

## Fleas and Their Management

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This NebGuide provides information on flea biology and how to solve flea problems.

Fleas are among the most annoying pests known to humans. In ancient times, fleas were even indicted, found guilty and sentenced to condemnation. Today, the verdict remains the same.

In Nebraska, fleas are common household pests attacking dogs, cats and sometimes people. In addition to these, several other flea species occur in Nebraska, feeding principally on rodents and occasionally on poultry and livestock. The information provided in this publication will focus primarily on cat and dog fleas, as they are the most commonly encountered species.

Cat and dog fleas are usually found associated with their hosts and are found in and around homes and kennels. During the summer, fleas often breed outdoors and may be present in yards. Fleas prefer warm, moist conditions, with temperatures of 75 to 85°F and a relative humidity of 70 percent or higher.

Adult fleas are approximately 1/12 to 1/8 inch (2 to 3 mm) long, wingless, reddish-brown, hard bodied, and compressed from side-to-side like the blade of a knife. The entire body has stout bristles pointing backward to facilitate forward movement through fur or hair. Fleas have very powerful back legs that are used for jumping onto the host, which gives the false impression that they can fly. Fleas can jump 7 to 8 inches (178 to 203 mm) high and for distances of 14 to 16 inches (356 to 406 mm).

Adult fleas are primarily external parasites of cats and dogs; however, in the absence of their preferred hosts, will bite humans. Bites are painful and result in blood loss, irritation, itching, and moderate to severe discomfort. In addition, fleas can carry disease organisms and serve as intermediate hosts for tapeworms that sometimes attack humans.

### Injury

#### Bites

Adult fleas have piercing-sucking mouthparts with which they penetrate the skin for a blood meal. Flea bites most often occur on legs, particularly around the ankles. Some people react severely to these bites, while others hardly notice them.

Children under 10 years old are more sensitive to flea bites than are older persons. Irritation, itching and rash are caused by flea saliva which is injected into the skin during feeding. The typical human reaction to a flea bite is the formation of a small, hard, red, slightly raised, itching spot with **no swelling** (Figure 1).

Some bleeding can occur, particularly if the bitten area is scratched. A single puncture point caused by the flea is generally apparent in the center of each spot. This characteristic distinguishes the flea bite from the bites or stings of other pests. Ants and spiders leave two marks when they bite; mosquitoes, gnats, chiggers, bees, and wasps leave large swellings or welts.



Figure 1. Flea bites on lower leg. Source: Univar USA Inc.

### Disease Transmission

Some fleas transmit organisms that cause serious diseases in humans and domestic animals. Their ability to be carriers of disease organisms is enhanced due to their wide host range. For example, the cat and dog fleas not only feed on cats or dogs, but also on humans, rats and raccoons.

#### Tapeworms

Both cat and dog fleas serve as intermediate hosts to dog and rodent tapeworms which occasionally attack humans, particularly young children.

#### Filarial Worms

Cat and dog fleas have been implicated in the transmission of microfilaria worms found in the blood stream of infected dogs. These worms are often confused with heartworms of dogs, which are transmitted by mosquitoes.

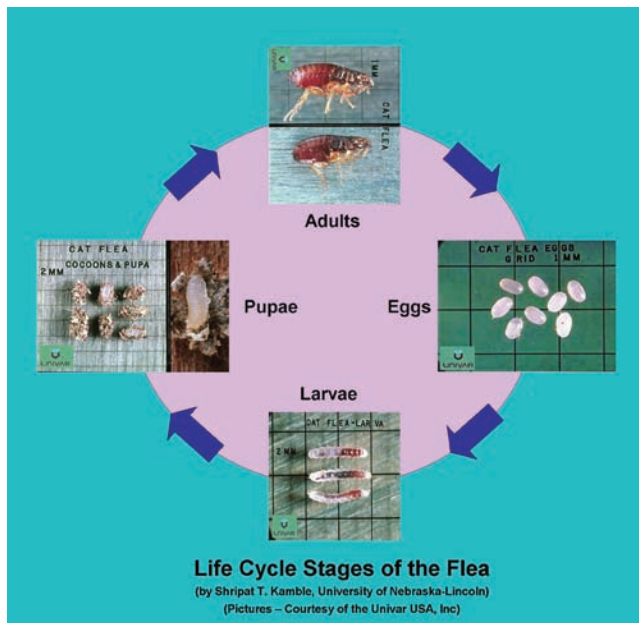


Figure 2. Life cycle of the flea. (Source: Univar USA Inc.)

## Plague

Plague is one of the most serious diseases transmitted to humans by fleas. Throughout history, several worldwide plague epidemics have occurred, killing millions of people, particularly in Asia and Europe.

In the United States, plague has caused over 300 deaths in the past 80 years. The majority of these deaths occurred in California, Texas, New Mexico, and Florida. There have been no reported cases in Nebraska.

The rat flea is the primary transmitter of the plague organism. Cat and dog fleas have not been known to transmit this disease.

## Murine Typhus

This disease, caused by a rickettsia-type microorganism, is transmitted by rat fleas. Murine typhus is primarily a disease of rats and mice, and usually does not pose a serious problem to humans.

## Life Cycle

Cat and dog fleas are similar in their appearance and life cycles. There are four stages - egg, larva (wormlike), pupa (inactive stage in a cocoon), and adult (*Figure 2*). The time required to complete the life cycle depends on temperature, humidity and availability of food. Under favorable conditions, it takes from 2 to 4 weeks to complete development from egg to adult, but it can take as long as 8 to 12 months.

### Egg

Flea eggs, which are smooth, oval, pearly white and 1/50 inch long (0.5 mm), are deposited in the hair and bedding of the host cat or dog (*Figure 3*). The eggs are not sticky and can be easily dropped or shaken off the host into mats, rugs, carpets, bedding or where the animals sleep or rest. The fer-

tilized adult female flea lays a few eggs after each blood meal and can lay up to 40-50 eggs per day. The female can lay up to 2,000 eggs in her lifetime. The eggs hatch in 2 to 4 days, depending on environmental conditions. Eggs can be desiccated and killed in a humidity of 50 percent or less.



Figure 3. Flea eggs. (Source: Univar USA Inc.)

### Larva

The slender, straw-colored, hairy and wormlike larvae are often found in floor cracks, rugs, carpets and animal bedding (*Figure 4*). Newly hatched larvae are approximately 1/17 inch (1.5 mm) long; when mature, they can be up to 1/5 inch (5 mm) in length. Larvae lack eyes and legs but have chewing mouthparts. They move by using their body bristles and feed on organic debris, such as food particles and flea feces. They prefer a dark, moist environment and grow by periodically shedding their skin. Fleas pass through three larval stages and are fully developed within 8 to 24 days; however, the larval stage can be prolonged to over 6 months under adverse conditions.



Figure 4. Flea larva and feces. Source: Univar USA Inc.

### Pupa

Prior to entering the inactive pupal stage, the fully grown larva prepares a cocoon by incorporating debris particles with saliva (*Figure 5*). The larva then pupates within the cocoon. The cocoon is whitish, loosely spun and about 1/4 inch (7 mm) long. The pupa, initially creamy white, gradually darkens to a brownish color. Typically, the pupal stage lasts from 5 to 7 days, but may be prolonged to a year by unfavorable conditions. Flea cocoons can be found in carpets, under furniture, and on animal bedding.

### Adult

When mature, adult fleas may remain quiet in their cocoons for up to 5 months, waiting for a suitable host and



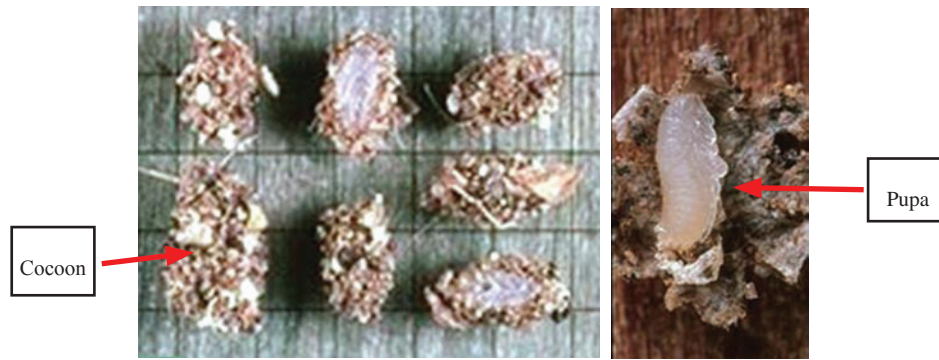


Figure 5. Flea pupa and cocoon. Source: Univar USA Inc.

environmental conditions. Adults emerge fully when they sense the presence of a potential host by its body heat and movement causing vibrations (*Figure 6*). This is one of the reasons why large numbers of fleas sometimes attack people returning home after a prolonged vacation.

Newly emerged adults are ready to feed within 24 hours but they can survive for one to two weeks without feeding. Males usually emerge first and generally are less numerous than females. Adult fleas feed and mate on hosts, with mating usually taking place after the initial blood meal. Females are able to lay eggs only after a recent blood meal, and may feed several times a day when close to hosts. Adult fleas can survive for several weeks between blood meals.

Adult fleas typically bother humans in the absence of their preferred hosts. Indoors, cat and dog fleas become a problem after pets are kept outside during warm weather or are boarded out during vacations.



Figure 6. Adult fleas feeding. Source: Univar USA Inc.

### Management Strategies

Fleas can be successfully controlled only when infested pets and premises are treated at the same time. Effective flea management involves:

1. Inspection
2. Sanitation including vacuuming
3. Treatment of indoor premises
4. Treatment of outdoor premises
5. Treatment of pets
6. Exclusion of alternate (substitute) hosts

1. *Inspection.* Pay attention to family members who complain of bites. Inspect the bites to determine if they are

typical of fleas. Also, observe if cats and dogs scratch and bite themselves as this can be an indication of flea infestation. Small black specks of dried blood ("flea dirt") found at the base of your pet's tail or in the lower abdomen and groin area are sure signs of fleas being present.

It is important to inspect rugs, carpets, bedding or resting areas of pets for signs of flea larvae or adults. An effective way of inspecting for fleas in rugs and furniture is to put a pair of white knee-length socks on over your pant legs and walk through the areas. Adult fleas will jump onto the socks where they can be easily seen.

2. *Sanitation.* Good housekeeping helps minimize flea problems by eliminating food, hiding and breeding areas. Infested rugs, blankets, pillows, and bedding used by cats and dogs must be thoroughly cleaned, especially during the warm months. If cleaning is impossible, these items should be discarded, destroyed or burned as applicable.

**Vacuuming:** Vacuum floors, carpeting, upholstered furniture, and pet resting areas regularly. Vacuuming helps to remove the eggs, larvae and pupae of fleas developing in homes. The vacuum bag must be promptly sealed with tape, frozen and disposed of outside to prevent it from becoming a flea reservoir and a source for reinfestation. Daily vacuuming of carpets and furniture is recommended if flea problems persist.

3. *Treatment of indoor premises.* Use sanitary measures to supplement insecticide treatments. Before using insecticides, always READ, UNDERSTAND, AND FOLLOW all label directions and precautions. Keep insecticide in original containers with the label intact. Do not contaminate food, water or dishes. Keep insecticides out of the reach of children and do not allow children and pets near treated surfaces until dry.

There are several insecticides used for flea control and they are registered under many brand names. The active ingredients are:

acephate (Orthene®)	malathion
allethrin	methoprene (Precor®)
bifenthrin (Talstar®)	permethrin
cyfluthrin (Tempo®)	phenothrin
cypermethrin	pyrethrins
deltamethrin	pyriproxyfen (Nylar®)
lamda-cyhalothrin	resmethrin
tetramethrin	

Following label directions, thoroughly treat rugs, carpeting and upholstered furniture. Remove furniture cushions so that both sides can be effectively treated. Pay particular attention to pet bedding, resting and sleeping areas.

Some insecticide formulations used for flea control can cause odor and staining problems. To avoid these problems through the home, it is advisable to test-treat a small out-of-sight area before proceeding with a complete treatment. Crawl space areas should also be thoroughly treated. Dust formulations are best used in crawl spaces.

Repeat treatment as directed on the insecticide label.

**4. Treatment of outdoor premises.** During the warm season, it may be advisable to apply insecticides to lawns or yards, under porches, garages, and outbuildings. These areas must also be kept clean by removing animal manure and debris.

Insecticide products commonly available for outdoor contain active ingredients as follows:

acephate (Orthene®)	lamda-cyhalothrin
bifenthrin	malathion
cyfluthrin (Tempo®)	permethrin
cypermethrin	pyriproxyfen (Nylar®, Archer®)
deltamethrin	pyrethrins

Follow insecticide label directions and precautions. Repeat treatment as directed on the label.

**5. Treatment of pets.** Along with treating the premises, it is important to treat flea-infested cats and dogs simultaneously. Before bringing a new pet into the home, inspect the animal for fleas and treat as necessary. Insecticides are registered under many **brand names** and they are formulated as shampoos, aerosols, dips, sprays, dusts (powders), and flea collars for use on pets. Registered insecticide products include the following active ingredients:

**Pet Shampoos:**

allethrin	pyrethrins
permethrin	pyriproxyfen (Nylor®, Archer®)
phenothrin	

**Flea Collars:**

allethrin	phenothrin
deltamethrin	proprosur

**Pet Dips:**

permethrin	pyrethrins
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**Pet Topical Applications:**

allethrin	permethrin
fipronil (Frontline®)	pyriproxyfen (Nylar®, Archer®)
imidacloprid (Advantage®)	

Products available **only to veterinarians** for flea control:

1. Advantage® (imidacloprid)
2. Bio Spot® Flea/Tick (permethrin plus pyriproxyfen)
3. Capstar® (nitenpyram)
4. Frontline Plus® (fipronil plus methoprene)
5. K9 Advantix® (permethrin plus imidacloprid)
6. Program® (lufenuron)
7. Revolution® (selamectin)

Before treating pets, consult with your veterinarian and read the insecticide label directions thoroughly to avoid accidental poisoning. Repeat treatment as per label directions.

**Caution:** Avoid using products containing different insecticides at the same time when treating pets to prevent an accidental overdose. For example, don't shampoo the animal with a product containing permethrin if you intend to use a flea collar containing deltamethrin.

**6. Exclusion of alternate hosts.** Make sure that stray cats and dogs or other animals are not allowed to live or seek shelter in and around your home. Control mice and rat infestations immediately to avoid flea problems.

**Be Aware of Certain Non-Performing Products**

Research data have shown that ultrasonic flea collars and other ultrasonic devices do not repel fleas, interfere with reproduction, or alter flea development. The use of brewers' yeast, garlic, B-complex vitamins and elemental sulfur products as flea repellents is common practice but these products are not effective.

**Flea problems are often difficult to solve. If fleas persist, seek help from a commercial pest control professional and/or your veterinarian.**

Reference to commercial products or trade names is made with the understanding that no discrimination is intended of those not mentioned and no endorsement by University of Nebraska–Lincoln Extension is implied for those mentioned.

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