ALABAMA COOPERATIVE Extension SYSTEM

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ALABAMA A&M AND AUBURN UNIVERSITIES

IPM Tactics for Flea Control

There are over 2,000 described species of fleas in the world. Only about a dozen adversely affect humans and their companion animals. In the U.S., the most common domestic flea is the cat flea, *Ctenocephalides felis felis* (Figure 1).

Starting early and using an Integrated Pest Management (IPM) approach is the best way to control fleas. IPM methods incorporate all available control methods into a pest management program. Control methods include sanitation, exclusion, and chemical techniques.

Start flea control programs no later than April if you have had a problem in the past or if you have seen a flea or two on your pets (or on yourself). Do not expect good flea control if you begin a control program in July or August when the flea populations have already exploded. You can do your own flea control or contract the services of a professional pest control operator. Veterinarians also have prescription treatments for flea control on pets.

The Importance Of Flea Control

Besides the discomfort even one flea bite can cause people and pets, a more serious medical concern for people in the U.S. is infection by the dog tapeworm, *Dipylidium caninum*. The cat flea is an intermediate host of the tapeworm. An intermediate host carries the parasite from one primary host to another. The primary host of the dog tapeworm can be a cat, dog, or even occasionally humans, if the infected flea is accidentally swallowed.

Adult fleas infected with the tapeworm are ingested by the pet during grooming, thereby infecting or reinfecting dogs and cats.

Fleas are infected when flea larvae ingest tapeworm eggs during the normal course of feeding. Tapeworm eggs are dropped from tapeworms that crawl out of the anus of infested dogs or cats. One study reported that 24 percent of dogs and 30 percent of cats carried the tapeworm. Another study reported that approximately 1.1 percent of the fleas are infected with tapeworm.

Flea Development And Life Cycle

Fleas are holometabolous (complete metamorphosis) insects having an egg, larval, pupal, and adult stage much like a butterfly. In order for proper egg development, female fleas must ingest a blood meal from a host such as a cat or dog. Usually a flea cannot complete its life-cycle on human blood. Females lay eggs on the host. The eggs have smooth shells and are not stuck to the host, so they roll off into the host's surroundings. Adult fleas that have taken a blood meal will excrete partially digested blood in their feces. The feces also falls off into the host's surroundings along with the eggs (Figure 2). The emerging larvae feeds on the adult feces which contains partially digested blood from the host (Figure 3). Larvae produce cocoons from debris in their surroundings making the pupae difficult to detect (Figure 4).

Fleas are most protected from traditional insecticides during the pupal stage. Fleas develop into adults and remain in their cocoons until conditions are conducive to successful reproduction. This intermediate stage is termed the "pre-emergent adult." When conditions are right for successful reproduction, adult fleas emerge from the cocoons and begin the cycle again (Figure 1). One female cat flea can lay between 158 to 420 eggs in her lifetime. Some estimates are higher. Table 1 has the development time for each stage of the flea life cycle.

Table 1. Development Time For Each Stage Of The Flea Life Cycle.

Stage	*Development Time*	*Temperature*
Eggs	1.5 to 6 days	55 to 90°F
Larva	4 to 8 days	80 to 90°F
Pupa	7 to 10 days	—
Pre-emergent Adult	4 to 20 weeks	52 to 90°F
Adult	4 to 25 days	—
Total Life Cycle	6 to 27 weeks	—

Figure 1. Adult fleas taking blood-meal and excreting partially digested blood that will become the larval food source. (Photo used with permission of the University of Florida, Entomology and Nematology Department, Gainesville, FL.)

Figure 2. Smooth-shelled eggs that roll off of host along with partially digested blood that will become larval food source. The egg stage is easily vacuumed up and discarded. (Photo used with permission of the University of Florida, Entomology and Nematology Department, Gainesville, FL.)

Figure 3. Flea larva that will feed on the partially digested blood excreted by adults. (Photo used with permission of the University of Florida, Entomology and Nematology Department, Gainesville, FL.)

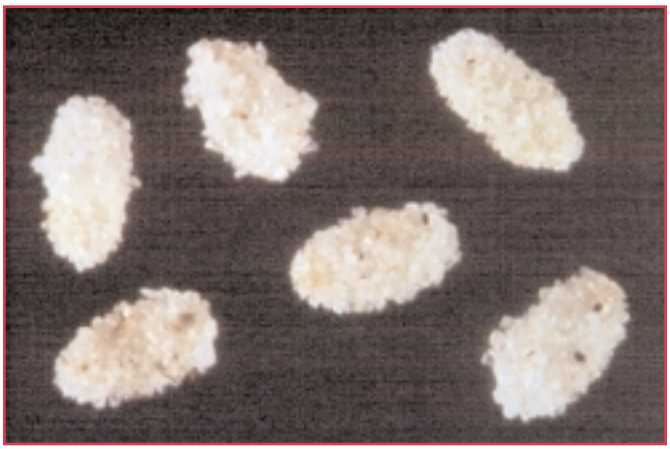

Figure 4. Flea cocoons. Fleas use whatever material they are living in to make the cocoon. Blue carpet fibers will result in a blue cocoon. (Photo used with permission of the University of Florida, Entomology and Nematology Department, Gainesville, FL.)

A Chemical Control Program

You should complete this control program in one day for maximum success.

1. Treat the pet by bathing it in a soapy bath or insecticidal shampoo containing carbaryl (Sevin), pyrethrins, or pyrethroids. Always follow the label directions. Also, clean and treat the pet's bedding and resting areas.

2. Vacuum the house thoroughly with a beater-bar brush before any insecticidal treatment. Vacuuming will pick up about 60 percent of the flea eggs and about 27 percent of the flea larvae. Also, some adult fleas as well as the partially digested blood which is the larval flea food source are picked up. Discard the vacuum bag outside immediately when done.

3. Treat indoors with an insecticide registered for flea control. Be sure to follow all label directions. Concentrate on areas where the pet spends the most time such as bedding, rest areas, and runways. A repeat treatment after about 3 weeks may be necessary to control fleas that were still in the pupal stage when initial treatments were done.

4. Treat outdoors especially where the pet rests. A repeat treatment after about 3 weeks may be necessary to control fleas that were still in the pupal stage when initial treatments were done.

Some common insecticides registered for use on fleas by homeowners are diazinon, carbaryl (Sevin), chlorpyrifos (Dursban), and malathion. If the infestation is severe, consider using the services of a professional pest control operator to do steps 3

and 4. Professional pest control operators are licensed to use insecticides not available to homeowners and have the proper equipment to do a thorough treatment.

An Alternate Reduced Chemical Control Program

There is no insecticidal "bait" for fleas. Consequently, the standard chemical control method is to broadcast-spray an insecticide over the surface of the carpet. Although the chemicals used today are relatively safe, compared with those used in the past, some homeowners may prefer a reduced chemical approach. Again, the program should be completed within 1 day.

1. Bathe the pet with a mild detergent or shampoo. Bathing will remove the fleas from the pet and drown the fleas. Mild detergents cut the waxy layer of the flea and should desiccate fleas that survive the initial bath.

2. Vacuum the house thoroughly with a beater-bar brush. Vacuuming will pick up about 60 percent of flea eggs and about 27 percent of flea larvae. Also, some adult fleas as well as the partially digested blood which is the larval flea food source are picked up. Discard the vacuum bag outside immediately when done. Thoroughly steam cleaning the carpet will not only remove the food source from the carpet, but will also destroy most of the fleas, even within their cocoons.

3. Treat indoors with an insect growth regulator (IGR). IGRs are specific to the flea because they mimic the flea's development hormones. Fleas are unable to properly complete their life cycle if exposed adequately to IGRs. Unlike traditional insecticides that have immediate results, it takes 1 to 2 weeks for a noticeable reduction in fleas and 1 to 2 months for control. Fleas will be controlled once their life cycle is broken.

Pesticide Safety

Do not reenter the house until the insecticide is dry (about 4 hours). One way to check dryness is to place a paper towel at the door when you leave. After the drying period, reenter the house, place the paper towel on the carpet and with your shoe still on, step on the paper towel. If the paper towel is dry, the house is clear to reenter. If the paper towel is wet, return in a couple of hours and redo the paper towel test. This test was suggested by Creig Manson, Ciba-Geigy/Sandoz.

Other Ways To Reduce Flea Populations

Suggestions For Pet Care

1. Groom the pet daily with a flea comb. This method is especially effective on cats since cats do not tolerate baths well. This method is time consuming but effective. Fleas removed with the comb should be dropped in soapy water and then discarded.

2. Confine the pet to a single indoor sleeping area. This action confines the flea population so control efforts can be focused.

3. Spray the pet and sleeping area with a flea repellent found in pet care sections of stores. Repellents often contain DEET.

4. Consult a veterinarian for flea control products.

5. Use flea collars. Flea collars are impregnated with an insecticide that is distributed through the pet's fur, generally by grooming, to kill fleas. Collars should not be kept on for more than 6 days (or prescribed treatment time). Do not keep flea collars on the pet permanently. Be careful to check for dermatitis under the collar.

6. Dust pets with a pyrethrin or salicylanilide. One disadvantage to dusts is that they can be ingested during grooming, particularly by cats.

Suggestions For Indoors

1. Vacuum pet areas at least twice a week and discard the vacuum bag immediately.

2. Exclude pets from carpeted areas so fleas are not a problem there from the start.

3. Work borate products registered for fleas, including boric acid and borax, into carpets as an effective treatment. Boric acid may discolor some carpets, so be sure to test a small area first. Do not use these borate products outside around plants because boron compounds are non-selective herbicides.

4. Diatomaceous earth (DE) in carpeting is more effective in climates less humid than the southeast. DE is made up of the tiny skeletons of diatoms which are microscopic protozoa. DE is only effective against flea larvae and kills it by adsorption of the waxy cuticle, causing the larvae to desiccate.

Suggestions For The Exterior

1. Mow grass, keep weeds down, and trim shrubs. These actions will expose flea eggs and larvae to lethal desiccation.

2. Irrigating areas surrounding buildings may kill fleas by drowning.

Treatments With Questionable Effectiveness

1. Flea traps. There is no evidence to show that flea traps do anything to control flea populations, although they can be a monitoring tool.

2. Ultrasonic pest repelling devices that were tested were shown to be completely useless (Hinkle et al. 1990).

3. Leaves from wax myrtles such as the southern bayberry *(Myrica cerifera)* have not been shown to have a repellent effect on cat fleas (W. H. Kern and R. S. Patterson unpublished data).

4. The effectiveness of fresh bayberry, penny royal, eucalyptus, rosemary, or citronella has not been documented.

Reference

Hinkle, N. C., P. G. Koehler, and R. S. Patterson. 1990. Egg production, larval development, and adult longevity of cat fleas (Siphonaptera: Pulicidae) exposed to ultrasound. J. Econ. Entomol. 83: 2306-2309.

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