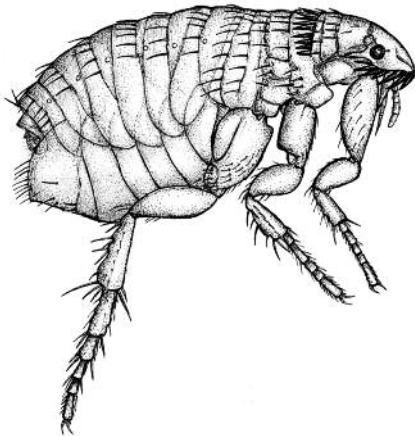


Control Fleas on Your Pet, in Your House, and in Your Yard



If you own a dog or cat, you will have to control fleas. Even light flea infestations are annoying to pets, and some dogs and cats develop skin problems because they are allergic to flea bites. Heavy flea infestations can cause pets to be unthrifty and cause anemia in puppies and kittens. Fleas may also host tapeworms, and pets become infected when they ingest infected fleas while grooming. Fleas also bite people, and heavy infestations in the home or yard can make life miserable for pet owners and their family and friends. Although there are many different species of fleas in the world, the cat flea, *Ctenocephalides felis*, is the species that most commonly occurs on dogs and cats in the US.

To control fleas successfully, you need to control them in all areas where they occur: on the pet, in the house, and in the yard. Not allowing pets inside the house is the surest way to avoid having fleas inside the house, but not all pet owners favor this method. Whether or not pets are allowed inside, the first step in flea control is to treat the pet(s) with an effective and appropriate on-pet treatment. Fortunately, there are several highly effective treatments that can be

applied to pets for preventive flea control. Good, preventive on-pet flea control, combined with frequent cleaning of pet bedding areas, can keep fleas from becoming established in the house or yard. But if pets are infested with adult fleas, the house and yard will also be infested with immature fleas, and these areas will need to be treated.

Flea Biology

To control fleas effectively, you need to have a basic understanding of flea biology. Only adult fleas live on the animal and suck blood; the immature stages live on the ground or floor of areas frequented by the host, especially in areas where the animal sleeps or rests. Adult fleas lay eggs on their hosts, but because the small white eggs are not sticky, they roll off the host and fall to the floor, accumulating in those areas where the pet sleeps or rests. In 2 to 6 days the eggs hatch into slender, dirty-white larvae that feed on dander, dried excrement of adult fleas, dried blood, and other organic material that falls from the host or accumulates from other sources. Notice that this “flea food” is also concentrated in areas where pets sleep or rest—right where the developing flea larvae need it to be.

Flea larvae are only about 1/4 inch long when fully mature and can be difficult to find, even when present in large numbers. But if your pet is



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infested with adult fleas, the larvae are there and will quickly develop into more blood-sucking adults. In an established flea infestation, adult fleas represent only a fraction of the total flea population. The eggs, larvae, and pupae far outnumber the adults, and you will not control fleas unless you control these immature stages.

Because flea larvae require high humidity and are repelled by sunlight, they usually move into cracks and crevices or burrow deep in carpet or rugs. The larvae mature in 1 to 3 weeks and then spin a small cocoon in which they develop into adults. This cocoon, or pupal, stage can be just a week long or several months long. You must wash your pet's bedding and vacuum carpets regularly to complete your flea control regimen.

Newly developed adult fleas that are still inside their cocoons can sense whether or not host animals are present in the area, based on vibrations and carbon dioxide concentrations. When no hosts are present, they will delay emergence from the cocoon for up to several months. This is why heavy flea infestations can emerge suddenly in homes that have been vacant for weeks or months. A new homeowner might exclaim, "We just moved in and the house is full of fleas! No one has lived here for over three months and we don't even have a pet!" What has usually happened in such situations is that the previous occupants did have indoor pets. After they moved, the flea eggs and larvae that were left behind developed to the pre-adult stage

and waited for a new host to arrive. They emerge as soon as they sense renewed activity, and, in the absence of a dog or cat, begin biting people.

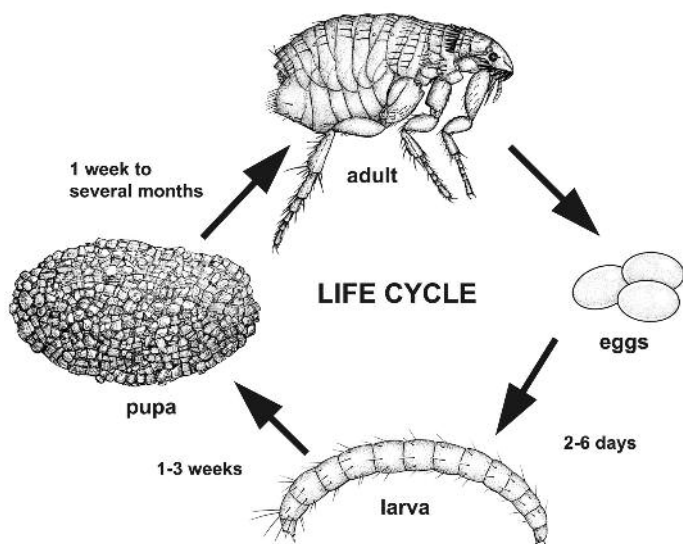
Flea Control on the Pet

Fleas can be present year round, but they become much more plentiful in the spring and summer. Protecting pets from these parasites also helps protect humans and helps prevent infestations in the home and yard. Fortunately, there are several effective products that can be applied directly to the animal to control fleas. Be sure to read the label carefully and understand what you are buying. Some of these products work on both ticks and fleas, while some work only for fleas or only for ticks. Some control internal parasites while others do not. Some of these products may be used on dogs or cats, while some may not be used on cats.

The following table provides general information about on-pet flea treatments. Note that this table focuses on flea products and flea and tick products and includes only one ticks-only product. It also does not address products that are used primarily for internal parasite control, although some of those products do contain additional medications that control both internal and external parasites. When using on-pet treatments, it is important to be sure the product is labeled for use on the type of animal being treated, as some of these products should not be used on cats. Be sure the dose and frequency of use is appropriate for the size of the animal. Many of these products are available in different sized packages that are for animals in a specific weight range. Some of the listed products require a prescription and may be purchased only through a veterinarian, but many are available over-the-counter or through online sources. Flea collars are generally ineffective and are not recommended.

There are many options for on-animal flea control in Mississippi. The following table lists a few of the more popular flea control products for use on dogs and cats and provides a comparison of attributes.

Advantage®, **K9 Advantix®**, and **Advantage Multi®** all contain the active ingredient imidacloprid, which kills adult fleas. K9 Advantix® also



Fleas have a complete life cycle and can complete a generation in as short a time as three weeks. Only adult fleas bite pets or people.

contains permethrin, which kills ticks but renders the product unsafe for cats. Advantage Multi® contains imidacloprid plus moxidectin, which enables it to kill adult fleas and prevent heartworms and a number of other intestinal parasites in dogs.

Capstar® is an oral flea-control product popular in veterinary clinics because it kills adult fleas within 30 minutes and can be used for both dogs and cats. However, its effectiveness lasts only about 24 hours and is not a good choice for long-term control of fleas.

Comfortis™ is a fairly new product for dogs that begins killing adult fleas within 30 minutes and remains effective for approximately 30 days. The primary disadvantage is that the flea has to bite the dog for the product to take effect. Comfortis™ is not currently labeled for cats.

Frontline Plus® is applied topically to cats and dogs and kills adult fleas, flea larvae, and flea eggs. It also kills chewing lice and all stages of a number of tick species. Although it is applied topically, the manufacturer claims resistance to bathing or swimming and good efficacy for a 30-day period.

Promeris® provides control of existing flea and tick infestations in dogs and protects against reinfestation. The formulation for cats contains metaflumizone but no amitraz and claims up to 7 weeks of flea control.

Revolution® kills adult fleas, prevents flea eggs from hatching for 1 month, prevents heartworm disease, and is used for the treatment and control of ear mite infestations. Revolution® is also indicated for the treatment and control of sarcoptic mange and for the control of tick infestations due to the American dog tick in dogs and roundworm and hookworm infections in cats.

Some widely available oral and topical treatments for control of fleas and ticks on dogs and cats.

Product name	Adulticide ¹	IGR ²	Admin	Controls ticks	Active ingredients	For use on
Advantage®	Yes	No	Topical	No	Imidacloprid	Dogs or cats
K9 Advantix®	Yes	No	Topical	Yes	Imidacloprid/ Permethrin	Dogs only
Advantage Multi®	Yes	No	Topical	No	Imidacloprid/ Moxidectin	Dogs or cats
Biospot for Dogs®	Yes	Yes	Topical	Yes	Permethrin + Pyriproxyfen	Dogs only
Biospot for Cats®	Yes	Yes	Topical	No	Pyriproxyfen	Cats
Capstar®	Yes	No	Oral	No	Nitenpyram	Dogs or cats
Comfortis™	Yes	No	Oral	No	Spinosad	Dogs only
Frontline Top Spot®	Yes	No	Topical	Yes	Fipronil	Dogs or cats
Frontline Plus®	Yes	Yes	Topical	Yes	Fipronil/ Methoprene	Dogs or cats
Preventic collar	No	No	Topical	Yes	Amitraz	Dogs only
Program®	No	Yes	Oral	No	Lufenuron	Dogs or cats
Program Plus®/ Sentinel®	Yes	No	Oral	No	Milbemycin oxime + Lufenuron	Dogs
Promeris®	Yes	No	Topical	Yes	Metaflumizone/ Amitraz	Dogs only
Promeris for Cats®	Yes	No	Topical	No	Metaflumizone	Cats
Proticall®	Yes	No	Topical	Yes	Permethrin	Dogs only
Revolution®	Yes	No	Topical	Yes ³	Selamectin	Dogs or cats

¹ Kills adult stage.

² Insect growth regulator. Kills larval stage.

³ Kills only the American dog tick (*Dermacentor variabilis*)

Veterinarians usually recommend controlling pests on the animals as well as in the environment and selecting flea-control products based on the individual animal's needs. It is important to emphasize that some flea products are deadly to cats. If you intend to use a product on cats, always check the label to make sure the product is approved for use on cats and always follow the manufacturer's directions. Do not use products that contain amitraz or permethrin on cats!

Use on-pet flea treatments properly. Be sure to apply only at the recommended time intervals and use the dose and frequency that is appropriate for the size animal you are treating. If a product that previously worked well on your pet appears to lose its effectiveness, change to another product that uses a different active ingredient. Also, with heavy flea infestations it may be necessary to use more than one method of application. For example, Capstar® may be used in both dogs and cats to kill all fleas on the pet within 30 minutes. However, this approach would not provide long-term control and would not control fleas in the environment. Heavy infestations usually require multiple approaches starting with a quick knock down, followed by a long-term product and treatment of the environment.

It is very difficult to treat a newborn puppy or kitten for fleas safely because of their ages and size. It is therefore wise to treat a pregnant animal for fleas before she gives birth. Use bedding that can be washed frequently and keep the whelping area flea-free if at all possible. Do not use any flea treatments directly on newborn puppies or kittens!

Flea Control in the House

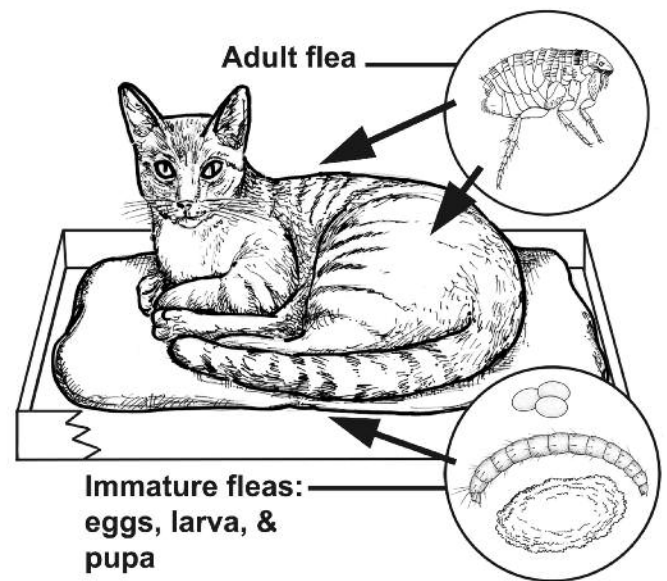
Given the biology and habits of immature fleas, it is easy to see why indoor flea infestations are usually concentrated in areas where pets rest and why infestations are often more severe in rooms that are not cleaned regularly and in rooms with carpet or rugs. It is also easy to see why vacuuming and other methods of cleaning pet bedding and floors play such an important role in indoor flea management. Weekly cleaning of pet bedding and the surrounding area not only removes many eggs and immature fleas before they become adults, but it also removes much of the dander, dried blood, and other organic accumulations on which immature fleas feed.

Cleaning is essential to successful indoor flea control!

Not allowing pets indoors is the best way to avoid indoor flea infestations. If pets are allowed indoors, designating special areas for pets to sleep, rest, and spend most of their time can let you concentrate your frequent cleaning efforts on these areas. If pets are allowed on furniture, keep in mind that immature fleas will occur under seat cushions and in other cracks and crevices within the furniture and vacuum these areas regularly. You will also need to move furniture and vacuum underneath. When you finish vacuuming remove the vacuum bag, seal it in a plastic garbage bag, and discard.

When using insecticide sprays to treat established indoor flea infestations it is important to target both the adult and immature stages. There are many products labeled for indoor control of adult fleas that can be applied as directed sprays. These contain active ingredients such as permethrin, deltamethrin, or pyrethrins. While these products also have activity against immature fleas, flea larvae are difficult to control with traditional adulticide type insecticides because of their habit of burrowing deep into cracks and crevices where they are difficult to reach with insecticides.

You can improve control of immature fleas in indoor settings by including an insect growth regulator (IGR) product, such as methoprene or nylar (pyriproxyfen), in your flea treatment.



Only adult fleas live on pets. Eggs fall off the pet and accumulate in bedding areas. Flea larvae feed on the feces of adult fleas, dried blood, and dander, which also falls off the pet and accumulates in bedding areas.

These IGR products work by disrupting the growth of immature fleas, causing them to die before they reach adulthood, and/or by interfering with the female flea's ability to produce viable eggs. The greatest strength of these IGR products is that, when used indoors where they are not exposed to sun light, they last several months and provide long-term control of immature fleas. Because these IGR products will not control adult fleas, it is best to apply a combination treatment containing an adult flea control product and one of the IGRs when attempting to control established indoor flea infestations. In situations where there is no established infestation of adult fleas and the objective is to simply apply a preventive treatment in areas frequented by pets, the IGR products may be effective when used alone.

Most flea treatments for indoor use by homeowners are sold as pre-diluted, ready-to-use (RTU) sprays. These products usually contain an adulticide, such as permethrin, bifenthrin, cyfluthrin or deltamethrin and some treatments contain both an adulticide and one of the IGR products. Another option is to buy adulticides and IGR products separately, as concentrates, and mix them together in pump-up type household sprayers. If you use a pump-up type sprayer, be sure to choose one that applies a fine spray pattern or a small pin-stream spray. Many pump-up sprayers apply spray patterns that are too heavy for indoor use.

Indoor flea treatments are also sold as total release aerosol foggers that contain an adulticide, an IGR, or both. However, the insecticide fog they release does not penetrate well underneath furniture, floor coverings, or seat cushions, and into the crack and crevices where most immature fleas live. Most of the insecticide applied by total release foggers settles in places where it is more likely to contact people and pets than fleas. Whether you use one of the ready-to-use pre-mixes or buy concentrates and mix your own spray, directed sprays will provide much better flea control.

When applying insecticides in indoor situations, it is especially important to carefully read and follow all label directions. Do not apply insecticides to areas where they are not approved for use. For example, some flea treatments may not be applied in areas where food is prepared, some may not be applied directly to furniture, and few flea products are labeled for broadcast application to carpets and floors. Do not apply any insecticide directly to pets unless the label says you can. Also be sure to observe the re-entry period specified on the label. Most products require that people and pets be kept out of the area until spray has dried, but some may have longer re-entry restrictions. Do not apply more insecticide than the maximum rate indicated on the label. Increasing the rate or concentration will not improve control, but it will increase pesticide exposure to your family and pets.

Indoor Flea Control Sprays *

Active Ingredient	Brand Name (examples)
Pre-Mixed, Ready-to-use Sprays	
Bifenthrin	Ortho Home Defense Max (RTU)
Cyfluthrin	Bayer Advanced Indoor/Outdoor Insect Killer (RTU)
Deltamethrin	Enforcer BugMax 365 (RTU)
Permethrin	Eagles 7 Flea and Tick Spray (RTU)
Nylar + Permethrin	Enforcer Flea Spray for Homes (RTU)
Methoprene + Permethrin	Zodiac Fleatrol Carpet & Upholstery Pump (RTU), Adams Home Flea & Tick Spray (RTU)
Nylar + Tetramethrin + Sumithrin	Enforcer Flea Spray for Carpets & Furniture (Aerosol)
Insecticide Concentrates	
Permethrin (25% concentrate)	Venom X-Terminate
Permethrin (13.3% concentrate)	Bonide Total Pest Control Indoor Concentrate
Permethrin (10% concentrate)	Hi-Yield Indoor/Outdoor Broad Use Insecticide
Insect Growth Regulators	
Nylar	Martins IG Regulator
Methoprene	Zoecon Precor IG Concentrate

The key to successful indoor flea control is to be thorough in cleaning and treating all areas in the house where fleas occur, giving special attention to areas where pets sleep or rest. A cursory, hastily applied flea treatment is not likely to produce satisfactory results, but a well-planned, carefully conducted treatment will provide good control. Clean and vacuum floors and pet bedding. Move furniture and vacuum underneath as well as vacuuming cracks and crevices in seats and under seat cushions. Then make a thorough application of an adulticide plus an IGR according to label directions.

Keep in mind fleas that are already in the pupal stage are especially difficult to control, and newly emerged adult fleas will hop onto a host as soon as possible. This means adult fleas may continue to appear for a few weeks following treatment, even when the treatment was properly applied using effective products, and follow-up treatments are sometimes required. When attempting to control heavy indoor flea infestations it is usually necessary to treat two or three times at weekly intervals, keeping in mind that the cleaning and vacuuming is as important as the spraying. If you properly clean and treat all of the areas that harbor immature fleas and treat all pets with an effective on-pet treatment, you will be successful in controlling fleas. After you have gotten the fleas under control, you can maintain control by preventive use of on-pet treatments, weekly cleaning of bedding and other areas frequented by pets, and application of IGR treatments at appropriate intervals.

While not allowing pets inside the house is the best way to prevent indoor flea infestations, you may not want to ban indoor pets from the house after a heavy flea infestation has developed and you have treated as described above. Emerging adult fleas are eager for a blood meal and in the absence of pets are more likely to bite people living in the house. Instead, treat the pet with one of the long-lasting on-pet treatments and allow it to remain indoors. Most emerging adult fleas will be attracted to the pet, where they will be controlled by the on-pet treatment. Essentially you are using the pet as a flea trap.

Of course you can also hire a professional pest control company to apply indoor flea treatments. The pest control technician will have effective insecticides and growth regulators and

the knowledge and equipment to apply them safely and properly. However, you will still need to do the necessary cleaning before the technician arrives and you will still need to be present at the time of treatment to move furniture and work with the technician to assure an effective treatment. Omitting the cleaning steps and hiring a pest control company to “just treat the areas you can reach” will not give satisfactory results. You have to do your part with cleaning and making sure the technician has access to all areas that need to be treated.

Key Steps to Control Heavy Indoor Flea Infestations

- Treat pet(s) with an on-pet flea treatment
- Thoroughly vacuum pet bedding and surrounding area
- Wash pet bedding in hot soapy water or discard and replace
- Vacuum floors, carpets, and rugs (Give special attention to cracks and crevices, under furniture, along walls, and around pet bedding areas)
- Vacuum furniture where pets rest, being sure to move seat cushions and vacuum underneath
- Move furniture and vacuum underneath
- Apply directed spray of adulticide + IGR (Do not fan spray or broadcast spray carpets or floors unless the label says you can. Apply spray to cracks and crevices, under furniture, along edges where walls or furniture meets the floor, and around and under pet bedding areas)
- Repeat cleaning and treatment in seven days
- Repeat again in seven more days if fleas are still present
- Maintain control by weekly cleaning of bedding areas and regular on-pet treatments

Flea Control in the Yard

Occasionally, high numbers of fleas will occur outside, in the yard or landscape. This usually happens when the area is frequented by flea-infested pets or wild animals. When attempting to control fleas in an outdoor situation, keep in mind that you will not have lasting success unless you also control fleas on all animals that frequent the area. On-pet flea treatments are an

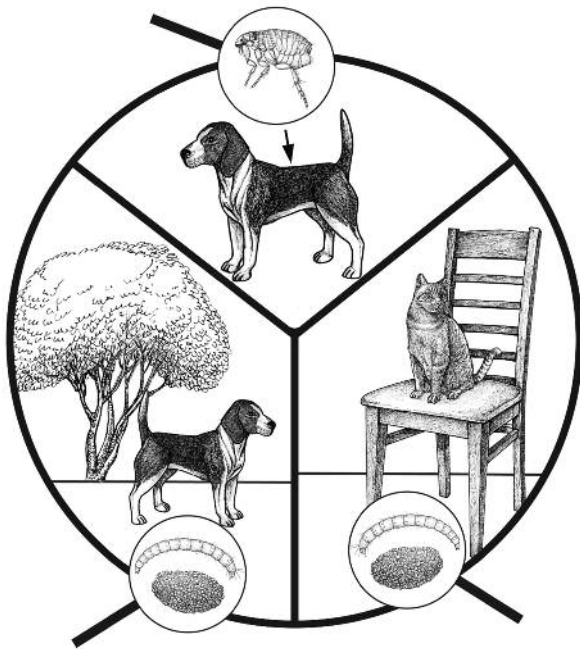
excellent way to treat pets, but in cases where the area is being frequented by stray dogs or cats or wild animals, such as possums or raccoons, treating the animal itself may not be an option. However, it may be possible to prevent or discourage the animals from using the area. Fencing the yard or sealing crawlspaces under buildings and openings to attics (be sure to maintain proper ventilation) are examples of ways to achieve this. If you feed pets outside, avoid feeding free-choice in areas where strays or wild animals can access the food. Otherwise, you will be attracting unwanted animals, and the fleas they carry, onto your property.

In situations where lawns become infested by fleas, broadcast insecticide treatments, applied either as sprays or as granules, can aid in reducing the incidence of bites on people who are using the area. But keep in mind that most immature fleas occur in areas where pets sleep or

rest and these areas may not be in the lawn itself. Instead they may be in some nearby, more protected site, such as: under porches, under shrubs, under crawl spaces of homes, and in garages or utility sheds. Remember cats can climb, and flea breeding sites sometimes occur in overhead areas of garages and sheds. Especially heavy flea infestations often occur in garages, storage sheds or crawlspaces of houses where litters of kittens or puppies are being raised. Some insecticides labeled for use against fleas in a lawn are not labeled for use in these other situations, and some insecticides labeled for use in these other situations are not labeled for broadcast treatment of lawns. Be sure to check the product label before making applications and use products that are labeled for the site you are treating.

Successful outdoor flea control depends more on controlling fleas in areas where pets routinely rest than in the open, sunny areas of the yard—immature fleas rarely occur in open, sunny areas of the yard. You may need to treat the sunny part of the yard to control adult fleas that have hopped out there, but spend most of your effort on identifying and treating those areas where pets sleep and rest and immature fleas breed.

Products for treating fleas in lawns are available for application as granules or as liquid sprays. Although they may be easier to apply, granules are generally less effective than liquid sprays, and liquid sprays are better suited for treating under shrubs and porches and other resting areas. When attempting to control heavy outdoor flea infestations, apply a second application in seven to ten days. Be sure to observe the restricted entry interval specified on the label of the product you use.



Treatments for Control of Fleas in the Yard

Active Ingredient	Brand Name (examples)	Rate/1000 sq ft	Comments
Treatments Applied as Sprays			
Bifenthrin (0.3% concentrate)	Ortho Bug-B-Gon Max Insect Killer Concentrate	12 fl oz	Apply as a broadcast spray using a hose-end sprayer or other appropriate sprayer
Permethrin (38% concentrate)	Hi-Yield 38 Plus Turf, Termite & Ornamental Insect Concentrate	0.4 to 0.8 fl oz/gal	Apply as a broadcast spray using a hose-end sprayer or other appropriate sprayer.
Permethrin (10%)	Hi-Yield Indoor/Outdoor Broad Use Insecticide	1/2 fl oz in 3 gal per 1000 sq ft	Apply as a broadcast spray
Cyfluthrin (0.75% liquid)	Bayer PowerForce Multi-Insect Killer	6 fl oz	Apply as a broadcast spray using a hose-end sprayer or other appropriate sprayer
Carbaryl (22.5% concentrate)	Sevin Concentrate Bug Killer	5 fl. Oz. per gal * Not for broadcast treatment of lawns.	Although not labeled for broadcast treatment of lawns, carbaryl is a good alternative for control of pyrethroid resistant fleas. (Active ingredients whose names end in “thrin” are pyrethroids.) Use according to label for spot treatment of outdoor pet bedding areas, as a building perimeter treatment, and to treat other areas where fleas are concentrated.
Treatments Applied as Granules			
Carbaryl (2% granules)	GardenTech Sevin Lawn Insect Granules	2.25 lbs	Water following application
Bifenthrin (0.115% granules)	Ortho Bug-B-Gon Max Insect Killer for Lawns	1 lb	Water following application
Cyfluthrin (0.05% granules)	Bayer PowerForce Multi-Insect Killer Granules	2 – 3 lbs	Water following application
Permethrin (0.5% granules)	Hi-Yield Kill-A-Bug II Lawn Granules	2 - 3 lbs	Water following application

The information given here is for educational purposes only. References to commercial products or trade names are made with the understanding that no discrimination is intended against other products that may also be suitable.

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By **Blake Layton**, Ph.D., Extension Professor, Entomology and Plant Pathology; **Jerome Goddard**, Ph.D., Associate Extension Professor, Entomology and Plant Pathology; **Kristine T. Edwards**, D.V.M., Ph.D, Entomology and Plant Pathology; and **Joe McGown**, Entomology and Plant Pathology.

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