

Antiparasitic Drugs

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Taxonomy Review

- It is important to understand basic parasite taxonomy as many of the available antiparasitic drugs will be effective against particular type of parasites, i.e. roundworms.
- Broadly speaking, parasites can be divided into several groups based on taxonomy:
 - Ectoparasites (i.e. external parasites)
 - Lice
 - Mites
 - Fleas
 - Ticks
 - Flies
 - Endoparasites (i.e. internal parasites)
 - Helminths (multicellular organisms)
 - Roundworms (Nematodes)
 - Flatworms
 - Flukes (Trematodes)
 - Tapeworms (Cestodes)
 - Protozoa (unicellular organisms)
 - Coccidians (i.e. *Coccidia*, *Sarcocystis*, *Neospora*)
 - Amoeba and Flagellates (i.e. *Giardia*, *Trichomonas*)
 - Hemoparasites (i.e. *Hemoproteus*, *Leucocytozoon*, *Plasmodium*)
 - Ciliates (non-pathogenic)
- There are a number of reference materials that can aid in parasite identification; it is essential that parasites be identified correctly to ensure that the appropriate treatment is provided.
 - Veterinary Parasitology Reference Manual, 5th Edition. 2001. Foreyt, W.
 - Veterinary Clinical Parasitology, 8th Edition. 2012. Zajac, A.M., Conboy, G.A.
 - Diagnostic Parasitology for Veterinary Technicians, 5th Edition. 2016. Hendrix, C.M., Robinson, E.
 - Online Resources:
 - www.capcvet.org
 - Numerous parasite identification charts can be found online as well

Diagnostic Techniques

- There are a number of ways by which parasites can be diagnosed:
 - Identification of adult worms in the feces, sputum or occasionally found in the eyes (i.e. flukes in water birds).
 - There are several basic ways that parasite eggs can be identified (requires a microscope)
 - Direct smear
 - Place small amount of feces on microscope slide, add saline and coverslip and examine under the microscope
 - Fecal flotation
 - Passive flotation

- Place small amount of feces into collection container, fill with flotation solution until a meniscus forms and then place a coverslip on the meniscus
- Let sit for 20 minutes and then examine under the microscope
- Centrifuged flotation
 - Place small amount of feces into a centrifuge tube and add flotation solution. Centrifuge for 2 minutes, let stand for 1 minute
 - Recover eggs from the surface of the liquid with a fecal loop or glass rod and examine under the microscope
- Fecal sedimentation
 - Place small amount of feces into a centrifuge tube and add flotation solution. Centrifuge for 2 minutes, let stand for 1 minute
 - Recover eggs from the bottom of the tube where a pellet has formed with a pipette and examine under the microscope
- Fecal concentrating solutions – these solutions have a specific gravity that promotes flotation of certain types of parasite eggs and lets most of the particulates sink to the bottom.
 - Sodium nitrate
 - Zinc sulfate – preferred solution for detection of *Giardia* cysts
 - Sheather's sugar solution – excellent general purpose solution
 - Commercially available but can also be made:
 - <http://veterinarymedicine.dvm360.com/recipe-sheathers-sucrose-solution>
- For a step-by-step guide on how to conduct fecal examinations, see: <http://www.rvc.ac.uk/review/Parasitology/Index/Index.htm>

Antiparasitic Drugs

- A formulary is essential resource that provides specific dosage information about drugs. Suggested Formularies
 - NWRA Wildlife Formulary, 4th Edition. 2017. Miller, E.A., Goodman, M.D. and Cox, S., editors. National Wildlife Rehabilitators Association, St. Cloud, MN.
 - Exotic Animal Formulary, 5th Edition. 2017. Carpenter, J.W. and Marion, C., editors. Saunders, Atlanta, GA. (Available November, 2017).
- Special considerations for Antiparasitic Drugs
 - Make sure that animal is well hydrated prior to giving an antiparasitic drug (EXCEPTION: administration of Nitenpyram (Capstar) for maggot infestation)
 - Certain drug formulations should be avoided in most cases because they are difficult to dose:
 - Boluses
 - Pastes (can be used if animal appropriately sized)
 - Powders (can be used if animal appropriately sized)
 - When providing medication in the water, ensure that the medication is mixed appropriately and that the medicated water is the only water available to the animal
 - Use caution with expired formulations
 - Use caution with topical products in birds as they will affect waterproofing
 - Do not apply powdered products directly on animals; use caution to prevent inhalation or ingestion
- Work with your veterinarian to choose appropriate antiparasitic treatment protocols
- Always perform post-treatment fecal to make sure that the infection has been resolved