Fleas and ticks
Fleas and ticks have been around for a long time, but we still have much to learn about these parasites. What is clear is that the list of vector-borne diseases they carry seems to grow each year. The reduced use of toxic environmental insecticides has contributed to population booms in both fleas and ticks. Now more than ever, our clients need quality veterinary advice on how to control these ectoparasites to protect their own health, as well as that of their pets. Never have we had such a great selection of products, yet we still struggle with flea and tick control because owners aren’t using them consistently! Our value will be to assess the medical needs of the pet and match them to the ideal product, taking into account the environment in which the owner lives with their pet, what they do together, and what type of product owners prefer. Customizing flea and tick control for each family helps our patients and our clients, and it gives us more job satisfaction too!

It is very important that the veterinary team be united in their dedication to ectoparasite control as a worthy preventive health care measure, and to the idea that success means helping clients have realistic expectations. We can provide them with the basic information they need about the life cycle to understand why we recommend flea and tick control every 30 days throughout the year. This information is readily available to us (and them) on line. Elanco, Merial, Bayer, Elanco, CEVA, and Merck have great information. For the best, though, see Dr. Michael Dryden’s website! He has a link to a super video called “The Dirt On Fleas.” This takes about 10-12 minutes, is not product specific, and no one can tell the story like Dr. Dryden! Here is the link to his website, where you can find lots of good information on fleas and ticks. http://www.drmichaeldryden.com/

We have some differences in the way we approach dogs and cats with flea infestations compared to those with flea allergies. With regard to infestations, there are some basic facts that the client needs to know and some myths that need to be busted. The major flea infesting the dog and cat is Ctenocephalides felis, and like many insects, it undergoes metamorphosis. The female flea feeds on blood in order to lay eggs, and under ideal conditions she can lay 50 eggs per day. Adult fleas spend their lifetime on their host, but the flea eggs will roll off into the environment where they hatch into larvae, pupate, and then emerge as adults. The life cycle is variable and dependent on environmental conditions as well as the availability of hosts. For every one flea seen on the pet, there are many more in the environment in the form of eggs, larvae, and pupae and control measures have to address not only the fleas seen on the pet but those remaining in the environment. We know these facts, but most clients don’t. Because they don’t, they have unrealistic expectations about flea control and make poor decisions about how to use it.

There is much talk about flea resistance to the products we use for flea control; however, most of this is perception not fact. It is very true that fleas have become resistant to older insecticides such as organophosphates or carbamates, but it is yet to be proven that fleas have become resistant to fipronil, imidocloprid, or selamectin. In most cases, failure of flea control is due to one or more of the following reasons:

1. The product is not being used every 30 days throughout the year.
2. Flea control products are not being used on all the dogs and cats in the household.
3. The flea control products are not being applied directly to the skin correctly and at the right dose.
4. One tube of flea control is being used on more than one animal.
5. Our pets are being exposed to other dogs or cats who have fleas and who are not being treated with flea control products regularly. In particular, many people will feed feral or semi-feral cats in their yards, which encourages the accumulation of eggs, larvae, and pupae in that yard in protected places.
6. Our pets are being exposed to fleas from wildlife. It has been shown that possums can carry up to 1000 fleas per animal! A significant source of fleas are feral cats, populations of which are increasing in many urban areas. Many of these animals are nocturnal and may or may not be appreciated by the pet owner.
7. Pets are being exposed to fleas in areas under porches, in sheds, or under trees where the wild vectors may congregate at night!
8. Unreasonable expectations: no flea product we use, whether oral or topical, will truly repel fleas, although there may be some repellency associated with permethrin. It can take anywhere from 30 minutes to 24 hrs for a flea to die, depending on what product is used and the time after application. Some products disable the flea from effectively feeding before they die, which is why good flea control helps pets that are allergic to flea saliva. If flea control is not used until adult fleas are seen, it will take 8-12 weeks to get rid of fleas in the environment, as they complete their life cycle and become adults. So, the fleas that are seen today are not the same fleas that will be seen tomorrow.
We can help reduce the length of time it takes to get good control by using integrated pest management. We can utilize products that contain insect growth regulators as well as adulticides, and in some cases, we need to recommend environmental treatment as well.

What about the flea surge? Each part of the country that supports fleas will have times at which the flea numbers increase greatly. For my part of the country, numbers of fleas surge in the spring and again in the fall. These are times at which the climate is perfect.

Flea allergy is special! How many times have we heard from our clients (especially for indoor cats) that fleas cannot be the cause of the skin disease because they never see fleas. That is the time to pull out the flea comb and see what can be found. But it is important to know that failure to identify fleas or flea dirt is not proof that fleas are not the cause of dermatitis. Flea allergic pets have been shown to have fewer fleas or flea dirt than nonallergic pets because they do so much grooming. The best way to rule out flea allergy is by response to treatment. Capstar (Novartis, nitenpyram) is one of the most effective flea control products we have and the killing effects of one dose persist for 48 hrs. A Capstar trial can be used in both dogs and cats to determine the role of fleas in pruritus. Capstar can be given every other day for one month. If fleas are the sole cause of the itch, the pet will be dramatically improved, and a regular flea control program can be started that will work for them.

We know that there are several products out there and no one product will meet the needs of all of your clients and patients. I have a simple “mind map” I like to use to help me select the right product for my clients. I call it my 4 quadrant flea control. I try to think of this each time I am faced with making a recommendation for flea and tick control.

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<tr>
<th>Topical Flea Control</th>
<th>Topical flea and tick control</th>
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<tr>
<td>Dogs and cats with fleas</td>
<td>Dogs and cats with fleas</td>
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<td>Minimal risk of tick exposure</td>
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<th>Oral Flea Control</th>
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<tr>
<td>Dogs and cats with skin diseases that require frequent bathing</td>
<td>Dogs with skin diseases that require frequent bathing</td>
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<td>Minimal risk of tick exposure</td>
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The best source for current flea and tick control products is the CAPC website. In their resources section, they have Canine and Feline Parasite Control PDF files you can download and use for reference. (http://www.capcvet.org/resource-library/) We do not need to review all the products today, but we can make a few comments about specific products that have uses additional to flea and tick control, as well as some new products.

There are two ways to approach flea control: orally or topically. The appearance of spinosad (Comfortis, Trifexis) revolutionized oral flea control for many allergic pets, because these animals often need frequent bathing. In addition, many clients prefer the oral route because they don’t like the smell or the appearance of the coat after topical products are applied, they have observed topical drug eruptions, and/or they are concerned about transfer of the chemical to their children. Spinosad has been reported to be effective for ticks as well, but tick control requires weekly administration and spinosad is not the best choice. Spinosad is labeled for use every 30 days but it is very clear that efficacy falls off after two weeks, and for the flea allergic pet it may be necessary to advise administration every 2 weeks (unpublished data from Dr.’s Michael Dryden and Byron Blagburn, as well as our published data). Still, this is preferable to having to use Capstar every other day. Lufenuron, present in Program and Sentinel remains a great product and I like to use Sentinel combined with Comfortis because we then get both adulticide and insect growth regulator with this combination. We see quite a few patients that utilize Sentinel as their sole flea control; it is important to remind people that there is no adulticide activity in this product. In addition, it is very important that spinosad be given with a full meal to maximize absorption.

Up until recently we had no oral flea and tick control products. Merial’s Nexgard (afloxolaner) and Merck’s Bravecto (fluralaner) have changed that! Both of these compounds are members of a class of insecticides known as isoxazolines and have been developed for the control of fleas and ticks in dogs. Nexgard is a chewable tablet given every 30 days; Bravecto is meant to be given orally every 3 months. Both have minimal toxicity; the most common side effect (in less than 5% dogs) being vomiting. Note that for Bravecto, the label states that in order to get good control of the Lone Star tick you want to administer it every 2 months.

The other and original route for flea control involves topical administration. The efficacy of most topical products may be affected by frequent dermatologic bathing, although good killing can persist for 30 days when bathing is done weekly. Reduced efficacy would have major effects on those pets allergic to fleas. Many veterinarians have made the decision to stock flea control products that are not readily available over the counter. Because of the issues with diversion, at our practice we do not stock Frontline, Frontline Plus, Advantage or Advantix, because we can’t compete with the pricing available to clients through on-line pharmacies or local distributors such as Petco or Petsmart. These remain excellent products, but it is worthwhile noting that compared to Advantage, Advantage Multi (imidacloprid with moxidectin) has improved efficacy against fleas (data from Dr. Byron Blagburn), and it provides excellent heartworm protection as well as efficacy against several mites. It can be useful in dogs with mild to moderate demodicosis.
when used weekly, and in some cats with Demodex gatoi if used every other week for 3 months. Another useful multifunctional product is Revolution (selamectin). If used every 30 days it provides excellent flea control for cats and dogs, and when used every 2 weeks is great for treatment of sarcoptic mange, cheyletiellosis, and ear mites. It is NOT effective against Demodex mites in dogs or cats. There are many new products containing fipronil these days; Merial has recently come out with Certifect, containing fipronil and amitraz (providing efficacy against ticks), and the TriTak line for dogs and cats (separate product for each species). The canine product contains cyphenothrin; the feline product contains etofenprox. Data from Merial suggest a very rapid kill for fleas and ticks. Vectra (dinitofuran and pyriproxifen) and Vectra 3-D (dinitofuran, pyriproxifen, and permethrin) have been very useful to us in Texas, particularly along the coast where Culicoides and mosquitoes may contribute to skin disease. Similar results have been seen in Florida, where Culicoides hypersensitivity may be more common in dogs (personal communication, Dawn Logas). We have had several successes with Vectra-3-D in dogs that did not do well with Comfortis, and its permethrin provides tick control and mosquito repellency (one of the label indications is to aid in the prevention of heartworm). Alternatives could include the Scalibor collar and the new Seresto collar from Bayer, but time will tell how these collars perform in the southeastern US and Texas, particularly for flea allergic pets!

Fleaborne diseases potentially transmissible by C. felis to humans include cat scratch fever (Bartonella henselae), other Bartonella spp., murine typhus (Rickettsia typhi), flea-borne spotted fever/cat flea typhus (Rickettsia felis), plague (Yersinia pestis), and the tapeworm Dipylidium caninum. It is disturbing to note that 58% of stray cats can be positive for Bartonella spp., and up to 90% of the fleas that infest them positive. Fortunately, the prevalence in pet cats is much lower (3%). In addition to causing anemia in cats and dogs by blood loss, C. felis also carries Mycoplasma spp which cause anemias in cats (M. haemominutum, M. haemophilus ).

Ticks
Tick control is more difficult than flea control. Fleas are essentially one host parasites with a relatively short life cycle that we can break, because we can control their reproduction using insect growth regulators and in a closed system, kill the adults before they can reproduce. With the exception of the brown dog tick (R. sanguineus), ticks are much more complex, utilizing multiple hosts and having a long life cycle, much of which we have no ability to control. In addition, Dr. Dryden has pointed out that pet owners view ticks differently: 95% flea control is perceived as successful whereas 95% tick control is considered a failure. A few ticks are much easier to see than a few fleas and arachnophobia may contribute to perceptions about control as well. Tick populations are increasing as their wildlife hosts increase, and we can expect that dogs and people will have increased exposure. Furthermore these changes in tick density may influence how efficacious our control measures will be.

It is important that veterinarians educate themselves and their staff about the ticks that are found in their particular area. Most of this information is readily available on line, along with excellent pictures and information about what diseases may be transmitted by these ticks in each area. In addition, the CDC has a wealth of information about ticks, including great distribution maps and the diseases they carry.

Updates on demodicosis
Demodicosis remains a problem for dogs and cats. We can find three types in dogs, including D. canis, the longer tailed D. injai, and a short stubby mite similar to D. gatoi in cats, which has been called D. cornei. There is some dispute that these are separate species. From a clinical point of view, we treat these equally. It is important to look for these mites when you have unresolved cases of pododermatitis and deep pyoderma, particularly in Shih Tzus. These dogs commonly get adult onset demodicosis, often with no identifiable underlying cause. The long-tailed mite D. injai is often found in terriers in the oily stripe down the middle of their back. For adult dogs who develop demodicosis we advocate for a complete medical workup to rule out underlying causes, but some adult dogs develop this disease without an underlying disease; I wonder if it is an aging change? Diagnosis is made by skin scrapings, but you can then coverslip the slide and count as you would for a skin scraping.

Treatment options remain limited. Our two major choices include amitraz dips or high dose oral ivermectin. Oral ivermectin can induce toxicosis at low doses in predisposed breeds, due to a mutation in the drug transporter MDR-1. For a complete list of the dogs evaluated and for testing, see Washington State University College of Veterinary Medicine Clinical Pharmacology Lab’s website. (http://www.vetmed.wsu.edu/depts-VCPL/test.aspx) Because this mutation is not the only mechanism mediating toxicosis, it is usual practice to step up the dose slowly. I start at 0.1 mg/kg and increase it by 0.1 mg/kg daily until I achieve the target dose (0.4 to 0.6 mg/kg/day). It is important to avoid the use of spinosad when high dose ivermectin is used. It is often asked when to restart spinosad after ivermectin therapy is stopped. A good rule of them is about 5 half-lives. This is about 10-14 days after you stop the ivermectin. It has been advised to avoid starting ivermectin for 2-3 weeks after giving the last dose of spinosad.

Amitraz in the form of Mitaban dip was the first approved treatment for canine demodicosis. The label use for amitraz is every 2 weeks; however, most dermatologists recommend weekly dips with this product. Toxicity can be seen in any dog, but small dogs...
seem predisposed. If dogs suffer from side effects, yohimbine (25 microgram/kg IV) or atipamezole (Antisedan, 50 microgram/kg IV or IM) are recommended.

Moxidectin can be used in 2 ways. In the product Advantage Multi, it is applied every week, and has been shown to be effective in dogs with mild to moderate demodicosis. Oral milbemycin can be used off-label by giving 0.4 to 0.6 mg/kg orally as you would for ivermectin. Many veterinarians like to use weekly injections of doramectin at 0.4 to 0.6 mg/kg subcutaneously. If you use the latter I would recommend doing a small test dose first particularly in dogs suspected of being ivermectin-sensitive. Oral milbemycin has been used at 2 mg/kg/day; the price and lack of availability have made this approach less popular.

The endpoint of treatment is the same regardless of how you treat. We want to reexamine these dogs once a month to perform skin scrapings. We stop therapy when 2 consecutive skin scrapings are negative. Not all dogs are curable. For those dogs we recommend maintenance therapy, which could be oral ivermectin 2-3 times a week, or in some cases, the use of Advantage Multi once a month.

Cats can also develop demodicosis. Demodex cati, the hair follicle mite, has been identified as a cause of chin acne, particularly in older cats, and it can sometimes be found within the ear canals of cats with ceruminous otitis externa. More commonly we see the short tailed mite, D. gatoi, as a cause of hair pulling in cats, particularly on the abdomen. Diagnosis is made by skin scrapings, but it is not always possible to find the mites, so therapeutic trials are recommended. Key historical clues include a poor response to steroids, a history of a new cat in the home, and/or a cat that goes outside. This mite is not sensitive to selamectin or other routine methods of flea control. The treatment of choice has been weekly lime sulfur dips for 6-8 weeks, but this treatment is not 100% effective. Some cats will respond to the use of Advantage Multi applied every 2 weeks for 3 months; the moxidectin is the active ingredient. Some cats resistant to either of these treatments can be successfully treating with ½ strength amitraz dips every 2 weeks for 3 treatments. Because this mite is contagious, it is important to treat all in contact cats.

**Updates on sarcoptic mange**

Sarcoptic mange is easy to diagnose in its classic form (young dog with crusting on the ears, elbows, body with demonstrable mites), but it is important to consider this mite in older dogs as well. We don’t always find the mite with skin scrapings, so it is important to rule out this possibility by treatment. My suspicion is raised when I see an older allergic dog that suddenly has a relapse of severe itch. Skin scrapings in these patients are often negative, so a treatment trial is warranted.

I usually recommend selamectin for treatment, asking the owners to apply it every 2 weeks for 3 treatments. This will provide flea control as well, which is important in Texas dogs. It is important to note that avermectin resistant scabies has been identified, at least in Houston. For those dogs, treatment options could include amitraz dips, lime sulfur dips, and weekly Frontline sprays.

For a list of references, please contact fadokv@aol.com