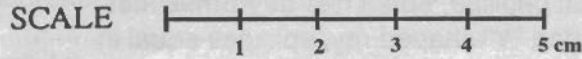


KEY FOR SOME COMMON GASTROINTESTINAL
PARASITES OF CATTLE, SHEEP & GOATS

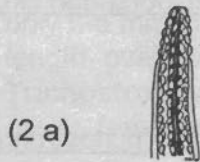
updated '03



1. Your specimen is from the	Go to couplet #
a. esophagus, tongue (nematode)	2
b. ruminoreticulum (trematode, protozoa)	3
c. abomasum (nematode)	4
d. small intestine	
nematode	9
cestode	12
protozoa	14
e. large intestine	
nematode	18
protozoa	20

2. **Esophagus or tongue: Spiruroidea**

- a. worm with numerous anterior cuticular plaques, larvated eggs in females Gongylonema pulchrum
- b. lesion: raised zigzag pattern G. pulchrum



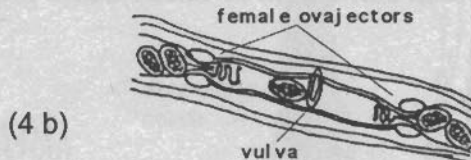
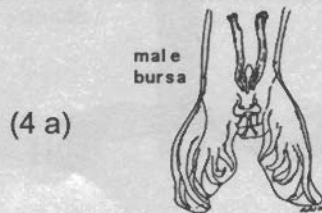
3. **Rumen-reticulum**

- a. small conical flukes: anterior sucker, posterior ventral sucker, and well developed ventral genital pore in the anterior third (rumen fluke) Paramphistomes
- b. protozoa with a macronucleus, and cilia in rows or in tufts numerous species Ciliates



4. **Abomasum: Trichostrongyloidea**

- a. worm has bursa and pair of golden brown spicules (**male**) 5
- b. worm lacks bursa & spicules, has eggs, ovajectors and tapered tail (**female**) 7



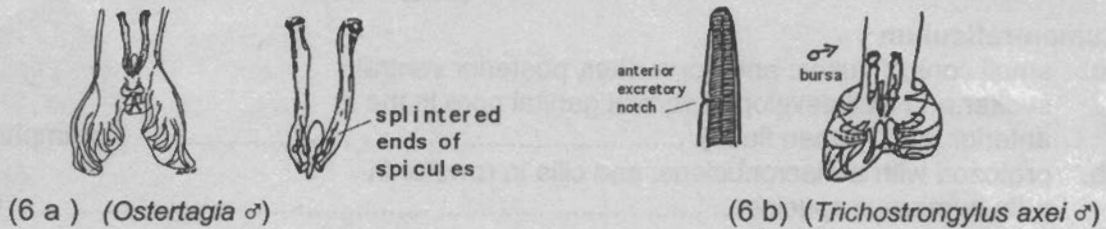
5. **Abomasum: MALE Trichostrongyloidea (size important)**

- a. robust (up to 2 - 3.4 cm - grossly visible), lancet in buccal cavity, 2 lateral cervical papillae, bursa has **asymmetrical dorsal lobe** with inverted "Y" shaped ray, spicules equal in size, slender, & have a barbed end, **under 40x objective spicules equal the diameter of the field.**
 - (sheep) Haemonchus contortus
 - (cattle) H. placei
- b. small delicate worms ≤ 1.0 cm, not as described above, spicules short & stout, **under 40x objective spicules $\leq \frac{1}{2}$ diameter of field** 6



6. **Abomasum: Small male Trichostrongyloidea**

- a. worm (7- 9 mm). **Spicules, stout & equal in length, end in 3 blunt, splintered or hooked processes**, under 40x objectives are almost $\frac{1}{2}$ diameter of field
 - (cattle)..... Ostertagia ostertagi
 - (sheep, goats)..... O. (Teladorsagia) circumcincta
- b. very small worm (5 - 7 mm), **anterior excretory notch** usually seen, spicules unequal in length and dissimilar, ends are pointed. under 40x objectives spicules almost $\frac{1}{3}$ diameter of field Trichostrongylus axei



7. **Abomasum: FEMALE Trichostrongyloidea (size important)**

- a. robust worm (2.0 - 3.4 cm), 2 lateral cervical papillae, lancet in buccal cavity, thickened vulvar flap usually present, **ovajectors not visible in same field as end of tail at 10x objective**, fresh specimen: braiding of white uterus and red intestine
 - (sheep & goat) Haemonchus contortus
 - (cattle) H. placei
- b. small delicate worms less than 1.5 cm, **ovajectors and end of tail visible in same field at 10x objective** 8



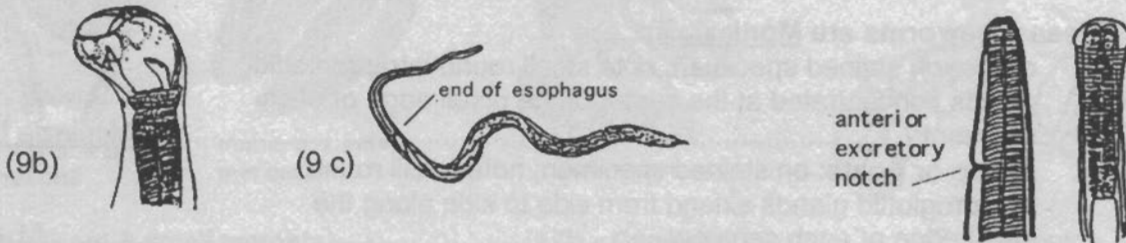
8. **Abomasum: Small female Trichostrongyloidea**

- a. worm 8-12 mm, tiny pair of anterior cephalic papillae, thin vulvar flap often present, tail usually curved
 (cattle) Ostertagia ostertagi
 (sheep & goats)..... O. (Teladorsagia) circumcincta
- b. worm 5.5 - 8 mm, **anterior excretory notch** present, no vulvar flap, <12 eggs end to end on either side of ovajector Trichostrongylus axei



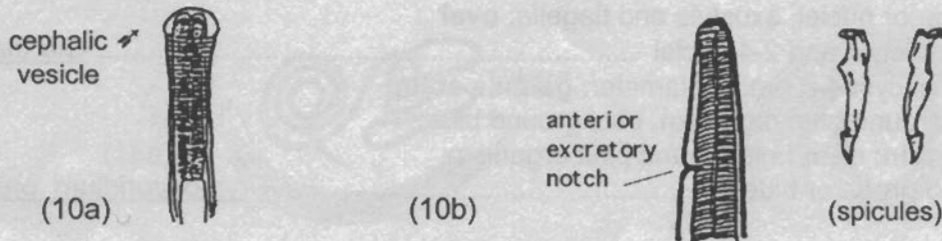
9. **Nematode SI: Is your worm a**

- a. **Ascaroidea:** large robust worm (up to 30 cm) about as thick around as a pencil, 3 large lips Toxocara vitulorum
- b. **Strongyloidea:** stout worm 12 - 26 mm, anterior hooked, large buccal cavity with cutting plates on anterior margin, males with bursa & 2 spicules
 sheep Bunostomum trigonocephalum
 cattle B. phlebotomum
- c. **Rhabditoidea:** only females parasitic, small & delicate only 6-8 mm long, filariform esophagus 1/3 of body length, ovajectors not seen, eggs larvated Strongyloides papillosus
- d. **Trichostrongyloidea:** club shaped esophagus, no buccal cavity, females with prominent ovajector, males bursate 10

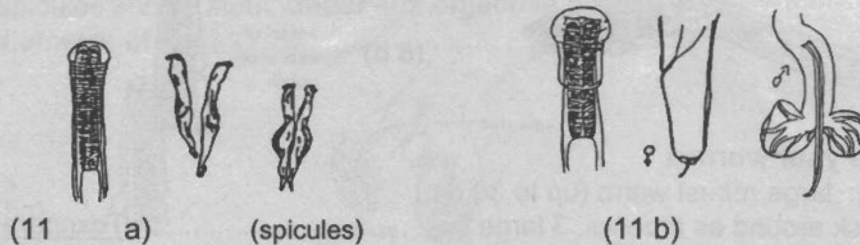


10. **Does your specimen have**

- a. small to medium cephalic vesicle surrounds a blunt anterior (diag. 10 a) Worms are small to medium in size 11
- b. tapered anterior, no cephalic vesicle, 5-8 mm long, anterior excretory notch, <12 eggs lie end to end on either side of ovajector, male spicules short & equal (diag. 10b) Trichostrongylus colubriformis



11. **Small intestine: Trichostrongyles with a cephalic vesicle**
- a. 5-11 mm long, marked transverse cuticular striations, **females** with many eggs, & typical tapering tail, **males** have short sturdy curved or striated spicules Cooperia spp.
 - b. 8-25 mm long, often twisted or knotted, **females** contain large football shaped eggs, and have blunt posteriors with a small hair-like spine at the end, (best seen 40x) males have long slender spicules that are fused at the tip (diagram 11b) Nematodirus spp.



12. **Small Intestine: Cestodes - segments wider than long,**
- a. finger like projections (fringe) along the bottom edge of each proglottid (sheep & goats) Thysanosoma actinioides
 - b. segments lack finger like projections 13



13. **These tapeworms are Moniezia sp.**
- a. **cattle:** on stained specimen, note small round intraproglottid glands concentrated at the center of the distal edge of each segment Moniezia benedeni
 - b. **sheep or goats:** on stained specimen, note small round intraproglottid glands extend from side to side along the distal edge of each segment M. expansa

14. **Small Intestine: Protozoa**
- a. stained smears or ileal impression slides 15
 - b. tissue x-sections 16

15. **Small Intestine: Stained protozoa smears or impression slides**
- a. flagellate: **trophozoite** with piriform body 12-17 μm . long, 2 anterior nuclei, axostyle and flagella; **oval cyst** with axostyle and 2-4 nuclei Giardia spp
 - b. **tiny round oocyst** 4-6 μm . in diameter; **giemsa stain:** clear halo around blue organism, background blue; **acid fast stain:** clear halo around pink organism, background green or blue Cryptosporidium parvum

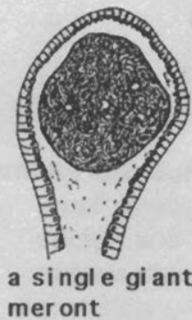
16. Small Intestine: X-section H&E stain

- a. tiny round intracellular extracytoplasmic organisms
4-6 µm. in diameter found along the villus epithelium Cryptosporidium parvum
- b. intracellular coccidial meronts, gamonts, and oocysts 17

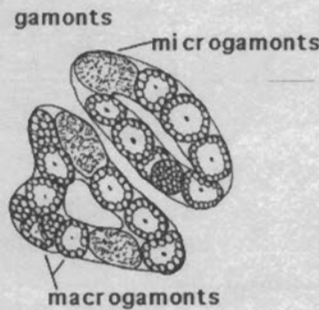


17. Small Intestine: stages of Eimeria

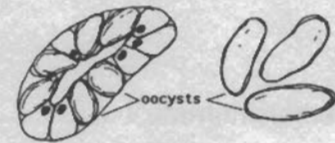
- a. **meronts**: stage containing few to many **non refractile finger like structures (merozoites)**
 - ◇ **giant meront** - with numerous merozoites, usually found within the lacteals of the lamina propria of a villus
 - ◇ **small meronts** - in epithelial cells, often clustered together, are small & contain only a few merozoites
- (diag. 17a - meronts) Eimeria sp.
- b. **gamonts**: clusters of numerous refractile beady looking eosinophilic (pink) macrogamonts and a few thready looking basophilic (blue) microgamonts (diag. 17b - gamonts) Eimeria sp.
- c. **oocysts**: smooth or slightly wrinkled oval pink structures found filling epithelial cells or ruptured from the cells (diag. 17c) Eimeria sp.



(17a - Giant & small meronts)



(17b - Gamonts)



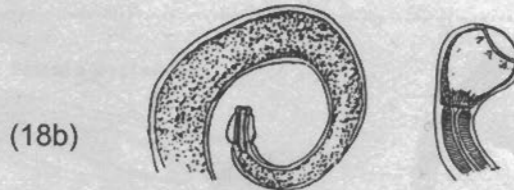
(17c - Oocysts)

18. Large Intestine: Nematode

- a. **Trichuroidea**: tiny mouth & very long slender stichosome esophagus, short stout posterior, female has bipolar plugged eggs, males have a single spicule in a spiny sheath Trichuris spp.
- b. **Strongyloidea**: club shaped esophagus, leafcrown & buccal cavity present, males bursate with 2 spicules 19



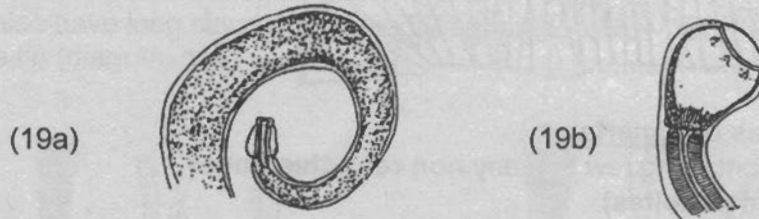
(18a)



(18b)

19. Large Intestine: Strongyloidea

- a. anterior often curved, prominent cervical and cephalic vesicles around anterior, small buccal cavity wider, than deep, leaf crowns small (diag. 19a) Oesophagostomum spp.
- b. lacks vesicles, large deep buccal cavity, tiny leaf crowns (primarily in sheep) (diag. 19b) Chabertia ovina



20. Large Intestine: Protozoa

- a. **Coccidia:** intracellular meronts, gamonts and oocysts in tissue x-section (diagrams at 17a-c) Eimeria spp.
- b. **Flagellate:** trophozoite (only), single anterior nucleus, undulating membrane, anterior flagella Pentatrichomonas hominis
- c. **Ciliate:** large macronucleus, cilia Buxtonella spp.