Fleas are pests of humans and their domestic animals all over the world. Worldwide, more than 1,600 species of fleas exist. The most recent survey of fleas in Missouri showed the presence of at least 26 species. In addition, 11 species found in adjacent states are expected to cross into Missouri.

Fortunately, humans encounter only a few of these species. The most common species of fleas in Missouri is the cat flea. The homeowner usually encounters other species, such as the dog flea, human flea, oriental rat flea and rodent fleas, only occasionally. Fleas are medically important because of their irritating bites, abundance, worldwide distribution and ability to transmit diseases.

**Flea bites**

Different people have differing reactions to flea bites. Some people are either immune to the bites, unattractive to fleas or both. Others seem to be highly attractive to fleas. In a flea-infested household, one or two individuals may show severe irritation from the bites, while other members of the family may not even realize fleas are present.

Fleas most often bite people on the legs and ankles; characteristically, they make two or three bites in a row. A small red spot with a light-colored center appears where the mouthparts entered the skin. Irritation, itching and rash are caused by salivary secretions, which the flea injects during feeding. The typical human reaction to a flea bite is a small, hard, red, slightly raised, itching spot. There is usually no swelling. Some bleeding can occur, particularly if the bite is scratched. Cats and dogs scratch and bite themselves constantly when heavily infested. Their coats become soiled and roughened and their skin is irritated as a result of a flea infestation.

**Life cycle**

The entire life cycle of fleas may be completed in as little as two weeks. The cycle is influenced by temperature and moisture conditions and may require months or even a year for completion. There are four stages in the developmental cycle of fleas: egg, larval, pupal and adult.

**Flea eggs**

Fleas deposit eggs, which are smooth, oval, light colored and about 1/32-inch long, in the hair and bedding of the host. The host usually drops or shakes off the eggs into mats, rugs, carpets or bedding where the animals sleep or rest.

The fertilized adult female flea lays two to 14 eggs after each blood meal and can lay up to 200 eggs in her lifetime. The eggs hatch in two to 14 days, depending on environmental conditions.

**Flea larvae**

The slender, straw-colored, hairy, wormlike larvae are often found in floor cracks, rugs, carpets and animal bedding. Newly hatched larvae are about 1/17-inch long; when mature, they can be up to 1/4-inch long.
Larvae lack eyes and legs but have chewing mouthparts. They move by using their body bristles and feed on a wide variety of organic debris, including food particles and dried feces from the pet and the adult fleas. They prefer a dark, moist environment and grow by periodically shedding their skin. Fleas pass through three larval stages and are fully developed within eight to 24 days. The larval stage, however, can be prolonged to more than six months under adverse conditions such as low temperature.

**Flea pupae**

Before entering the inactive pupal stage, the fully grown larva spins a silken cocoon, which incorporates debris particles and saliva. The larva then pupates within the cocoon. The pupa, initially creamy white, gradually darkens to a brownish color. Typically, the pupal state lasts from five to seven days but may be prolonged up to a year by unfavorable conditions.

**Flea adult**

The adults may remain in the cocoons for up to five months, depending on the availability of a host and environmental conditions. Adult fleas are small, wingless insects approximately ⅛- to ⅝-inch long. They are dark reddish-brown to black. Their bodies are well-adapted to their particular way of life. That is, the body is thin (laterally compressed) and covered with a series of backwardly directed spines so it can move rapidly between the hair or feathers on its host.

The mouthparts of adult fleas are adapted for puncturing animal skin and sucking up blood. Both male and female fleas bite and suck blood.

Adults have three pairs of legs, with the back pair modified for jumping. Their powerful legs permit them to jump as much as 7 to 8 inches vertically and 14 to 16 inches horizontally. This ability to jump gives the false impression that they can fly; they cannot.

The adult flea recognizes the presence of a potential host by the host's body heat and odor and by vibrations. This is one reason fleas often attack people returning home after vacation. Adult fleas typically bother humans in the absence of their preferred hosts. Indoors, cat and dog fleas become a problem when pets are kept outside during warm weather or are boarded out during vacations. Problems also often arise when new occupants move into quarters formerly occupied by people with pets.

**Medical importance**

The feeding habitat and occasional lack of host specificity of fleas increase the potential for transmission of disease-causing organisms to humans and domestic animals. Fleas transmit diseases such as plague, typhus and tularemia to humans. The plague (or "black death") is still found in some Western states, where rodent populations serve as a reservoir for the disease organisms, and where fleas serve as the carrier of the disease to man and pets.

Murine (or endemic) typhus can be transmitted from rats to humans, primarily by the oriental rat flea. This disease occasionally occurs in the Western states.

Cat and dog fleas can serve as intermediate hosts for dog, cat and rodent tapeworms, which may infest humans, particularly young children. In many cases, pets kept inside can become infected with these internal parasites by eating fleas.

**Control**

To control fleas successfully, treat the following places at the same time:
- inside the home,
- outside the home (lawn, kennel) and
- the pet animal.

Treating only one place, such as the pet animal, almost always leads to a reinfestation because fleas that occur outdoors or indoors find the animal and then are further distributed to other areas.

**Indoors**

Before you apply any insecticide for flea control, vacuum the premises thoroughly, especially pet resting areas, to remove all developing fleas as possible. Vacuum the entire house, especially carpets (even under furniture), areas pets frequent, cracks and crevices along walls and all upholstered furniture. Use a powerful upright vacuum cleaner. Destroy the vacuum bag contents by burning or by discarding in airtight plastic bags as soon as the house is cleaned. This is necessary to get rid of the accumulated flea eggs, larvae and pupae.

Where pets have free access to the entire home, flea control can be a complicated problem, and the services of a reputable pest control company may best rid your home of fleas. Obtain estimates from two or three companies and understand exactly what services you will receive. If you are so inclined, you can purchase pesticides and do the job yourself. If you use a spray, apply a coarse spray to floors, moldings and baseboards up to a height of 1 foot. Sprays available for indoor use are chlorpyrifos (Dursban®), malathion, diazinon and propoxur (Baygon). Dusts of malathion and pyrethrins (Drione) can be effective. Total release aerosols containing resmethrin, allethrin, pyrethrins, permethrin and DDVP (Vapona®) are available for quick knock-down of adults. These aerosols, in combination with methoprene (IGR), can give control of both adults and immature fleas.

Methoprene, an Insect Growth Regulator, prevents flea larva from maturing into adults. The product is odorless, non-staining and relatively non-toxic. Used according to label directions, it is extremely effective for flea control. A common trade name is Precor®.
Outdoors
You should thoroughly treat infested premises such as garages, porches, yards and especially the bedding or loafing areas of the pet. Prevent pets and all other animals from getting under the house. Eliminate rats and mice and follow a good flea control program. Treat areas frequented by pets with pyrethrins, carbaryl (Sevin®), malathion, chlorpyrifos, propoxur, diazinon or rotenone. Follow all label directions.

Pet treatment
Treatment of the pet is important because this is the primary source of flea infestation. Dust formulations are often preferred over sprays for treating pets. Put on rubber gloves and apply dust thoroughly into the hair coat. Use a shaker and rub the dust into the hair, being particularly thorough around the ears, between the legs and around the tail. Keep dust out of animals’ eyes, nostrils and mouth.

Many formulations are labeled for use on pets. They include shampoos, aerosols, dips, sprays, dusts (powder) and flea collars. Some materials are carbaryl, malathion, pyrethrins, DDVP, propoxur, rotenone, chlorpyrifos, resmethrin and naled (Dibron®). Always read the label for information important to the health and safety of your pet.