Fecal Procedures

Things to remember:

- Use gloves while performing the fecal as many parasites are zoonotic
- Clean up after the procedure is performed using Virkon
- Wash hands thoroughly afterwards
- Write down the results in the medical chart and calculate treatment
- Should re-fecal after treatment and ideally perform 3 consecutive fecals in total to make sure it is negative

Recording the results:

"NOO" = No ova observed
"OVA"= Ova observed

Recording the parasite load: under 10x

1+ = 1-2 ova per low power field (LPF) (light load)
2+ = 3-5 per LPF (moderate)
3+ = 6-8 per LPF (heavy)
4+ = > 9 per LPF (very heavy)

Fecal Collection and storage:

- Collect a fresh sample as rapid development and changes can occur in some parasites' eggs or larvae once passed
- Can be kept in the fridge for 4-5 days but will lose motile trophozoites (ex. Giardia); label with species, case no., and date
- Note fecal color, consistency, presence of parasites, and blood
- For birds, you only need to collect the feces (brown solid part) not the urates (white liquid part)
- Sending feces to lab: keep cold- send with ice packs, or store in 10% formalin

Fecal Exam

1. Gross examination of feces

- Consistency: diarrhea, soft, or hard, sandy
- Color: in birds: bright green (can mean parasites, anorexia), dark brown (also means anorexia for 24hrs) red (can be due to food-berries, meat)
- Presence of blood: dark black/brown and tar-like (melena-digested blood) or frank blood red (undigested blood, bleeding from lower GI tract)- some parasites can cause extensive damage to the intestinal lining
- Mucus: intestinal inflammation or irritation, parasitism (mammals)
- Gross parasites: larvae or portions of parasites are sometimes visible to the naked eye

2. Fecal Float

Purpose:

To detect parasite eggs. Using a floatation solution (Sodium Nitrate) with a higher specific gravity than that of the eggs, parasite eggs float to the surface of the liquid and large particles of fecal material sink to the bottom.

Procedure:

1. Collect fecal with the green part of the fecalyzer
2. Set in the white part and fill half way with the floatation solution
3. Mix thoroughly
4. Fill up the fecalyzer until a meniscus forms
5. Place a coverslip on top and set the timer for 10-15 mins (any longer than that and crystals will start to form)
6. Set coverslip on microscope slide, read under 4x-10x for roundworms and tapeworms and 10x- 40x for protozoa

Under the microscope:

- Keep the Iris Diaphragm more closed and the light source dim to see more detail
- Look for regular shaped cells: cell membrane, nucleus, are similar in color and shape

3. Direct Smear

Purpose:
To detect motile protozoans such as Giardia and Trichomonas sp., can also see Coccidia. Use for fecals or crop swabs.
Advantages: can use a very small amount of feces, allows observation of eggs and larvae
Disadvantages: the small sample is not a good representative sample size. This is diagnostic only when positive.

Procedure:
1. Place several drops of saline on a slide with an equal amount of feces
2. Mix the solution and feces together with a q-tip until homogenous
3. Smear the solution over the slide into a thin film, the density is correct when newsprint could be easily read through the preparation
4. Remove any large pieces of feces
5. Place a coverslip over the smear
6. Examine under 10x-40x

Microbiology

1. Gram Stain

Purpose:
The Gram stain is a procedure that results in the ability to differentiate between the two types of bacteria, gram positive and gram negative.
You can also detect yeast (show up as purple/blue colored), and bacteria such as Clostridium sp., and Campylobacter sp.
Bacteria is normal in certain areas of the body, called 'normal flora' (i.e. the mouth, digestive tract, skin) and abnormal in other areas (i.e. blood, urinary tract). Keep this in mind when looking at your sample. Look for the presence of WBCs to indicate an inflammatory process.

Procedure:

1. Obtain the desired bacteria sample and smear it on a microscope slide. Let the deposited bacteria air dry.
2. Once completely dry, heat fix the bacteria to the slide using a direct flame source (a lighter) by running the slide through the top of the flame 2-3 times. Allow slide to cool for five minutes or so.
3. Following Table 1., stain the slide on a stain tray. In between each step, rinse the reagents completely off the slide using water.
4. Allow the stained slide to air dry completely**.**
5. Look under the microscope with an oil objective lens and use only the fine focus knob to bring the specimen into focus.

Table 1. A summary of the procedure involved in the staining of a smeared and heat fixed bacteria sample.

Step	Reagent	Time (seconds)	Purpose	Gram Positive Color	Gram Negative Color
1	Crystal Violet	60	Stain all cells purple	Purple	Purple
2	Iodine	60	Bind target molecules, increasing crystal violet-iodine complex	Purple	Purple
3	Alcohol	2*	Gram Negative lipids of outer membrane are broken down	Purple	Colorless
4	Safranin	60	Stain gram negative cells pink/ red	Purple	Pink/ Red

*If a flash of purple appears sooner than two seconds, rinse immediately

2. Diff Quik

Purpose:
To be able to see cells, bacteria, yeast. Used for blood smears and swabs.

Procedure:

1. Allow the slide to dry completely
2. Starting with the fixer (light blue color), dip the slide 5 times in the solution
3. Dip slide 5 times in solution 2 (red color)
4. Dip slide 5 times in solution 3 (purple color)
5. Allow to dry, examine under oil immersion

3. Swabs

a. Crop swab

Purpose:

To detect Trichomonas sp., yeast, overgrowth of bacteria.

Procedure:

1. Using a sterile swab moistened with sterile saline swab the crop of the bird
2. Roll the swab onto the microscope slide (rolling decreases cell damage)
3. Stain using Diff Quik to see cells, bacteria, and yeast, or Gram stain to see bacteria and yeast, or direct smear to see protozoans

b. Other areas to swab

Other areas such as wounds, nares, etc. can be swabbed to see if there is the presence of WBC's, yeast, and bacteria. Using the same technique as above. You can also swab the ears of mammals to detect ear mites.

c. Sterile Swab:

A sterile swab is used for culture if you suspect a bacterial infection. Swab the area and place in the sterile transfer media, being careful to not contaminate. Label appropriately a

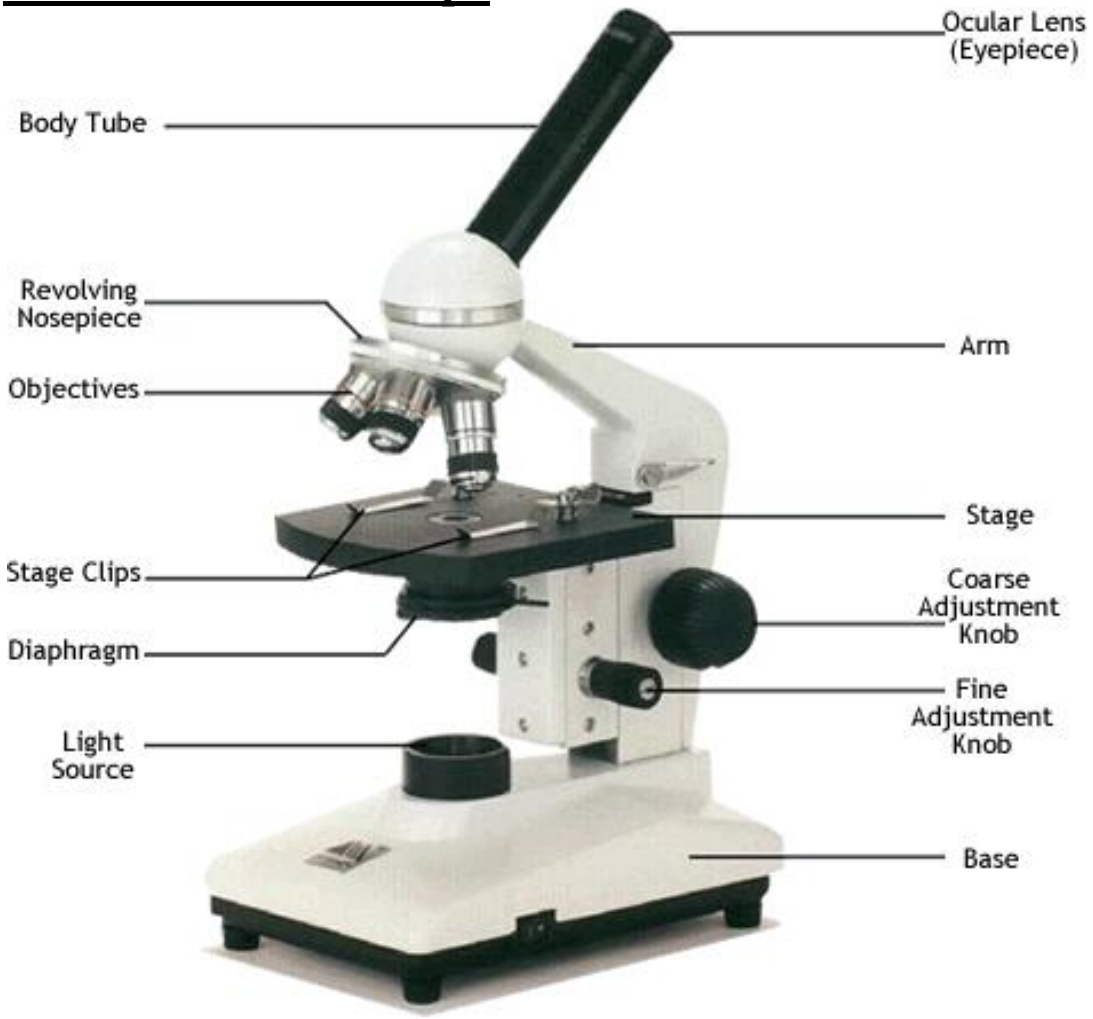
Table 2. Common endoparasite ova/oocysts found on a fecal float of both avian and mammal species

Type of parasite	Host	Symptoms	Diagnosis	Treatment
Capillaria sp.	all	Emaciation, diarrhea, hemmorrhagic enteritis	Fecal float	1.Fenbendazole (Panacur) 2. Ivermectin (Ivomec)
Syngamus Trachea (Gapeworm)	birds	Open mouth, difficult breathing, suffocation, tracheal lesions	Fecal float, can see worms in mouth	Fenbendazole (Panacur)
Ascarids (Roundworm)	all	Diarrhea, emaciation, weight gain, anemia	Fecal float, fecal worms	Fenbendazole (Panacur)
Coccidia (Isospora or Eimeria)	all	Hemorrhagic diarrhea	Fecal float	1. Appertex (Clazuril) 2.Amprolium Hydrochloride (Corid)- in drinking water 3. Sulfa dimethoxine (Albon, Di-Methox) 4. Sulfadimethoxine (SDM) + Ormetoprim (ORM) (Primor)
Taenia sp. (Tapeworm)	all	Emaciation, paralysis, enteritis	Fecal float, proglottids in feces- squash smear	Praziquantel (Droncit)
Trichomonas gallinae	Birds	Weight loss, emaciation, oral and enteric mucosal lesion	Direct smear from mouth or crop	1. Spartrix (Carnidazolum) 2. Metronidazole (flagyl)
Baylisascaris Procyonis (Raccoon Roundworm)	all	Common in raccoons, once stable and hydrated (over 3 wks old)	Does not effect raccoon	Strongid every 2 weeks

Table 3. Common Avian and Mammal Ectoparasites

Species	Host	Symptoms	Diagnosis	Treatment
Ear mites (Notoedres)	Mammals	Head tilt, black debris in ear(s), head shaking, scratching at ears	Swab ear with q-tip, smear onto slide with mineral oil, read at 10x	Clean ears with otic solution, apply Revolution drops
Scaley leg mites (Knemidokoptes)	Birds	Hyperkeratosis of the skin on the face, legs, and feet	Microscopic exam of scraping from skin	Ivermectin (topical, subq or oral)
Cuterebra (Bot flys)	Mammals	Swelling with air hole in neck or groin region, CNS signs sometimes	Clinical signs	Clip hair, incise edge of hole and grasp larvae, flush wound, give abx. Rupture of larvae inside may cause shock
Cheyletiella	Skin mites of rabbits	Dry scaly skin, dandruff, scratching, hair loss, around head and rump	Skin scraping	Phosmet dip or lyme sulfur dip
Maggots (fly larvae)	All – eggs hatch in 10-12hrs, leave host in 3-6d	Larvae grossly visible	Larvae grossly visible	Remove with hemostats, flush area, treat as open wound
Flat flies (Hippoboscidae)	Birds- will suck blood and may transmit disease, cause anemia	Gross visible flies run and dive across feathers	Gross visible flies	Manual removal, Pyrethrin spray
Avian skin mites	Birds	Black specks (<1mm) crawling on birds	Grossly visible specks on birds or hands	Pyrethrin spray, keep isolated from other birds- may transmit disease
Feather mites	Birds	Lacey appearance to feathers	Microscopic exam of feathers	Pyrethrin spray
Avian follicular mites	Birds	Tumors with yellow crusted appearance	Mites deep within lesions (usually removed on biopsy)	Possibly Ivermectin, no treatment reported in literature

Parts of the Microscope



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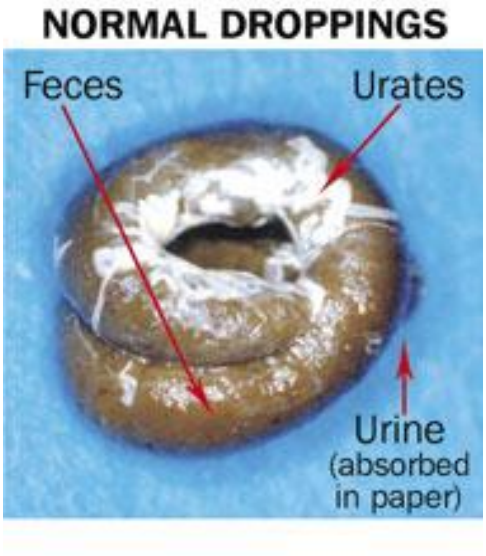

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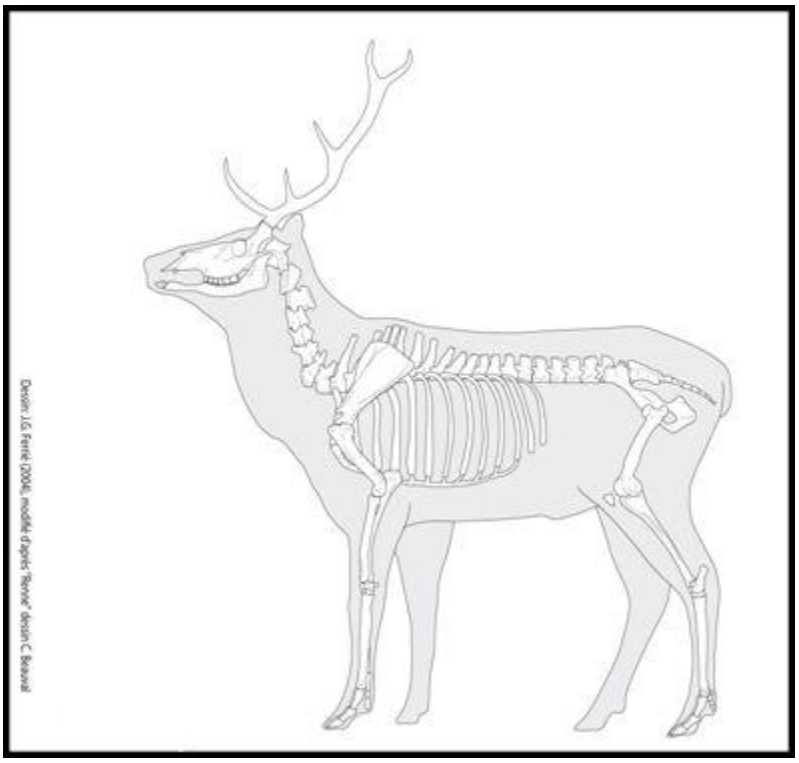
http://www.worldpigeon.org/tag/pigeon-canker/
TRICHOMONAS

Vein anatomy for blood collection

Mammal



Common medications used for treating internal and external parasites

1. Appertex (Clazuril)

Forms: 2.5mg tablets

Species	Dosage	Route	Frequency	Duration (days)
Pigeons for both young and adults	1- 2.5mg tablet	PO	Once	Once

Indications: For treatment of Coccidia
Contraindications: None found

2. Fenbendazole (Panacur):

Forms: Powder, granules

Species	Dosage	Method	Frequency	Duration (days)
Avian(anseriformes)	5-15mg/kg	PO	SID	5
Avian	50mg/kg	PO	SID	5
Rabbits	50mg/kg	PO	SID	5
Animals <2kg	10mg/kg	PO	SID	Repeat in 14
Animals >5 kg	5mg/kg	PO	Once	1

Indications: Treatment for Capillaria sp., Syngamus sp., Trichuris sp., Ascarids, Trematodes, Ancylostoma (hookworms)
Contraindications: DO NOT USE during feather growth stages such as molting or fledgling age

3. Ivermectin (Ivomec):

Forms: Injectable, dilute for avian

Species	Dosage	Method	Frequency	Duration (days)
Avian (< 2 days old)	0.2mg/kg	PO	SID	Once
Avian	0.6mg/kg	PO	SID	Once
Fawns/deer	0.2mg/kg	IM	SID	Once, may repeat in 14
Mammals	0.25-0.5mg/kg	IM	SID	Once, may repeat in 14

Indications: To treat Capillaria sp., Syngamus sp., ectoparasites such as Mange, Scaly leg mite
Contraindications: Use with caution in young animals

4. Medistatin (Nystatin)
Forms: powder

Species	Dosage	Route	Frequency	Duration (days)
Avian	**5g per 500g soft food**	**In food**	**daily**	**5-7 days**
Avian (prevention)	**1g per 200g soft food**	**In food**	**daily**	**Until symptoms resolve**
Avian (Treatment)	**1g per 20ml of water**	**Oral**	**BID**	**5-7 days**

Indications: For treatment and prevention of Candida yeast
Contraindications: None found

5. Sulfadimethoxine (Albon, Di-Methox)
Forms:
Injectable 400mg/mL (40%)
Oral Suspension 50mg/mL (5%);Tablet 125mg, 250mg, 500mg; Soluble Powder 95g/packet

Species	Dosage	Route	Frequency	Duration (days)
Mammals	25-100mg/kg	IV/IM/PO	SID	Until fecal is negative for 2 consecutive days 1-2 wks
Birds	55mg/kg-initial dose, then decrease to 25mg/kg	PO	SID	Decreased dose for 1 wk

Indications: Treament of Coccidia
Contraindications: May cause severe renal or hepatic dysfunction

6. Praziquantel (Droncit)
Forms: 23mg, 34 mg tablet
Injectable 56.8mg/mL

Species	Dosage	Route	Frequency
Mammals	5-10mg/kg	IM/SQ/PO	Once
Birds	5-10mg/kg	IM/SQ/ PO	Once
Raptors	30mg/kg	IM /SQ/ PO	Once

Indications: Treatment of Cestodes (tapeworms)
Contraindications: Do not fast, injectable form is toxic in small birds and use with caution in animals less than 6 weeks old

7. Praziquantal Treatment for Trematodes (flukes)

Species	Dosage	Route	Frequency	Duration (days)
Mammals/birds and Birds	30-200mg/kg	IM/SQ/PO	SID	1-5

8. Metronidazole (Flagyl)
Forms: 250mg and 500mg tablets

Species	Dosage	Route	Frequency	Duration (days)
Mammals	25mg/kg	PO	SID	5
Avian	25mg/kg-50mg/kg	PO	SID to BID	5
Deer	10mg/kg	PO	BID	5-7d

Indications: Treatment of Giardia, Trichomonads
Contraindications: Pregnancy, lactation or severe debilitation. Use with caution with hepatic insufficiency

9. Pyrantal pamoate (Strongid)

Species	Dosage	Route	Frequency	Duration
Mammals (raccoons) and birds	5mg/kg if <2.25kg may increase dose to 15-20mg/kg	PO	Once	Repeat every 14 days

Indications: Treatment for roundworms, in raccoons to stop shedding Baylisascaris prcyonis
Contraindications: Make sure animal is stable and well hydrated first, over 3 weeks old

10. Pyrethrin spray (Ovitrol Plus)

Species	Route	Frequency	Duration
Mammals	Apply liberally in to the fur	Once	Can repeat daily if needed
Birds	Apply to towel and wrap bird in towel for 2-4 minutes	Once	Can repeat BID for 3 days if needed

Indications: For treatment of fleas, lice, avian skin mites, feather mites
Contraindications: None found but use in well ventilated area, watch for any sensitivities
In humans- avoid contact with skin, eyes, or clothing. May cause skin irritation.

11. Spartrix (Carnidazolum)
Form: 10mg tablet

Species	Dosage	Route	Frequency	Duration
Columbidae (Pigeons) adult	1- 10mg tablet	PO	Once	Once
Columbidae newly weaned	½- 10mg tablet	PO	Once	Once

Indications: For treatment of oral Trichomonas
Contraindications: None foun

Hematology

1. Packed cell volume (PCV)

- To determine the percentage of whole blood composed of Red blood cells (RBCs)
- Also known as the Hematocrit (Hct)
- Reference ranges:
  Avians 35-55%
  Mammals 30-55%

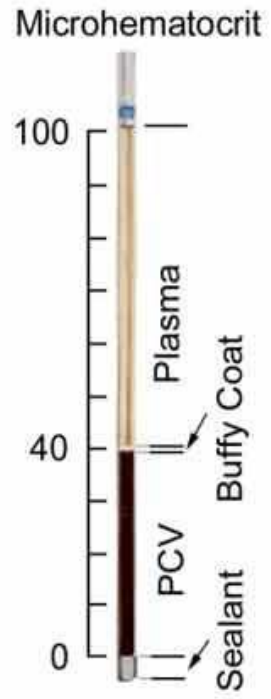
Procedure:

1. Collect the blood and transfer to a heparinized microcapillary hematocrit tube. Cap it in the clay.
2. Centrifuge for 5 mins
3. How to read it: line up the top of the clay to the zero line. Slide the tube along the chart until the meniscus of the plasma intersects the 100 line. Read at the height of the red cell.

2. Buffy coat

- To estimate the WBC and platelet level in mammals. Most often a thicker buffy coat is caused by an increased number of WBCs.
- It is the whitish-gray layer just above the RBC layer that contains WBCs and platelets.
- Reference ranges:
  Healthy bird: <1%
  High buffy coat: >2%

Procedure: line up the buffy coat to zero and record.



3. Total Protein

The plasma layer is the clear to yellow fluid above the buffy coat layer that consists of proteins (hormones, antibodies, enzymes, etc.), water, salts, glucose, fats.
Note the color as yellow, clear, red.