LABORATORY 9

Review of the Parasites of Small Animals

Introduction:

In labs 2 through 10 we presented you with the various parasites of veterinary importance in a taxonomic manner. However, as veterinarians, you will be dealing with the host as your patient and therefore only need to deal with the limited number of parasites that normally reside within or on that host. In this lab we will present you with the parasites you have previously learned, but grouped according to the small animal which they parasitize.

Objective:

To review the parasites of small animals in a host-oriented manner. The "checklist" parasites for this lab are the same ones that were in the labs in which you first learned them. For your convenience we have reprinted these parasites in the appendix to this lab.

At the Bench

1. The parasite ova and cysts can be found on slides on the center bench and some other slides can be found in your Student Slide Box. Host - Parasite Lists can be found starting on the next page.

The following lists are not all inclusive, for example the deer tick can be found on many small mammals and birds, but it is just listed under dogs. As you go through the following lists make note of the parasites which can be found in several hosts (i.e. those that are not host species specific). Also note that some of the slides referred to have eggs or cysts of parasites that look identical to the ones actually on the center bench slides (for example: *Capillaria*: eggs in stool = *C. aerophila*, in urine = *C. plica*, but both look like the eggs on the slides on the center bench).

2. Fecal Examination Techniques:

a) Do a salt flotation on the dog feces in tub #1. What parasites are present?

b) Do a $ZnSO_4$ flotation on the dog feces in tub #2. What parasites are present?

3. Blood Examination (Center Bench):
Examine the blood on the center bench for microfilaria using either the Knott's or the Filtration methods.

Demonstrations

Demonstrations are arranged by host and predilection site. Host-parasite lists start on the next page.

The CAL websites are also a good place to review.

Dogs

Parasite	Location in Host	Diagnostic Stage*	Lab Specimen+
Spirocerca lupi	esophagus	eggs in feces	B 90
Physaloptera spp.	stomach	eggs in feces or adult in vomit	
Dipylidium caninum	small intestine	proglottids (eggs) in feces	SSB 4,5,6
Echinococcus granulosus	small intestine	proglottids (eggs) in feces	SSB 9
E. multilocularis	small intestine	proglottids (eggs) in feces	
Taenia ovis, etc.	small intestine	proglottids (eggs) in feces	B 14, SSB 1,2,3
Ancylostoma caninum	small intestine	eggs in feces	SSB 29
A. braziliense	small intestine	eggs in feces	
Strongyloides stercoralis	small intestine	larva in feces	
Toxocara canis	small intestine	eggs in feces	B24
Uncinara stenocephala	small intestine	eggs in feces	
Mesocestoides sp.	small intestine	proglottids in feces	
Giardia	small intestine	cyst in feces	
Sarcocystis	small intestine	sporocyst in feces	B 181
Cystoisospora sp.	small intestine	oocysts in feces	B 157
Cryptosporidium	small intestine	oocysts in feces	SSB 97
Neospora caninum	sm. intestine, brain	oocysts if in sm. int., serology, biopsy	
Entamoeba histolytica	large intestine	cyst in feces or trophozoites in diarrhea	
Tritrichomonas spp.	large intestine	trophozoite in diarrhea	
Trichuris vulpis	large intestine	eggs in feces	B 25, SSB 37
Dirofilaria immitis	pulmonary artery	microfilaria in blood	SSB 34, 35
Filaroides spp.	lungs	larva in feces	B 113
Eucoleus (Capillaria) aerophila	lungs	eggs in feces or sputum	B61
Paragonimus kellicotti	lungs	eggs in feces or sputum	B 142
Leishmania donovani	Macrophages	maybe seen in ascites from peritoneal cavity	SSB 41
Babesia canis	red blood cells	in RBCs (also serology)	SSB 54
Toxoplasma gondii	brain, other tissues	none (serology)	SSB 49
Pearsonema (Capillaria) plica	Urinary bladder	eggs in urine	B 61
Dioctophyma renale	kidney	eggs in urine	
Pneumonyssus caninum	nasal cavity	adults in nasal swab	
Otobius megnini	ear	adults seen	
Otodectes cyanotis	external ear	adults seen	
Sarcoptes scabiei	skin	adults in skin scrape	SSB 88
Demodex canis	skin	adults in skin scrape	SSB 90
Ixodes scapularis	skin	tick seen on skin	
Dermacentor variabilis	skin	tick seen on skin	SSB 96
Rhipicephalus sanguineus	skin	tick seen on skin	SSB 95
Ctenocephalides sp.	skin	adults on skin	SSB 75
Linognathus setosus	skin	adults on skin	SSB 78
Trichodectes canis	skin and hair	adults on skin	SSB 77
Cuterebra sp.	skin	larva under skin	

* In living host, serology and biopsy excluded. Where no diagnostic stage is present, serology or biopsy may be appropriate.

\+ B = Slide on center bench, SSB = Student Slide Box Slide #

Cats

Parasite	Location in Host	Diagnostic Stage	Lab Specimen
Physaloptera spp.	stomach	eggs in feces or adult in vomit	
Ollulanus tricuspis	stomach	adults and larvae in vomit	
Dipylidium caninum	small intestine	proglottids (eggs) in feces	SSB 4,5,6
Taenia taeniaeformis	small intestine	proglottids (eggs) in feces	SSB 1,2,3 B 14
Mesocestoides sp.	small intestine	proglottids in feces	
Spirometra mansonoides	small intestine	eggs in feces	B 144
Diphyllobothrium latum	small intestine	eggs in feces	
Echinococcus multilocularis	small intestine	eggs in feces	
Ancylostoma tubaeforme	small intestine	eggs in feces	
A. braziliense	small intestine	eggs in feces	
Toxocara cati	small intestine	eggs in feces	
Toxascaris leonina	small intestine	eggs in feces	
Cryptosporidium spp.	small intestine	oocyst in feces	SSB 97
Toxoplasma gondii	small intestine	oocyst in feces	B 182, SSB 49
Cystoisospora sp.	small intestine	oocyst in feces	B 157
Giardia	small intestine	cyst in feces	
Tritrichomonas foetus.	large intestine	trophozoite in diarrhea	
Eucoleus (Capillaria) aerophila	lungs	eggs in feces or sputum	B 61
Paragonimus kellicotti	lungs	eggs in feces or sputum	B 142
Aelurostrongylus abstrusus	lungs	larva in feces	B 157
Dirofilaria immitis	pulmonary artery	usually none	
Pearsonema (Capillaria) plica	urinary bladder	eggs in urine	B 61
Otodectes cyanotis	external ear	adult in ear	
Notoedres cati	skin	adults in skin scrape	
Cuterebra sp.	skin	larva under skin	
Ctenocephalides sp.	skin	adults on skin	SSB 75
Trichinella spiralis	muscle	larva (biopsy)	SSB 38

Poultry

Parasite	Location in Host	Diagnostic Stage	Lab Specimen
Capillaria sp.	esophagus, sm. intestine	eggs in feces	B 61
Ascaridia galli	small intestine	eggs in feces	
Eimeria sp.	small intestine	oocysts in feces	SSB 47, B 30
Giardia	small intestine	cyst in feces	
Cryptosporidium sp.	small intestine	oocysts in feces	SSB 97
Heterakis gallinarum	cecum	eggs in feces	
Histomonas meleagridis	cecum and liver	trophozoites in cecal scraping	
Syngamus trachea	trachea	eggs in feces	
Echidnophaga gallinacea	skin	adults on skin	
Ornithonyssus sylviarum	skin	adults on skin	B E203
Dermanyssus gallinae	skin	adults in skin	SSB 91
Columbicola columbae	skin	adults in skin	SSB 85
Argas persicus	skin	adults on skin	
Knemidocoptes sp.	skin of legs	adults in skin scrape	
Menopon gallinae	feathers	adults on feathers	SSB 84
Leucocytozoon smithi	blood cells	gametocytes in blood smear	
Haemoproteus columbae	red blood cells	gametocytes in blood smear	SSB 52

Wildlife

Parasite	Location in Host	Diagnostic Stage	Lab Specimen
Physaloptera spp.	stomach	eggs in feces or adult in vomit	
Baylisascaris procyonis	small intestine	eggs in feces	
Giardia	small intestine	cyst in feces	
Cryptosporidium	small intestine	oocyst in feces	SSB 97
Eimeria sp. or *Cystoisospora* sp.	small intestine or liver	oocyst in feces	
Xenopsylla cheopis	skin	adults on skin	SSB 76
Cheyletiella parasitivorax	skin	adults on skin	
Ixodes sp.	skin	adults on skin	
Cuterebra sp.	skin	larva under skin	
Dermacentor variabilis	skin	stages on skin	SSB 96
Trichinella spiralis	muscle	larva in biopsy	SSB 38

Appendix Laboratory 11

Checklist material covered in this review:

Learn to identify:

□ Giardia cysts □ oocysts of *Cystoisospora* spp. (2 sizes)

□ *Cryptosporidium* oocysts (acid fast stained)

□ *Toxoplasma* (cat) and *Neospora* (dog) oocysts □ sporocyst of *Sarcocystis*.

□ *Giardia* trophozoites □ *Tritrichomonas* trophozoites

□ *Babesia* spp. in a blood smear □ *Leucocytozoon* in a blood smear

□ *Ollulanus* Adult (from stomach of a cat) □ *Ancylostoma* spp. Egg

□ the typical lungworm L1 ("kinked" tail) and be able to identify to species (by host).

□ the L1 of *Strongyloides* spp.

□ Distinguish between and recognize the L1 of *Strongyloides stercoralis, Ancylostoma* sp., and *Oslerus (Filaroides)* sp. (or *Aelurostrongylus* sp. if from a cat) from the feces.

□ The eggs of the following Ascarids: *Toxocara canis, T. cati, Toxascaris leonina,*

□ The eggs of the following Trichocephalids: *Trichuris vulpis, Trichuris* spp. & *Capillaria* spp.

□ the L1 of *Trichinella spiralis* in a "squash-prep" of muscle.

□ Adult *Dirofilaria immitis* (by size and location in host)

□ Adult *Spirocerca lupi* (by size and location in host)

□ microfilaria (the pre-L1 stage of filariids)

□ a spiruid egg (all similar to *S. lupi* eggs)

Be able to do (and explain the theory behind) the following techniques:

□ The Knott concentration technique

□ The Filtration technique

□ An assay for heartworm antigen

Be able to identify the following trematodes:

□ any trematode egg (A brown egg with an operculum is considered a trematode egg or a trematode-like egg.)

□ *Paragonimus kellicotti* eggs (the operculum surrounded by a thick ring and the size should be sufficient to identify this egg).

Be able to identify the adults of the following:

□ an acanthocephalan (a predilection site in the small intestine, and the presence of a anterior proboscis covered with spines coupled with the lack of suckers on the anterior end is enough to identify an adult acanthocephalan.)

Be able to identify the eggs of:

□ *Echinococcus* spp. and *Taenia* spp. (Small (35 - 45 um) brown eggs with striated border)

□ *Dipylidium caninum* (expressed from a proglottid, they will be in packets)

Be able to identify the proglottids of:

□ *Taenia* spp. (When gently flattened they are square to rectangular.)

□ *Dipylidium caninum* (When gently flattened they pinch in at the ends - "cucumber seed" shaped.)

Be able to recognize a representative mite from each of the following 5 families:

□ Dermanyssidae
□ Chyletidae
□ Psoroptidae
□ Sarcoptidae
□ Demodicidae

Be able to:

□ Use the pictorial key to identify an unknown tick specimen to the genus level.

□ Recognize *Rhipicephalus*, *Ixodes*, *Dermacentor*, *Ambylomma* ticks without using a key.

Be able to recognize:

□ the suborders of flies by antennal type (Nematocera, Brachycera, Cyclorrhapha)

□ Adult flies of the family Tabanidae

□ Chewing lice and the two subgroups: Amblycera and Ishnocera

□ Sucking lice

Using a pictorial key be able to:

□ prepare posterior spiracles of muscoid fly larvae and make a genus diagnosis

□ identify flea adults to species