Parasites

Parasites are one of the most common conditions we see in veterinary medicine. Parasitic infections are broken down into internal (endoparasites) and external (ectoparasites). One of the biggest concerns with parasites is the risk of zoonotic potential, which is the ability to pass from animals to humans. Some may truly infect humans, while others may just cause irritation while waiting to be passed back to the pet.

Internal Parasites:

Hookworms live in the dog's GI tract as "voracious bloodsuckers". Eggs are passed in the dog's bowel movements and larvate in the environment for 3 weeks, where they are picked up by a dog licking its paws or eating off the ground. At 3 weeks after infection, eggs may be found in the stool again. The worms can also be passed through milk and the placenta to puppies, which is why we start deworming around 2 weeks of age. In humans, certain hookworm species cause cutaneous larval migrans, or tracks in the skin due to migration of the larvae.

Roundworms are the most common parasite that we visually see, usually in puppies and kittens after they've been dewormed. Roundworms generally cause disease by the numbers, causing obstructions, diarrhea, and irritation to the intestinal lining. Certain roundworms can cause visceral larval migrans and ocular larval migrans, where the larvae migrate through the organs of the body and the eyes, respectively.

Whipworms are one of the hardest worms to diagnose, as they only shed eggs 1 out of 5 days. Generally, the diarrhea is freshly-bloody and mucoid, as compared to the small bowel diarrhea of hookworms. Severe infections can also cause electrolyte imbalances (pseudo-Addisonian) that affect the heart. It also takes 3 months from infection to test positive on a fecal sample.

Tapeworms are generally carried by rodents (*Taenia* spp) or fleas (*Dipylidium* spp). Infections are rarely problematic (unless obstructive due to large numbers), but the general appearance to clients often concerns them more for hygienic reasons. Some minor species in our domestic animals can be significantly zoonotic (i.e. *Echinococcus* can form cysts in the liver and lungs).

Heartworms are carried by mosquitoes and affect the heart and pulmonary systems in dogs and cats. More extensive information can be found on the heartworm handout.

External Parasites:

Fleas (*Ctenocephalides* spp) can affect both dogs and cats, as well as opossums, raccoons, rabbits, and can irritate humans. The life cycle of the flea is similar to that of a butterfly: egg → larva → pupa → adult. Temperatures over 55*F and 45% humidity promote a hatch of the pupae (why spring and fall are so bad for adult fleas). The goal of control is to limit the numbers of adults in the environment, which actively feed on the animals and cause the damage. Our products do this by speed of kill of adults and insect growth regulators (IGRs) for eggs and larvae. Fleas frequently cause skin irritation by flea bites, flea allergy dermatitis (FAD), and anemia. We have seen TOO MANY kittens die of flea anemia, often seen too late to survive without aggressive blood transfusions.

Ticks - four major species seen in east Tennessee - can cause Lyme disease, Rocky Mountain Spotted Fever, Ehrlichiosis, and Anaplasmosis in both animals and humans. These diseases are often seen as limping, immune-mediated issues, and platelet problems (clotting dysfunction). The primary goal of tick control is to prevent attachment and spread of proteins via saliva. Speed of kill and repellency are the two main factors.

Scabies is caused by a mite (*Sarcoptes scabei*) that lives on the surface of the skin. Often intensely pruritic (itchy) - pruritus scale: 10/10. There is some evidence that scabies can be spread from animals to humans and significantly contagious amongst animals. Diagnosis via superficial skin scrape, history, and pinnal-pedal reflex (approx 85% +)

Demodex is a mange mite that burrows into the hair follicles, acting as a "normal flora" on the skin. Most often affected, puppies show symptoms as hair loss around the eyes and feet, deep crusting lesions, variable pruritus that may predispose to secondary bacterial infections. Diagnosis via a deep skin scrape. Cats have their own species of *Demodex*.

Ear mites belong to the genus *Otodectes*. They are characterized by their squat bodies and legs with "hairs" at the ends under the microscope. Cats are more prone to ear mites than dogs, seen as the dry dark crusty debris in the ear canals. Close contact increases the contagious nature of ear mites.

Treatment and Spectrum of Coverage:

Dogs:
Interceptor Plus (1 mo oral) - heartworms, roundworms, hookworms, whipworms, tapeworms
Proheart 6 (6 mo injection) - heartworms, hookworms

PPO (oral) - hookworms, roundworms, whipworms, tapeworms
Pyrantel pamoate (Strongid) [oral] roundworms, hookworms
Fenbendazole (Panacur) [oral] roundworms, hookworms, whipworms, tapeworm (*Taenia* spp)

Bravecto (3 mo oral) - flea adults, ticks (label); Demodex and scabies (extra-label)
Credelio (1 mo oral) - flea adults, ticks (label); Demodex and scabies (extra-label)
Advantage II (OTC topical) - flea adults, IGR (eggs and larvae)
Advanti**x** II (OTC topical) - flea adults, IGR (eggs and larvae), ticks, mosquitoes [**NO CATS**]
Seresto (8 mo collar) - fleas, ticks; some repellency.

Cats:
Revolution Plus (1 mo topical) - heartworms, roundworms, hookworms, fleas, ticks, ear mites
Revolution (1 mo topical) - heartworms, roundworms, hookworms, fleas, ear mites
Bravecto Plus (2 mo topical) - heartworm, roundworms, hookworms; (3 mo) - fleas, ticks, mites
Advantage II (OTC topical) - flea adults, IGR (eggs and larvae)
Seresto (8 mo collar) - fleas, ticks; some repellency.

Drontal (oral) - roundworms, hookworms, tapeworms
Praziquantel (Cestaject) [injectable] - tapeworms