



Flea Control

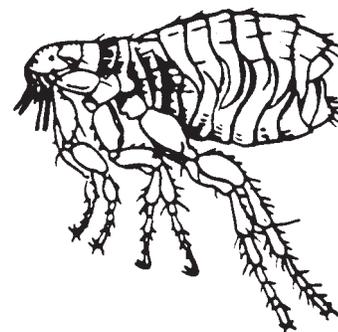
Carolynn MacAllister, DVM
OSU Extension Veterinarian

Fleas are a major nuisance for pets and pet owners alike during the summer months. They not only are a constant source of irritation for your pet, but can be the source of allergic dermatitis, intestinal tapeworms, and, if the flea is infected with the organism causing plague, can transmit this disease to pets. There are approximately 2,000 species of fleas, but the most common flea infesting both dogs and cats is the cat flea. Fleas are a pesky pest and a health threat, and they can be quite costly to control for pet owners. U.S. consumers spend an estimated one billion dollars annually on flea control for their pets and their environment, and on flea-related health problems, such as allergic dermatitis. In fact, pet owners spend more to control fleas and flea-related problems than any other disease problem in pets.

To understand why fleas are so difficult to control, a review of the flea's life cycle and habits is helpful. Fleas actually undergo four developmental stages. The adult flea lives almost exclusively on its host by feeding on its blood. The adult female flea will start laying eggs approximately 24 to 48 hours after consuming a blood meal. Eggs are deposited on the host and readily fall off the pet into the environment. Eggs will hatch into larvae anywhere from one to 10 days later. Egg hatch is better in an environment that is warm (75-85°F) and humid (50-90%). The larvae that hatch are very small (2-5mm) and look like a white worm with a darker head (until they feed, at which time they will appear brown due to flea feces and organic debris ingested). These larvae are considered "free living" because they can crawl about and are usually found at the base of the carpet and at dirt level away from light, where they can find organic material and flea feces needed to survive. These larvae also need moisture and warmth to thrive.

After the larvae complete their development (usually 5-12 days), they will spin a cocoon to form the pupal stage of their life cycle. After the pupa has finished changing inside the cocoon to an adult flea, movement, pressure, or heat will stimulate them to emerge from the cocoon. Adult fleas will emerge from the cocoon on average one to four weeks after the pupal stage begins. If not stimulated, the pre-emerged fleas can survive in a dormant state up to approximately 140 to 170 days. The adult fleas live approximately 100 days. After emerging from the cocoon, the adult flea begins feeding within 10 seconds after landing on a host. At the initial time of a bite, the flea will inject saliva into the wound which may serve to soften the skin and help the flea penetrate the skin and more effectively access blood. Also, the saliva contains a substance that prevents the blood from clotting, which further facilitates the blood uptake. While fleas are taking a blood

Oklahoma Cooperative Extension Fact Sheets
are also available on our website at:
<http://www.osuextra.com>



Cat or Dog Flea—The adult fleas are dark brown, strongly flattened from side to side, with many spines on legs and bodies, approximately 1/16-1/10 inch in length.

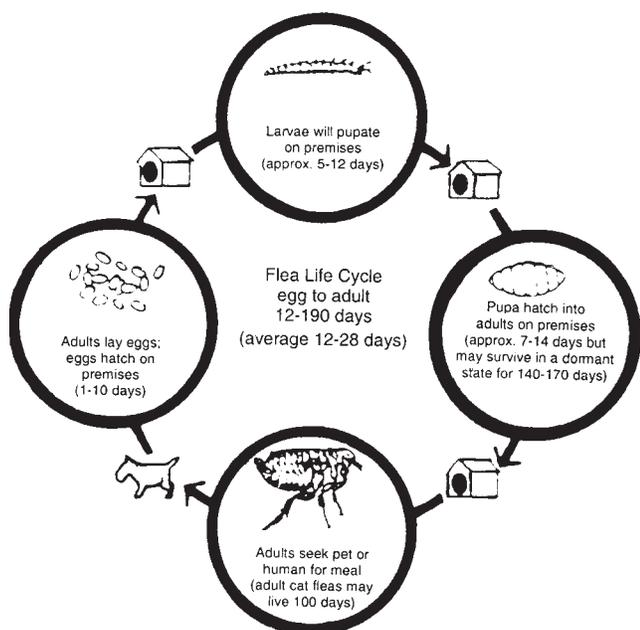
meal, they will defecate partially digested blood, which is often seen on the host as "flea dirt." This flea dirt will fall into the host environment and be a source of nutrition for the flea larvae. Once the adult cat flea starts feeding, it will spend its entire life on that host, unless removed (e.g., by grooming). The female flea will usually start laying eggs two days after feeding starts and lay eggs only on the host. An adult female flea can produce approximately 2,000 eggs during its lifetime. The eggs produced by the flea will fall off into the environment. Less than one percent of eggs that are laid will survive. Only eggs that fall into an environment with the proper humidity and temperature will develop into adult fleas.

Examples of areas of the home that are likely to support the proper environment for complete flea development are the pet's bedding, furniture cushions, and thick carpeting—protected areas and where the pet spends most of its time. Wood or tile floors are not likely to be suitable for flea development. Likewise, open areas of the lawn exposed to continuous sunlight won't support flea development, but shady, moist areas will. Outdoor examples of "hot spots" for fleas are dog houses, flower beds, gardens, and under decks or porches. Any location out of direct sunlight where the pet spends time can become flea infested and a source point for reinfection. For every six fleas you see, there are 300 in the environment or on the pet.

Owners are often quite dissatisfied with their efforts to treat a flea infestation. One of the primary causes for flea control failure is the pupal stage of the life cycle, which is

resistant to any and all insecticides. This stage can lay dormant 140 to 170 days. Thus, in some areas of the country, fleas can actually survive through the winter. The common failure scenario is that the owner treats for fleas, then in one to two weeks the flea infestation returns because the adults are emerging from the insecticide-resistant cocoon. Another cause of control failure is missing or insufficiently treating source points. Such source points are areas either indoors or outdoors that are highly infested with fleas and heavily used by pets. In most circumstances, 95 percent of the flea infestation is in five percent of the house or yard. Most of the flea infestation is in these source points. Therefore, these points must be adequately treated and usually retreated one to two weeks after the initial application of insecticide.

There are many flea products on the market today that make a lot of claims which can be confusing to the consumer trying to select a flea control product. But before applying any flea insecticide, it is important to consider the complete scope of the flea problem. The most important principle in a total flea control program is that the pet's environment (indoors and outdoors) as well as the pet and all other pets (dogs, cats, and ferrets) should be treated simultaneously. Before using any insecticides, the environment must be thoroughly cleaned to remove as many of the adult fleas, eggs, larvae, and pupae as possible. Vacuuming with a beater-bar brush is extremely effective in removing adult fleas and other immature forms. Vacuuming raises the carpet fibers which makes the immature forms of fleas accessible to insecticides, in addition to aerating and drying out the carpet. Even if the vacuum fails to remove the cocoon because of its sticky nature, it will stimulate pre-emerged adults to emerge from the pupae, allowing them to be sucked up by the vacuum or exposing them to the insecticides. Be sure to thoroughly vacuum the "source points" where the pet spends most of its time. If that is a chair or bed, be sure to vacuum and treat under the furniture, because the eggs



Simplified Life Cycle of the Cat Flea—Optimum temperatures for the flea's life cycle are 75°F (or 75 to 85°F), and optimum humidity is 78 percent (or 70 to 80%).

and larvae will actually fall off and the larvae will crawl under the furniture away from the light. Be sure to dispose of the vacuum bag immediately. Don't use a flea collar in the vacuum bag because it is not approved for use in such a manner and may pose a threat to your health. You may also want to steam clean your carpet at this time which will further help in the mechanical removal of fleas. Be sure your pet's bedding and blankets or rugs routinely occupied by your pet are washed in hot water. This is something that should be repeated on a weekly basis.

Outdoor cleanup will involve mowing and raking the yard thoroughly, including removal of any organic debris from flower beds and under bushes. This will also increase the exposure of the fleas to the insecticides. Be sure to clean any areas where your pet spends time, such as the garage, basement, pet carrier, and automobile. Non-carpeted floors should be mopped because fleas may develop in cracks and crevices.

The next step in flea control is the application of insecticides to all pets and the indoor and outdoor environment simultaneously. All pets, such as dogs, cats, and ferrets, should be treated at the same time, and free-roaming animals kept out of the environment.

There is no one chemical or chemical combination of insecticides that will fit every flea infestation problem or fulfill the needs and desires of every pet owner. One natural and safer approach in killing and controlling fleas on the pet and in the environment is to use a product with a pyrethrin and an insect growth regulator (IGR). IGRs are synthetic juvenile insect hormones that have ovicidal and larvicidal activity. The pyrethrin will provide the quick kill of the adult flea, while the IGR will prevent eggs and larvae from developing into the pupae. There are currently two IGRs used in flea control products on the market—methoprene and fenoxycarb. These are extremely stable and provide prolonged residual activity of approximately 30 days.

You can also find IGRs in foggers and premise sprays which can be used alone or in combination with other chemicals. Foggers are commonly used by pet owners but several precautions should be considered:

- Foggers should be placed in each room to be treated (because they don't effectively go around corners).
- Fogger spray does not go under furniture.
- All people and pets, including fish and birds, must be removed before treatment.
- Utensils and all surfaces in which food is prepared must be covered.
- The home must be thoroughly ventilated and chemicals dried before people and pets return.

Areas that cannot be reached by the foggers, such as closets or under furniture, and heavily infested source points should be sprayed by hand with the insecticide. Often, the heavily infested source points in the home or yard need to be retreated in two to three weeks, because the pre-emerged adults inside the pupae or cocoons are protected from the initial application of chemicals. Retreat the areas where you see fleas. In most cases, these will be the source points or hot spots.

Treatment and control of fleas in an outdoor environment should be concentrated in the areas protected from direct sunlight and where the soil is moist, especially where the pet

spends its time since these are the places where flea development will occur. There are many commonly used insecticide compounds (e.g., malathion and chlorpyrifos, which are photostable (unchanged by the influence of light) and are highly effective with residual activity), but be sure to combine them with a photostable IGR to inhibit the development of more immature forms of the fleas in the environment. If it doesn't rain, the residual activities of these chemicals may be over a month, but free-roaming animals, including wildlife, must be kept out of your pet's environment for this flea control program to be successful. Retreatment may be necessary, depending on the environmental conditions and how well you spot treat the "source points" in the yard and the home.

It is important to note that ultrasonic flea collars do not repel fleas. Fleas cannot perceive sound waves, but pets can. These collars have resulted in temporary hearing loss in some pets. There are several products that are commonly used, such as B vitamins, brewer's yeast, and sulfur products, which have not been scientifically proven to be effective as flea repellents.

A pet owner with a flea infestation problem should consult a veterinarian before attempting flea control treatment. Veterinarians can design a flea control program that is comprehensive and fits your flea infestation problem. Each flea infestation is unique; therefore, no one flea program is effective for every flea problem, regardless of what a commercial company claims. Also, these insecticides can be toxic if used improperly, so be

sure to use them only as your veterinarian has prescribed and read and follow all package instructions.

For a flea program to be successful, it must involve a thorough cleaning to remove the fleas in the pet's environment and a complete and proper application of flea insecticides, including an IGR prescribed by your veterinarian. All pets and their indoor and outdoor environments, especially source points, should be retreated. Also, stray animals must be kept away from the pet's environment and the pet should not be allowed to roam. Remember, if you go on a vacation, be sure to check your pets for fleas and ticks before returning them to their home environment, or you may infest or reinfest your home or yard with these pesky pests.

References

- Dryden, M. Personal communication. Concepts of Flea Control Short Course, Tulsa & Oklahoma City, June 15-16, 1992.
- Dryden, M., J. Blakemore, J. Georgi, M. Song, and R. Young. Dispelling the Myths. Round table discussion sponsored by Vetkem. *Veterinary Medicine*.
- Dryden, M. W. Biology of the Cat Flea. *Ctenocephalides felis felis*. *Companion Animal Practice*. March 1989, 19(3): 23-27.
- Dryden, M. W., J. J. Neal, and G. W. Bennett. Concepts of Flea Control. *Companion Animal Practice*. April/May 1989, 19(4-5):11-21.

The Oklahoma Cooperative Extension Service

Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, sex, age, religion, disability, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Samuel E. Curl, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 20 cents per copy. 0703