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Resistance to a Flea Product?

A mixed-breed dog and 2 domestic shorthair cats were presented for severe flea infestation.

1

Flea-infested dog with flea allergy dermatitis

History. The owner reported that fleas were first seen 4 weeks ago on all 3 pets. He purchased several flea products from hardware stores, pet supply stores, and a local veterinarian but concluded the fleas were resistant to the products because none seemed to be effective. The owner reported that the dog sleeps indoors and is restricted to a fenced-in backyard while outdoors; the cats are kept indoors exclusively.

Physical & Dermatologic Examination. Numerous fleas were observed on the dog and both cats. The dog also had clinical signs of flea allergy dermatitis **(Figure 1)**.

Initial Management. The pets were treated with fipronil-(s) methoprene on days 0, 28, and 60. To address emerging flea populations in the environment, a member of the clinic's staff visited the owner's home weekly to place 2 intermittent light flea traps (myfleatrap.com) **(Figure 2)** in areas of the home where the pets frequented.

During the 3rd and 4th visits to the home, the owner expressed concern that the flea product was not working because an increasing number of fleas were being observed on the pets and in the traps. While the flea numbers in the traps and on the cats decreased dramatically during the 2nd month of treatment, the number of fleas on the dog remained high.

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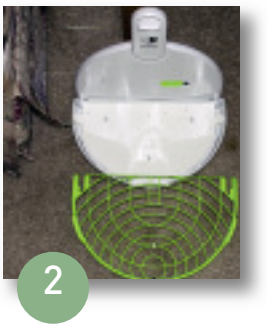

2

Intermittent light flea trap with fleas

ASK YOURSELF…

- What is the most likely explanation for failure of the previously used products?
- Why did the number of fleas in the home continue to increase before any significant tapering was noted?
- Why was the dog still showing high numbers of fleas despite receiving the same treatment as the cats?

DIAGNOSIS: INCONSISTENT TREATMENT WITH INSECTICIDE & PRESENCE OF FLEA-INFESTED WILDLIFE

Insecticide resistance has been defined in numerous ways but is basically the result of selective effects upon a population as a consequence of insecticide application.[1] The insecticides do not change or mutate the insects; resistance selection is simply survival of the fittest. Individuals with genetic traits that allow them to survive insecticide exposure reproduce and pass along those traits to subsequent generations, thereby increasing the percentage of a population that can survive subsequent exposure.

Historically, populations of fleas that infest dogs and cats have developed resistance to various classes of insecticides, such as organophosphates, chlorinated hydrocarbons, carbamates, pyrethrum, and pyrethroids.[2] Without ascertaining an adequate history and asking some basic questions of the pet owner, cases such as the one described may seem, at first glance, like classic cases of resistance.

Perceived Resistance. First, the owner's observation that the products were ineffective was interesting, but further questioning disclosed that the dog and cats were rarely treated regularly every month. Quite simply, if every pet is not treated every month for several months, fleas on untreated animals will continue to reproduce and sustain the infestation.[2,3] This may be one of the most common errors pet owners make. There is no way you can eliminate a flea infestation if every pet is not treated every month.

The continued emergence of fleas in a home and the presence of fleas on pets for several weeks after treatment is actually quite normal.[2,3] Flea eggs deposited in the premises before treatment continue to develop, and fleas will emerge for at least a couple months thereafter, regardless of type of pet treatment. In fact, the problem often worsens before it improves, depending on the number of eggs deposited and survivability of larvae.

Urban Wildlife. In this case, flea development and emergence in the home was halted after appropriate monthly treatment. However, there were still large numbers of fleas on the dog. When questioned about feral cats or urban wildlife (opossums and raccoons) that serve as hosts for cat fleas,[5] the owner reported that a raccoon was living in a tree in the backyard. During a subsequent visit to the home, fleas were observed jumping on the staff member's socks as he walked through shaded areas of the yard.

As nocturnal urban wildlife such as opossums **(Figure 3)** and raccoons **(Figure 4)** move through

3 Infrared image of opossum in residential yard

Fleas Recovered from Pets & Flea Traps

	DAYS						
	0*	7	14	21	28*	45	60*
DOG	160	44	112	236	144	132	248
CAT #1	8	5	4	18	34	5	1
CAT #2	7	0	5	4	14	5	0
TRAPS	20	15	17	30	7	3	0

* Pets treated with fipronil on this day (according to label instructions)

yards, flea eggs fall from the hair coat into shaded, protected habitats, develop into larvae and pupae, and emerge as fleas. In this case, the dog will never be free of fleas unless the raccoon is live-trapped and removed. The flea product is killing fleas but the dog is being constantly reinfested.

Before claims of resistance are made, clinicians must understand the ecology of the cat flea and take a thorough history of treatment type and administration history; number of pets; places the pets visit; and any known presence of feral cats, raccoons, opossums, coyotes, or foxes.[4] There is almost always an explanation other than product failure.

See Aids & Resources, back page, for references and suggested reading.

4 Three raccoons in tree in residential yard

? DID YOU ANSWER...

- The effectiveness of the previously used products cannot be assessed if the pet owner did not use them regularly every month. If 1 or more treatments are missed, fleas will continue to reproduce, sustaining the infestation.
- The number of fleas in the home and on pets will often increase during the first several weeks after treatment as eggs develop, flea larvae and pupae mature, and fleas emerge in the home. If a large number of eggs have been deposited, the problem may seem to worsen before it improves.
- Although the dog's outdoor activities were confined to the backyard, the yard also served as a playground for feral cats, opossums, and raccoons—animals that are hosts for fleas. Unless such species are removed from the environment, the dog will continue to be exposed to flea eggs from these wild animals. Since the cats remained inside exclusively, they were not exposed to this source of fleas.