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# CHAPTER 5

# FLEAS

## LEARNING OBJECTIVES

After you finish studying this chapter, you should be able to:

- Identify a flea and describe its appearance.
- Explain the life cycle of fleas.
- Know which stages of the flea live on the animal and which do not.
- Describe the reasons that fleas are pests to animals.
- Understand how flea bite dermatitis develops and affects the animal.
- Develop an integrated flea management program.
- Understand and follow all precautions for human and animal safety when selecting and using flea control products.
- Explain the importance of treating the animal as well as the animal's environment when controlling flea populations.
- List the components of an effective flea larvae control program.
- Explain the importance of regular sanitation in controlling fleas.

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## FLEA LIFE CYCLE

Fleas are insects of the order Siphonaptera (meaning siphon-like mouth and no wings). They are very small (2 to 4 mm in length), brown and flattened from side to side. Flea eggs are glossy white and oval. Immature fleas (larvae) are hairy and maggot-like in appearance. There are three instars, or developmental stages, of flea larvae, beginning with the larva that hatches from the egg. The second instar molts, or sheds the skin, and emerges out of the first instar. The third instar flea larva does the same, emerging from the second instar skin. With each molt, the flea larva grows larger. The third instar flea larva spins a silken cocoon and covers the cocoon with material from its environment. It molts inside of the cocoon to become a pupa. After a period of development the adult flea emerges from the pupa. The entire life cycle of a flea, from egg to adult, may take as few as 12 days or may last as long as 140 days, depending on temperature. Also, fleas may “rest” in the pre-emerged adult stage, inside the cocoon, if no hosts are available for the adults to jump onto.

Though there are over 2,000 species of fleas, the life cycle is similar in almost all of them. Adult

fleas obtain a blood meal from their animal hosts. They do not utilize any other kind of food. Thus, adult fleas are ectoparasites. In contrast, flea larvae live in the environment near the host animal but do not live on the animal. So, flea larvae are not ectoparasites.

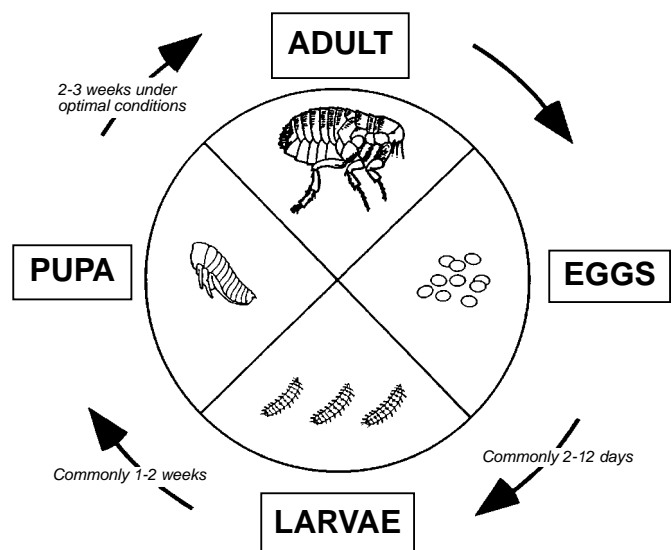


Figure 5.1 Flea life cycle.

The fleas of primary importance to domestic animals, whether companion or food animals, are the dog flea, cat flea and sticktight flea. Table 5.1 lists the scientific and common names of some fleas and shows which animals commonly serve

as their hosts. Dog and cat fleas are intermediate hosts for dog tapeworms. The sticktight flea is found only in the southern United States in association with poultry in poorly managed situations.

**Table 5.1 Common fleas affecting domesticated animals in the U.S.**

Host Animal	Flea Species	Common Name
Swine	<i>Ctenocephalides felis</i>	Cat flea
Chicken	<i>Echidnophaga gallinacea</i>	Sticktight flea
Ferret	<i>Ctenocephalides felis</i>	Cat flea
Dog	<i>Ctenocephalides canis</i> <i>Ctenocephalides felis</i>	Dog flea Cat flea
Cat	<i>Ctenocephalides felis</i>	Cat flea

## DOG AND CAT FLEAS: LIFE HISTORY

In many parts of the United States, the dog flea has been replaced by the cat flea as the most commonly found flea on both dogs and cats. These fleas are so similar in appearance and biology that we can treat them as basically the same. However, the scientific names are different. The dog flea is called *Ctenocephalitides canis*, and the cat flea is called *Ctenocephalides felis* (dog flea and cat flea will do).

The cat flea is an extremely important pest of these animals. In instances of heavy infestation where there are many fleas on an individual animal, the blood loss can be great and lead to poor animal health. Young animals may become anemic (weakened by blood loss) from heavy, regular feeding by fleas. Kittens and puppies can die from heavy infestations of fleas. At the least, flea bites are very irritating and cause animals to itch, which leads to scratching, adding to the irritation of their skin. Additionally, many dogs and cats develop flea bite dermatitis, an allergic condition that can be brought on by a single flea bite in an allergic or sensitized animal. In extreme conditions, animals develop “hot spots” (or “acute moist dermatitis”) where they continually scratch at highly inflamed sites on the skin, creating conditions for bacterial infection. A hot spot is painful to the animal and may exude pus.

Dog and cat fleas have very similar life cycles. (Figure 5.1.) The adult fleas spend virtually all of their lives on the host. They mate on the host, and both male and female fleas feed on blood by biting their host. The fleas feed daily and the female fleas lay eggs that drop from the host animal into the environment. A female lays a few eggs each day and several hundred over the course of her life. Flea eggs accumulate in areas where the host spends most of its time. In addition, the fleas defecate small pellets of digested blood into the host hair. These feces also drop off into the environment. A flea comb will gather these feces and flea eggs at the base of the tines. This provides evidence of flea infestation on dogs or cats.

Flea larvae occur indoors and outdoors, wherever the eggs have fallen off of the host. In houses, flea larvae live in carpeting, furniture, animal bedding and other protected areas with high humidity. Flea larvae can also live outdoors in areas where animals spend time (such as under porches, in dog houses, etc.). Because flea larvae depend upon the fecal pellets of dried blood produced by the adult fleas for food, larvae cannot survive in places that do not get a steady supply of adult flea feces. Therefore, flea larvae do not live in lawns or other outdoor areas unless the pet frequents those areas enough to provide food for the larvae.

Adult fleas inside the cocoon, called pre-emerged fleas, can stay in that condition for weeks to months if no host is available. However, when disturbed by the presence of a host (such as passing vibrations, carbon dioxide from exhaled breath, or other factors), the pre-emerged fleas activate, leave the cocoon and jump onto the host. This is why it is possible to return to a house or apartment that has been empty for months and find it full of fleas.

## FLEA MANAGEMENT

Managing fleas on animals requires an integrated approach. Both the host animal and the environment must be treated at the same time to be effective. Control of fleas on the animal generally requires the use of insecticides. Although flea combs can remove some fleas, combing is a better method for detecting fleas than for removing them from the animal.

**Insecticides.** A range of insecticides in the organophosphate, carbamate, pyrethrin and pyrethroid categories are available for flea control on the animal. Greyhounds and cats are more sensitive to insecticide products than most dogs. Read all insecticide labels and follow all precautions and dose directions. Consult a veterinarian if you have questions. The pyrethrins and pyrethroids have the lowest mammalian toxicity. These insecticides come in formulations such as shampoo, dust and powder, mousse, aerosol and non-aerosol mist or spray, dip, spot-on, roll-on and collar. Organophosphate drugs are also available, by prescriptions from veterinarians, for oral use. Some on-animal formulations contain insect growth regulators that kill flea eggs on the animal.

**Treating the animal.** When treating an animal, the applicator must take precautions to protect him- or herself from contact with the insecticide. All personal protective equipment listed on the label must be worn. As a minimum, chemical-resistant gloves, apron and goggles should be worn while mixing insecticides and during application to prevent insecticide contact with the skin. The working area should be appropriate for containment of the pesticide and should be resistant to caustic materials. A stainless steel preparation table and stainless steel or ceramic tub have these qualities.

The insecticides used for flea control vary widely in toxicity and efficacy. Considerations for selecting a formulation include the size and weight of the animal as well as the species. For example, cats groom themselves more than dogs and are more likely to ingest an insecticide and become poisoned by licking the residue from their fur. Cats are more sensitive to organophosphate



Mixing insecticides before shampooing an animal requires protective equipment and a good working surface.

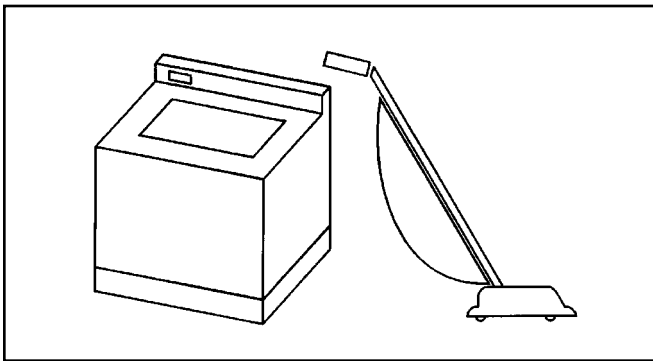


Protective equipment (gloves, apron, goggles) should be worn during insecticide applications onto animals.

insecticides than are dogs. Some insecticides that can be used on dogs cannot be used on cats. Read and follow all label directions. Kittens and puppies, because of their smaller size, require a lower dose than do adult animals. Young animals may also require treatment with insecticides of lower toxicity than adult animals. Some products should never be used on puppies or kittens. Pregnant or nursing animals may be sensitive to certain insecticides. Veterinarians should have accurate information on insecticides and their use for flea control on animals. The insecticide label contains accurate information on how a particular formulation of an insecticide should and should not be used. **READ THE LABEL BEFORE OPENING THE CONTAINER!**

**Treating the animal's environment.** The other important part of an integrated flea management program is to control larval fleas in the environment or larval habitat away from the animal. This can be achieved mechanically or physically and with insecticides.

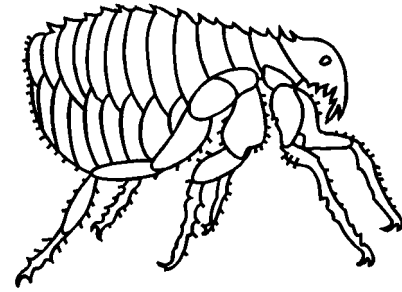
Mechanical or physical control of flea larvae requires removing and laundering animal bedding and thoroughly cleaning areas frequented by the animal. Vacuuming with a beater bar and immediately disposing of the waste bag (to prevent eggs from hatching) effectively eliminates up to half of the larvae and eggs in carpet. Do not put insecticides in the vacuum cleaner bag. This is an illegal use of the products and can harm you, your family and pets by creating dusts or fumes that could be inhaled.



**Launder animal bedding and thoroughly clean areas the animal frequents. Dispose of the vacuum waste bag after every cleaning.**

Carpet shampooing rids the carpet of blood feces, an important food for the larvae, and may also remove eggs and larvae. In outdoor areas, cleaning up the places where animals like to rest reduces eggs and larvae and removes blood pellets. In yards and kennels, flea larvae will be found in cracks at wall-floor junctions and in floor crevices. These areas must be thoroughly cleaned and then maintained to prevent another infestation.

Chemical control of flea larvae can be achieved with insecticides. Organophosphate, carbamate, pyrethrin, pyrethroid and growth regulator (hormone mimic) insecticides and certain minerals are available for flea control in the environment. These insecticides are formulated as coarse sprays, foggers, dusts or are microencapsulated. All but the growth regulators kill flea larvae on contact. Insect growth regulators prevent flea larvae from developing to the adult stage. Growth regulators may also inhibit egg hatching. A good flea larval control program incorporates sanitation, contact insecticides and growth regulators for good results.



Flea management requires patience, time and careful planning. Vacuuming and cleaning of areas frequented by dogs and cats should be a regular, routine part of house cleanliness and pet care. The same applies to kennels. If an infestation occurs, insecticide applications on the animals or in the environment may have to be repeated according to the intervals listed on the label and depending upon the efficacy of the treatments. Retreatment and time intervals between insecticide treatments will vary with the kind of insecticide and the formulation.

Successful flea control will not happen if only one approach, such as dipping the dog, is used. The animal and the environment in which it lives must be treated simultaneously, and that treatment must be combined with regular sanitation efforts. Read all product labels carefully. Do not overexpose your pet by combining too many treatments at one time, such as a collar, a shampoo and a dust. Pesticides have a cumulative effect. Be aware of each product's toxicity and do not endanger yourself or the animal by using excessive amounts of any one product or by combining products.

When using insecticides for flea control, remember that the applicator and the animal owner can be exposed to the insecticides at several times in the management process. The label may call for the use of gloves and other protective equipment during application and suggest the pet not be handled with unprotected hands until the treatment dries. Also, certain parts of the pet's body (such as the eyes) may be sensitive to the insecticides and must be shielded during application.

The applicator should follow label directions and application guidelines carefully to minimize exposure during and after application. When using flea "bombs" (aerosol cans with a self-releasing mechanism), follow all the precautions and remove the pets from the area being treated. Using excessive rates is illegal and can result in fires and even explosions.

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## Chapter 5 – Review Questions

**Write the answers to the following questions and then check your answers with those in the back of this manual.**

1. Kittens and puppies can die from heavy infestations of fleas. (True or False)
2. What is “flea bite dermatitis”?
3. How does a flea infestation lead to the development of “hot spots” (or “acute moist dermatitis”) on animals?
4. Dogs are the only hosts for dog fleas and cats are the only hosts for cat fleas. (True or False)
5. How many eggs might a female flea lay in a day? How many eggs would she lay in her life?
6. Flea eggs can accumulate on the host as well as in areas where the host animal spends most of its time. (True or False)
7. Flea larvae feed on:
  - a. Fur.
  - b. Animal dander.
  - c. Lawn grasses.
  - d. Adult flea fecal pellets of blood.
  - e. All of the above.
8. What are two important parts to an integrated flea management program?
9. Cats are more sensitive to organophosphates than dogs. (True or False)
10. Releasing excessive rates of flea “bombs” can result in \_\_\_\_\_.