulator absorb it into their bodies where it accumulates in their reproductive organs. Eggs laid by the adult female do not hatch. Flea collars may contain the insect growth regulator as the sole active ingredient or it may be combined with an insecticide. If the collar contains only the insect growth regulator, use another treatment, such as a spot-on product, to control adult fleas if necessary. Flea collars containing methoprene are effective for 4 to 6 months on dogs and up to a year on cats.

Traditional Insecticide Products. Until recently, pet owners had to rely on products containing conventional insecticides (pyrethrins, permethrin, d-limonene, chlorpyrifos, or carbaryl) to control fleas on their pets. These products were formulated as soaps, shampoos, powders, dusts, spray-on liquids, and dips. Although many of these products are still available, they are not as effective or as safe to use as the products listed in the section above titled "Preferred On-pet Flea Treatment Products." Some products are not safe for some pets, such as permethrin products on some cats, and small children and infants should be kept away from animals treated with any of these materials for at least a day or two.

Nonchemical Treatments. Special combs are available that help remove adult fleas from the coat of a short-haired pet. Removing fleas may provide comfort to the animal and reduce

flea breeding. Combing pets at regular intervals is also a good way to monitor the flea population and help you decide when other control measures may be necessary.

Studies have shown that neither Vitamin B_1 (thiamine hydrochloride) supplements nor brewer's yeast prevents fleas from feeding; also, herbal collars and ultrasonic devices are not effective flea repellents.

Indoors

Controlling cat fleas in buildings requires a variety of approaches. Before starting a control program, look through each room in the building to determine areas where larval development occurs. Flea populations are highest in places where dogs or cats regularly sleep. Flea larvae are not usually found in areas of heavy pedestrian traffic or locations that receive exposure to sunlight; they are likely to be present in areas where adult fleas have left dried blood and feces.

Sanitation. Thoroughly and regularly clean areas where adult fleas, flea larvae, and flea eggs are found. Vacuum floors, rugs, carpets, upholstered furniture, and crevices around baseboards and cabinets daily or every other day to remove flea eggs, larvae, adults, and food sources. Vacuuming is very effective in picking up adults and stimulating preemerged adults to leave their cocoons. Flea eggs can survive and develop inside vacuum bags and adults may be able to escape to the outside, so immediately destroy bags by burning or by sealing them in a plastic trash bag and placing them in a covered trash container. Launder pet bedding in hot, soapy water at least once a week.

Thoroughly clean items brought into the building, such as used carpets or upholstered furniture, to prevent these from being a source of flea infestation.

Insecticides. Several insecticides are registered for controlling fleas indoors. Sprays are only needed when you detect an infestation in your home. The most effective products contain one of the insect growth regulators: methoprene or pyriproxyfen. Fleas are known to build up resistance to insecticides, so always supplement sprays with other methods of control such as thorough, frequent vacuuming.

Use a hand sprayer or aerosol to apply insecticides directly to infested areas of carpets and furniture. Total release aerosols ("room foggers") do not provide the coverage and long-term effectiveness of direct sprays unless they contain an insect growth regulator. Treatments with insecticides other than IGRs often fail to control flea larvae because the treatment material fails to contact them at the base of carpet fibers where they develop.

Spray carpets, pet sleeping areas, carpeted areas beneath furniture, baseboards, window sills, and other areas harboring adults or larvae. Use an insect growth regulator (methoprene or pyriproxyfen) that specifically targets the larvae and has a long residual life. As soon as the spray dries, vacuum to remove additional fleas that emerge from the pupal stage in carpets and upholstery. Fleas will continue to emerge for about 2 weeks after treatment because pupae are not killed by sprays. Continue to vacuum and do not treat again for at least several weeks. Always seal and discard vacuum bags so fleas don't escape.

Outdoors

Outdoor flea populations are most prevalent in coastal localities and other places with moderate daytime temperatures and fairly high humidities. In Central Valley locations, populations can become very numerous in shaded and protected areas such as sheltered animal enclosures, crawl spaces where pets may sleep, or vegetated areas adjacent to buildings. If an infested outdoor location is not treated, the flea problem may reoccur if pets are reinfested. However, treatment of the pet with any of the preferred pet treatment products listed above will normally prevent reinfestation.

Outdoor sprays are not necessary unless you detect significant numbers of adult fleas. One way to do this is to walk around pet resting areas wearing white socks pulled up to the knee. If fleas are present, they will jump onto socks and be readily visible.

The best products for elimination of fleas outdoors are formulations that contain a knockdown material such as

Handling a Flea Emergency

If your home is heavily infested with fleas, take these steps to get the situation under control.

Inside the Home

1. Locate heavily infested areas and concentrate efforts on these areas.
2. Wash throw rugs and the pet's bedding.
3. Vacuum upholstered furniture. Remove and vacuum under cushions and in cracks and crevices of furniture.
4. Vacuum carpets, especially beneath furniture and in areas frequented by pets. Use a hand sprayer to treat all carpets with an insecticide that contains an insect growth regulator.
5. Allow carpet to dry and vacuum a second time to remove additional fleas that were induced to emerge.
6. Continue to vacuum for 10 days to 2 weeks to kill adult fleas that continue to emerge from pupal cocoons.

On the Pet

1. Use a spot-on treatment, which can be purchased in pet stores or from vets, or a systemic oral treatment, which is available from vets only.

Outside the Home

1. Sprays are only necessary outdoors if you detect lots of fleas.
2. Locate and remove debris in heavily infested areas, especially where pets rest. Concentrate treatment in these areas with a spray containing a residual insecticide and the insect growth regulator pyriproxyfen. Open areas to sunlight by removing low hanging vegetation.

pyrethrin or permethrin plus an insect growth regulator (pyriproxyfen) to inhibit larval maturation. Avoid products containing diazinon or chlorpyrifos as these materials pollute waterways when they are washed into storm drains by rain, hosing, or irrigation.

Apply sprays directly in locations where pets rest and sleep such as doghouse and kennel areas, under decks, and next to the foundation. It is seldom necessary to treat the whole yard or lawn areas. Flea larvae are unlikely to survive in areas with sunlight exposure or substantial foot traffic.

Regular lawn watering will help destroy larvae and prevent development of excessive flea populations. If possible, open pet sleeping areas to sunlight by removing low-hanging vegetation.

SUGGESTED READING

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For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

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This Pest Note is available on the World Wide Web (http://www.ipm.ucdavis.edu)

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.

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WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.