

# Update

NPMA LIBRARY UPDATE

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## Fleas ... The Timeless Pest

### BACKGROUND

Fleas are obligate blood-feeding ectoparasites mainly of mammals which belong to their own Order of insects, the Siphonaptera. There are about 2,500 different named species, but no more than about 20 species are common or wide-spread biting pests of people, pets or companion animals. By far the most common urban pest flea in North America is the Cat Flea, *Ctenocephalides felis* (Bouche). They are usually the species found pestering dogs and humans, not just cats, as their common name implies. This species is fairly typical and will be used here as the example for discussing the general biology, behavior, habits, and control strategies for all urban pest fleas.

Fleas are the primary vectors of bubonic plague and have had a tremendous impact on European and world history through that action. They also transmit other important pathogens and parasites of humans and pets. Their saliva has recently been determined to cause serious Flea Allergy Dermatitis in pets and their debris has been reported to cause similar allergic reactions in humans. Their biting can cause serious discomfort, pain, itching, and unsightly bite marks.

### BIOLOGY

Fleas have a complete life cycle including an egg, three larval stages, a pupal stage, and an adult (male or female) stage. Eggs take one to 12 days to hatch; larvae require one to two weeks to develop through their three stages (instars); and pupae usually need four to 14 days to develop into adults. Under harsh conditions, the pupae can go into a diapause state and require nearly a whole year to complete development. Fully developed adults (within their pupal cocoon) have been reported to delay emergence for up to 20 weeks. In good conditions of 55 to 80 percent relative humidity (RH) and about 60° to 90° F (15° to 32° C), one life cycle can be completed from egg to adult in 15 days, but usually takes closer to three weeks (21 days). Under marginal conditions, one generation can often require at least 40 days; and could take as long as six months to be completed. After a long diapause period, new adult fleas can be stimulated by



vibrations (like a host walking nearby) to quickly emerge from their cocoon and very actively seek a blood-meal host. Adult cat fleas can jump six inches (15 cm) or higher vertically, and they crawl very rapidly toward a suitable feeding spot once they make contact with a potential host's fur or clothing. Cat flea larvae will die if they are kept in moisture levels of less than 45 percent RH, or more than 95 percent RH; and they will not develop at temperatures below 55° F (13° C) or above 95° F (35° C).

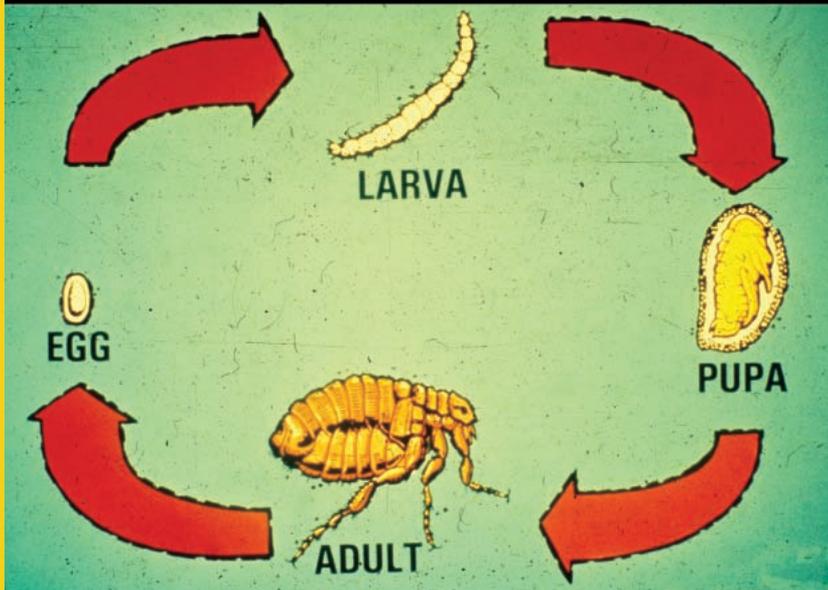
Adult fleas have piercing-sucking mouthparts, feed only on blood, and usually remain on their host all the time unless they are physically dislodged or they die. Larvae have strong chewing mouthparts and feed on any organic debris they can find in their location. Of course, eggs and pupae do not feed. Female fleas must mate and then take a blood meal to produce eggs. Each female may lay four to eight eggs after each blood meal, and may feed every day or two; producing 400 – 500 eggs in her adult lifetime, which is typically six to 12 months long. Fleas' smooth, round eggs are laid directly in the host's fur or hair. They are not sticky, so they tend to fall down to the host's bedding or onto nearby surfaces as soon as that host moves or shakes very much at all. That causes the eggs to accumulate wherever their hosts rest or

along paths those hosts routinely travel. Eggs can often be found in cracks or crevices in floors or near the base of the fibers of any rug-like materials they may be in. The larvae move about similarly to how fly maggots move, and they eat whatever organic matter is available. Flea larvae seem to need at least some of the partially-digested blood from within the feces of adults of their same species to develop properly. Adult fleas' fecal matter containing such partially digested host blood usually falls from the host into the same sites as the eggs fell into before. That means the larvae will grow well only where the hosts frequently rest or at least are often present.

Cat fleas have been reported to infect humans with plague, murine typhus, and certain tapeworms. Large populations of fleas can contribute to serious discomfort, can contribute to secondary infection due to their hosts' scratching bitten sites, and their feeding may contribute to, or even cause, serious anemia in young or small host animals.

It may not be necessary to have pets (dogs or cats are the usual suspects) in or near any given building to have cat fleas (or other flea species) present. Fleas can readily be carried from infested places into formerly uninfested settings on shoes, pant legs, or blankets. Many species of fleas will readily feed and survive well or alternate hosts if their primary hosts suddenly die, are removed or excluded, or leave. Cat fleas are often found in urban settings infesting various urban wildlife; especially opossums, raccoons and skunks. On many occasions, more than 20 adult cat fleas have been removed from a single live-caught adult opossums or raccoons. Larval cat fleas can develop well in the dens of such wildlife which are under, or next to, a house.

## LIFE CYCLE OF FLEA



## INSPECTION

A thorough inspection of the suspected infested area should be conducted. While fleas are small and can "jump" quite far, a well lit room or using a powerful flashlight in the suspected areas may help see the adult fleas. Some inspectors prefer to slip on white athletic socks to better see fleas

CAT FLEA LARVA



CAT FLEA PUPA



that react to vibrations and other evidence of a possible host.

Care should be taken by the customer to inspect domestic animals such as family pets for signs of adult fleas, open bites, and localized irritation of certain parts of fur. In severe cases, pets such as dogs may scratch until fur is compromised or is worn. This may create areas of thinning fur.

Common areas to inspect include any areas which animals or humans frequent in the home. These include living space, bedrooms, and pet resting and feeding areas. A thorough close inspection should be made of bedding. One area commonly overlooked is the influence of wild animals on flea infestations. Wild animals, such as squirrels, raccoons, opossums, skunks, roaming dogs, and even feral cats may drop eggs in areas around houses. These eggs hatch, develop, pupate, and become hungry adults. In warmer climates, it is common to find flea infestations under decks, around structures, and even in basements or garages that are frequented by such animals.

Infested sites should be documented or identified for control measures. Unseen areas such as nap of carpets and upholstery may contain eggs and/or larvae and pupae so not seeing live fleas adjacent to infested areas should not preclude control measures.

## FLEA MANAGEMENT

The industry has seen a shift in control strategies in the past ten years. Previously, it was common practice for all flea management measures to be administered by the pest control company. With the development and marketing of flea products by the veterinarian, it is common for pet owners to depend on their veterinarian for control measures. Such control measures include drops or pills administered to the animal. These products may be purchased from the vet or over the counter, depending on the product. The active ingredient varies but may include imidacloprid, permethrin, lufenuron, fipronil, and methoprene. These products go by the trade names of Front Line, Front Line Plus, Program, Advanced Care and others. Flea collars are also commonly used with varying degrees of success. Due to marketing, registration pressures, and other factors flea control products including shampoos will vary in availability.

At one time, there was a general thought that the flea control business was totally lost to the veterinarians. History has shown that even though some products administered by homeowners may impact the flea business of pest control companies, the market is strong in most areas. Companies must communicate that flea control may be performed by their company since this generation of pet owners may not be aware that flea control is possible from any venue other than veterinarians and over the counter. One

factor which may contribute to homeowner failure at control is the movement away from broadcast applications to carpets, historically used for fleas and other pests. Similar to bed bugs, fleas have benefited from pest management shifts to baiting, direct animal treatment, and crack-and-crevice treatments for control of insect pests.

For the professional, a regimen of cleaning animal areas, washing bedding in hot water, thorough sanitation improvements, restricting pet movements to focus on most interior will help. Commonly, floors should be vacuumed and the bag discarded. These sanitation steps require the participation of the customer and define an integrated approach to flea management. Product use by the technician may include residual, non-residual, and insect growth regulator products. Generally, products are used after the customer has prepared the area through sanitation steps described above. Many products are available either in ready to use aerosols, liquid concentrates, or dusts. Companies are finding that selling shampoos and other pet products may divert some of the emphasis to the professional. Labels vary with product as to use and re-entry. It is a matter of company choice as to products and protocols.

Flea management may require very time consuming measures in commercial buildings such as hotels, apartments, and dormitories. In these cases, there is more movement of people and perhaps animals and the inspection will have to be expanded to areas beyond just infested areas under the control of one family or resident.

In cases where there is a flea infestation on the exterior of buildings, it may be necessary to take the integrated approach to areas where pets frequent such as shelters, garages, etc. Wild animals should also be excluded to reduce chances of reinfestation. For example, if feral cats are a source and they frequent a garage, the customer may keep the garage closed as a method of exclusion.

After an integrated program has been implemented, followup visits may be required in the case of reinfestation or to inspect the area to make sure that the control measures have been successful.



## SUMMARY

Fleas are common and dangerous pests and the veterinarian and over the counter efforts to eradicate fleas have not eliminated fleas or the need for the services of the professional. While industry tactics may have been adjusted to include an integrated approach, the services of the professional are still in demand. New technicians, not used to flea measures, should be prepared to answer questions and provide control measures using the integrated approach provided in this Library Update. ●

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