Managing Parasite Resistance Using A Whole Farm Approach

Module 1. Understanding Equine Parasite Biology and Behavior

Important Parasite Management Considerations

- Parasites in the environment represent over 99% of the entire population.
- Offspring of parasites must spend time in the environment before infecting new hosts.
- Parasites have many extraordinary adaptations that make them highly effective at surviving.
- Misconception - all worms are bad and no worms should be tolerated in a horse.
- Misconception - all horses are susceptible to worms and should be treated the same.
- Understanding the types of parasites and their life cycle is an important management tool.

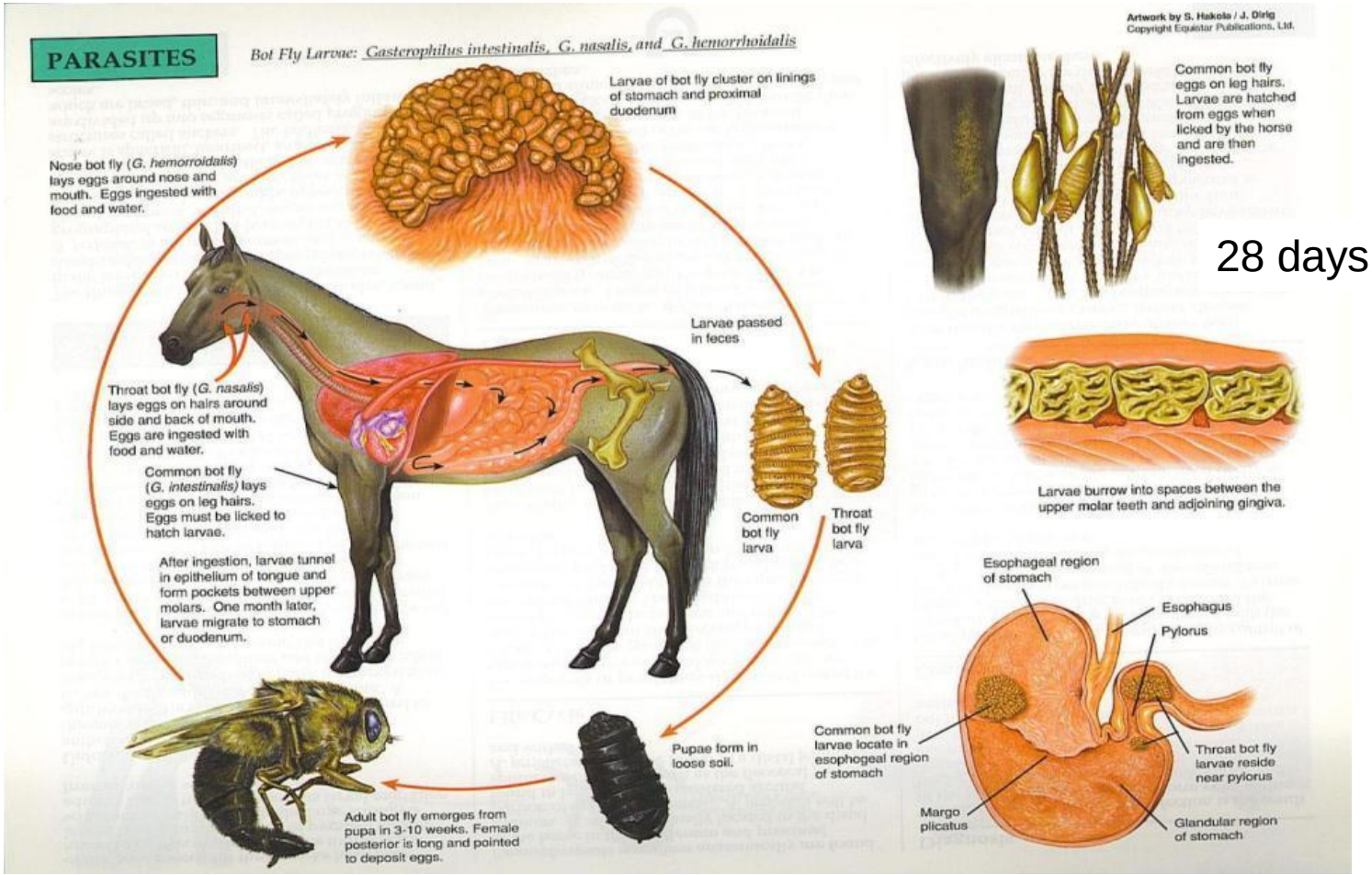
Strongyloides Westeri
“Threadworms”

Strongyloides Westeri egg

Strongyloides Westeri (Threadworm)

- Prepatent period: 5 – 7 days
- Resistance: none reported
- Most efficacious drugs: Ivermectin or Oxibendazole
- Immunity: complete by 4-6 months
- Environmental control: good drainage in dry lots

Gasterophilus - Bots

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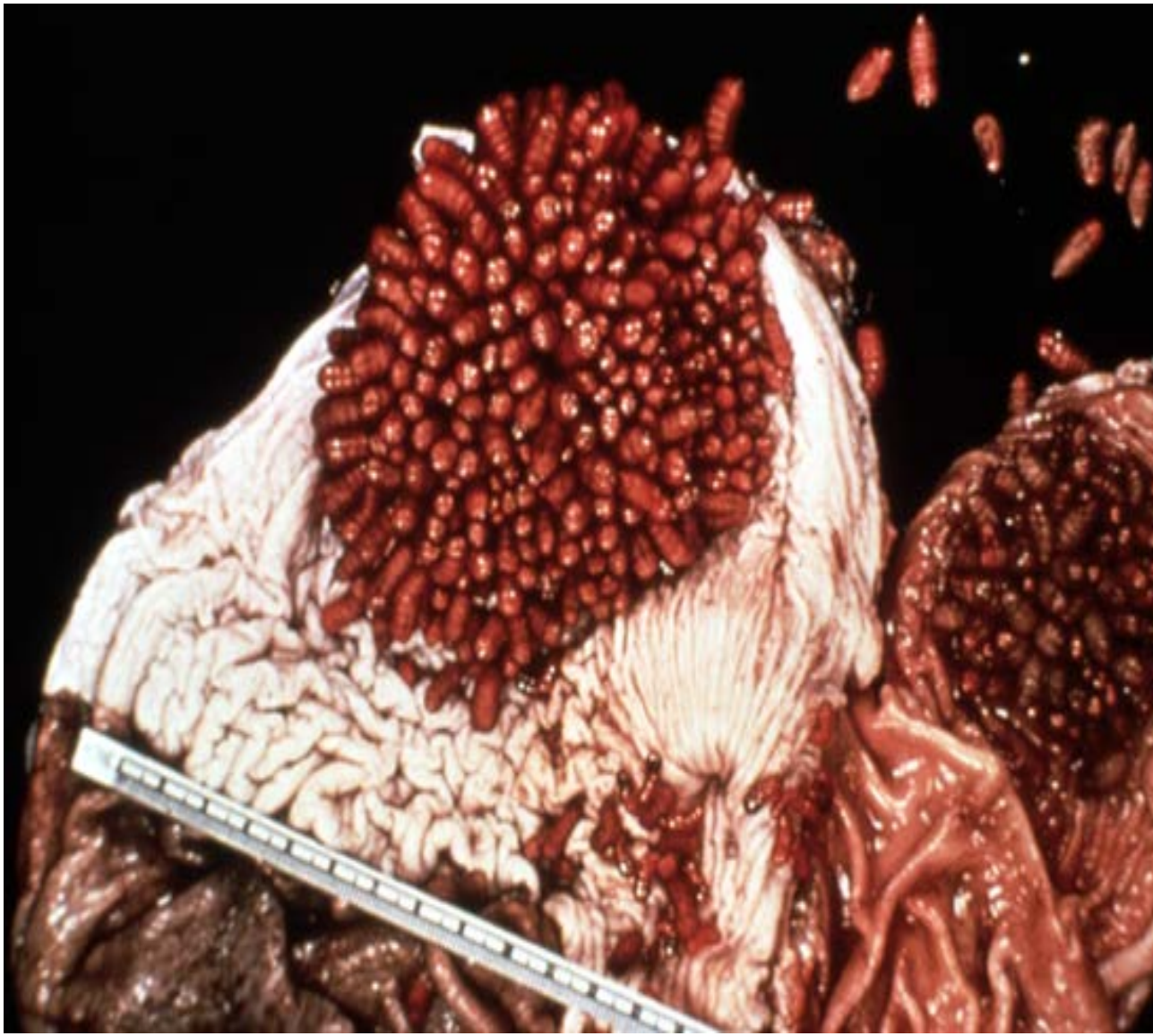
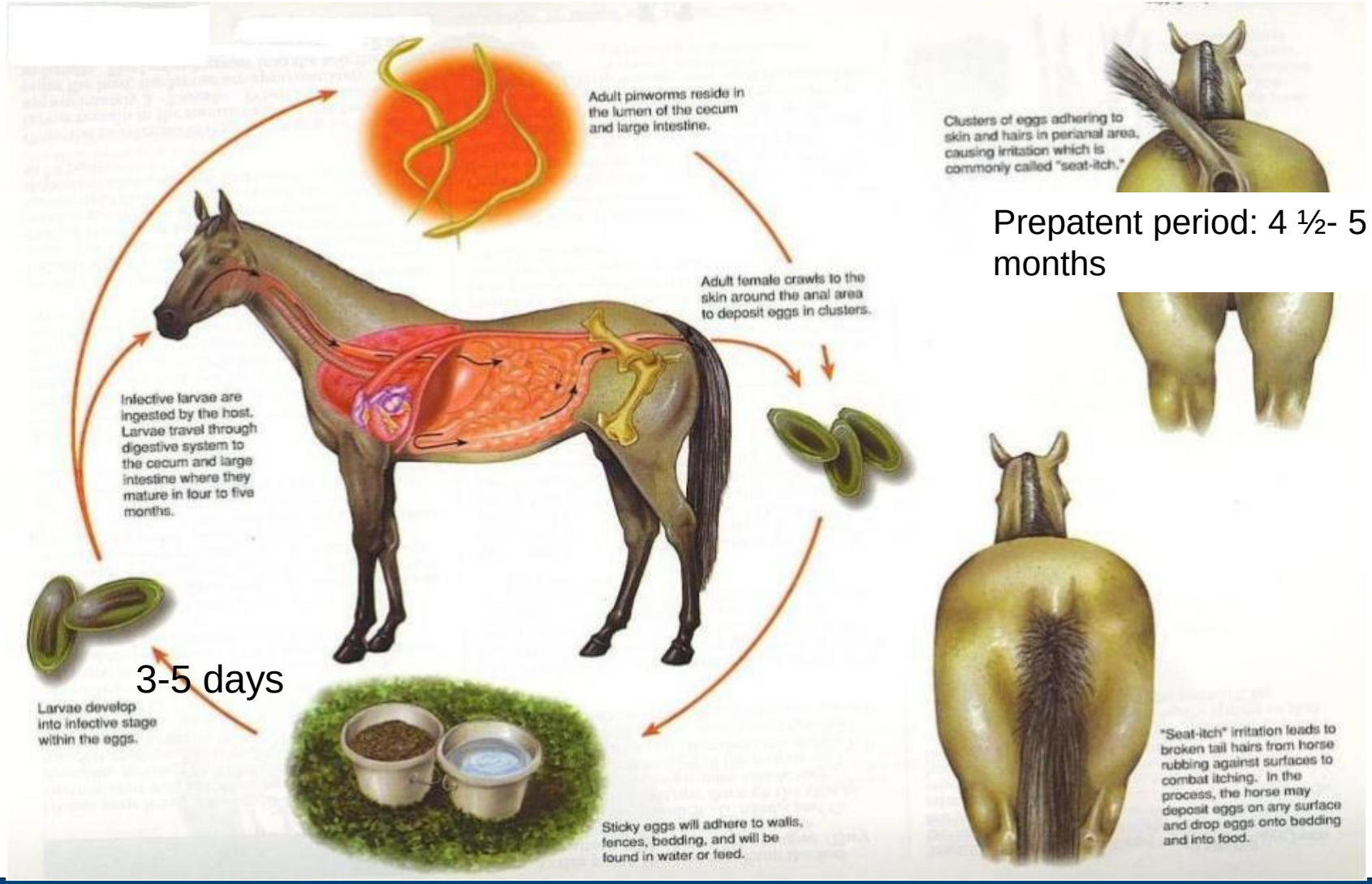


Gasterophilus (Bots)

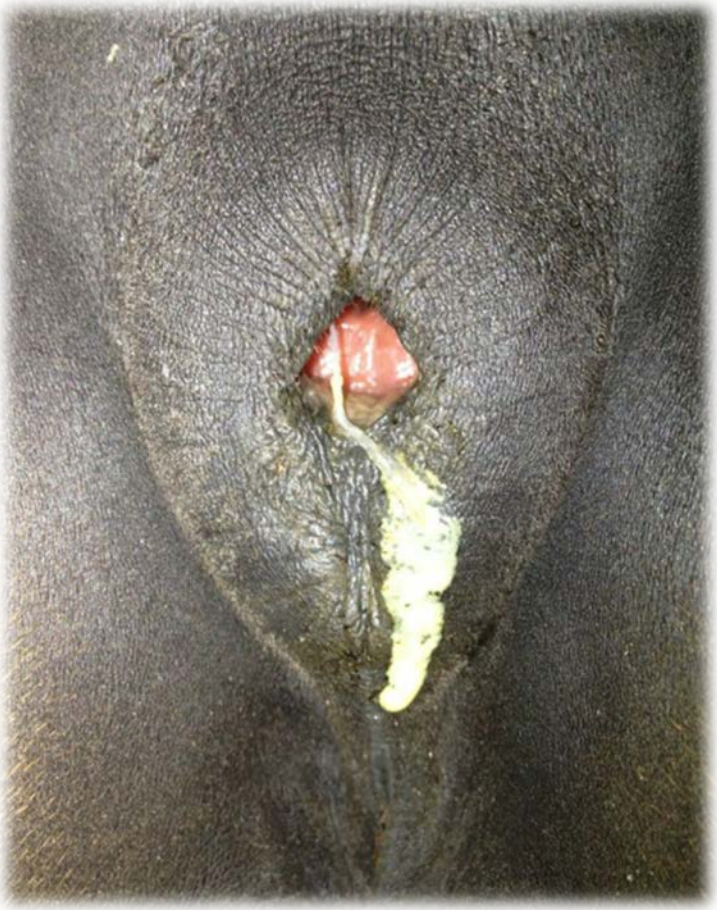
- Prepatent period: eggs infective 5 days after laid
- Resistance: none reported
- Most efficacious drug/s: Macrocyclic Lactones
- Immunity: none
- Environmental control: mechanical removal

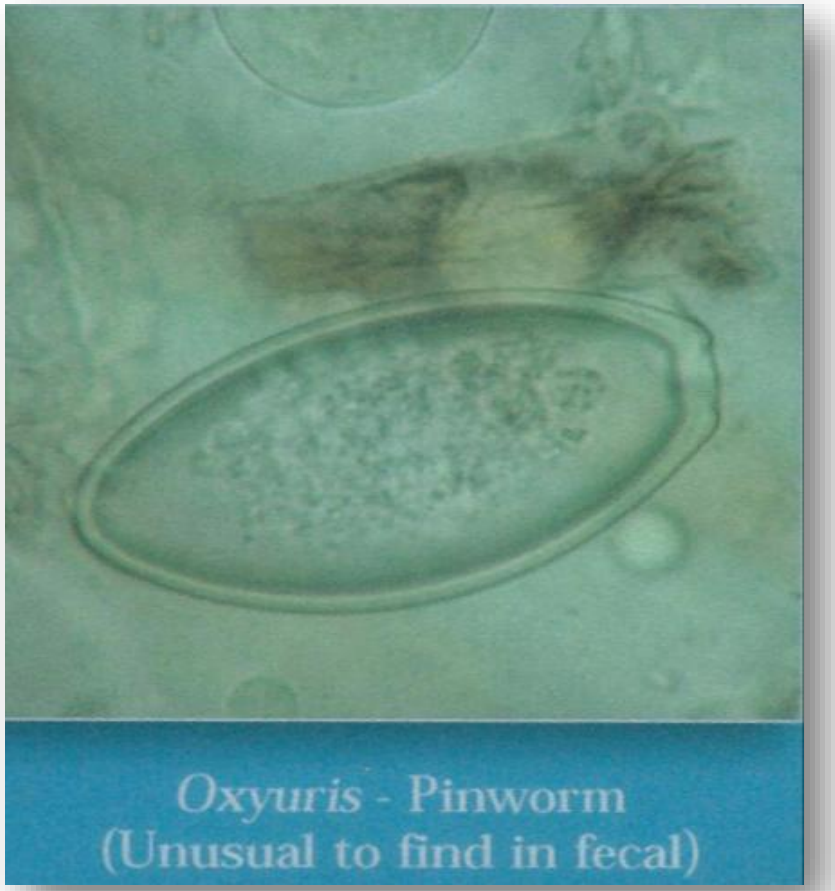
Oxyuris Equi – Pin Worm



Prepatent period: 4 ½- 5 months

Oxyuris Equi (Pinworm)

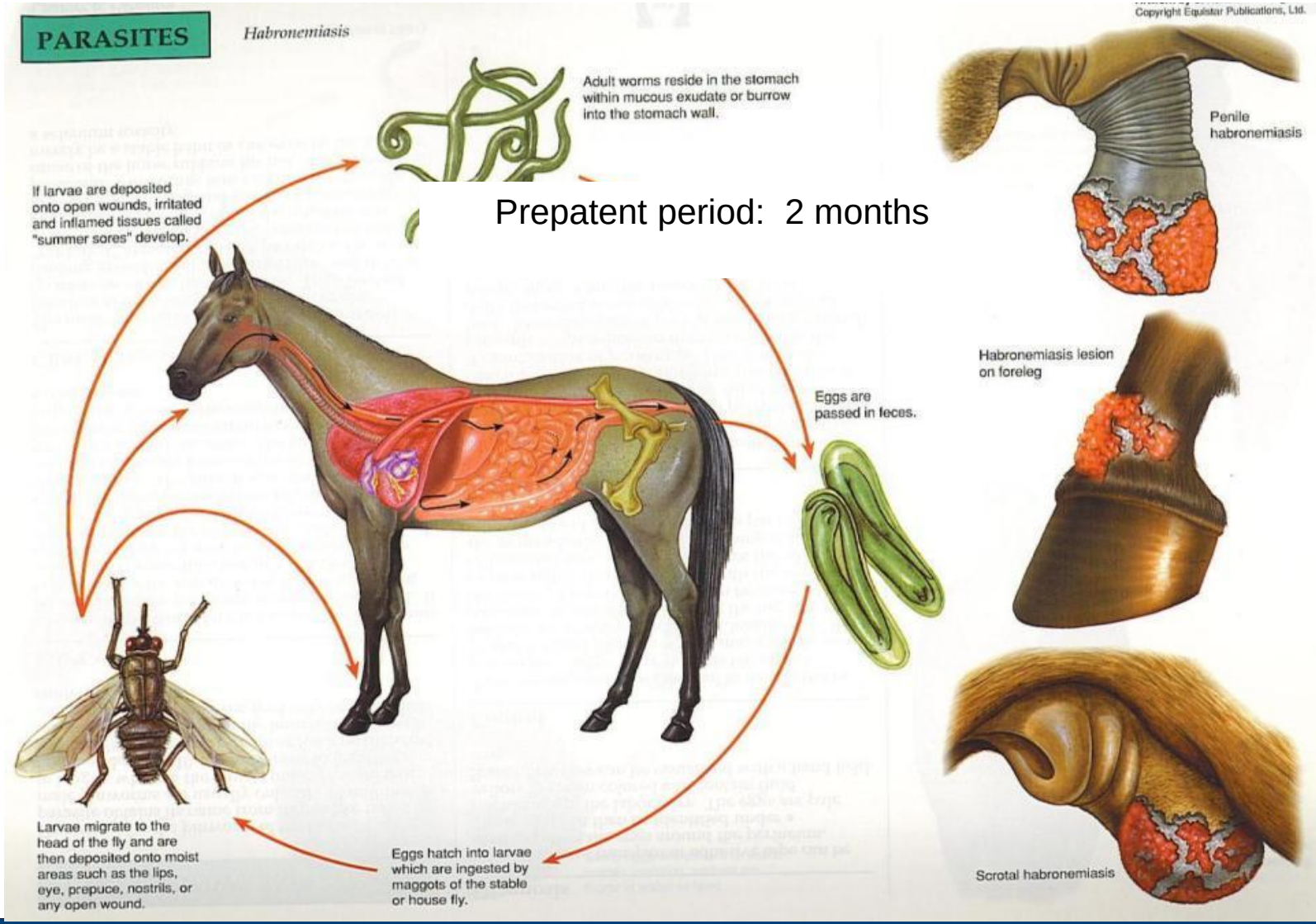




Oxyuris Equi - Pinworm

- Prepatent period: 4 ½ - 5 months
- Resistance: maybe Macrocyclic Lactones
- Most efficacious drugs: Benzimidazoles, Pyrantel, Macrocyclic Lactones
- Immunity: usually after 2 years of age
- Environmental control: Wash perineal area use disposable rags so don't spread

Habronema


PARASITES
Habronemiasis
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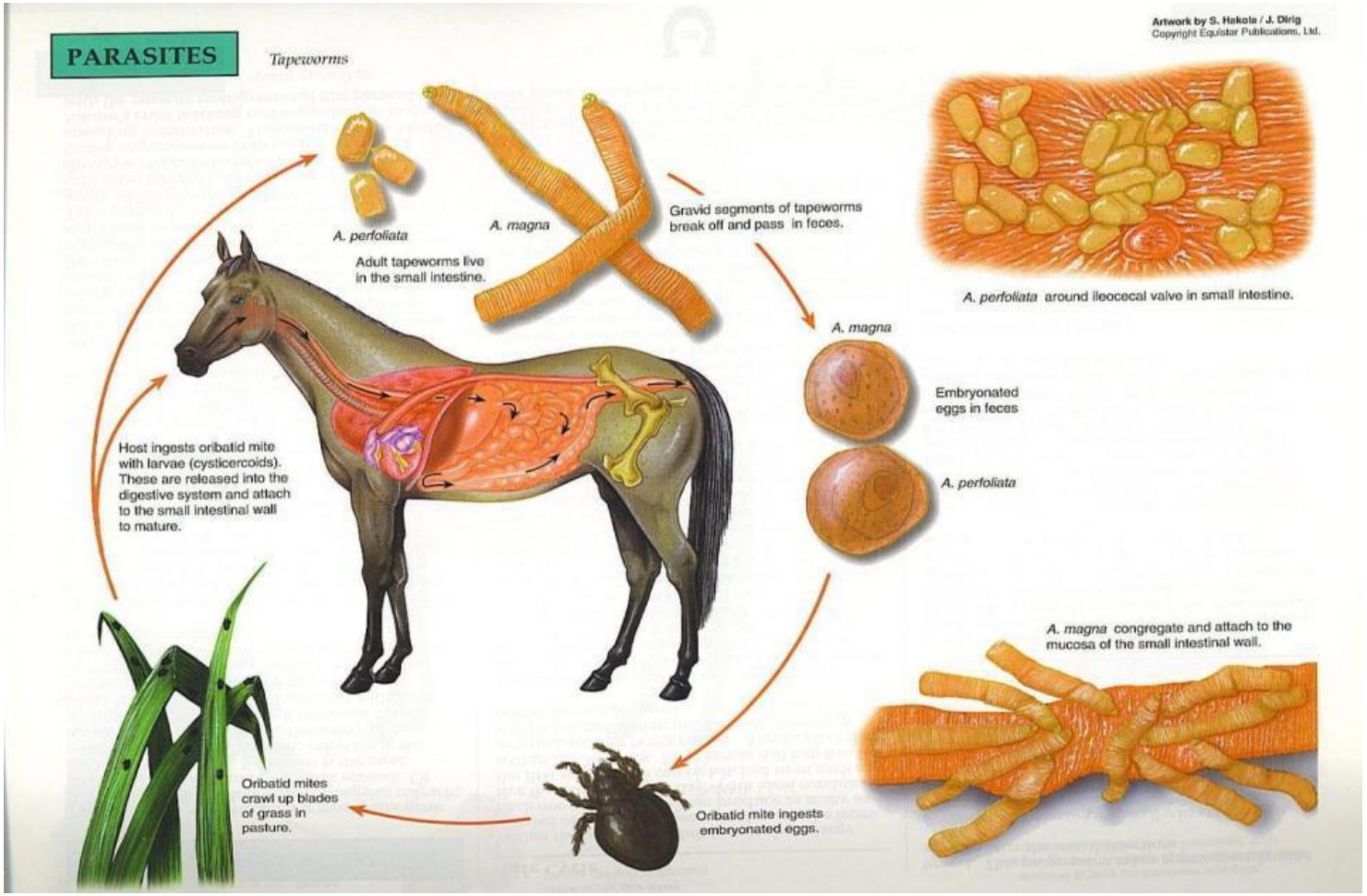
Adult worms reside in the stomach within mucous exudate or burrow into the stomach wall.
If larvae are deposited onto open wounds, irritated and inflamed tissues called "summer sores" develop.
Prepatent period: 2 months
Eggs are passed in feces.
Penile habronemiasis
Habronemiasis lesion on foreleg
Scrotal habronemiasis
Larvae migrate to the head of the fly and are then deposited onto moist areas such as the lips, eye, prepuce, nostrils, or any open wound.
Eggs hatch into larvae which are ingested by maggots of the stable or house fly.

Cutaneous Habronemiasis “Summer Sore”

Habronema

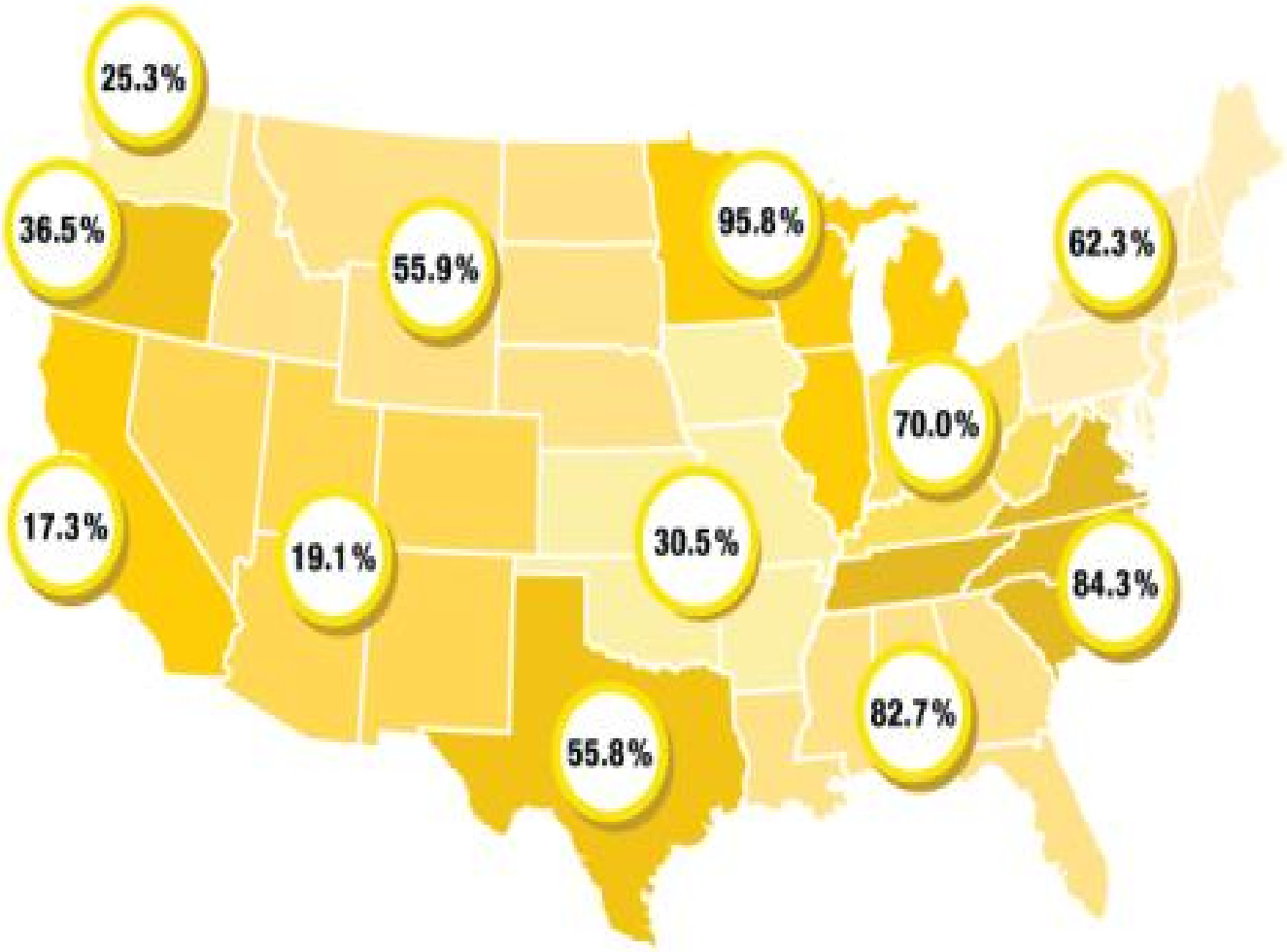
- Prepatent period: 8 weeks in stomach
- Resistance: reports of Macrocyclic Lactones
- Most efficacious drug/s: Macrocyclic Lactones
- Immunity: none
- Environmental control: fly control

Anoplocephala - Tapeworm

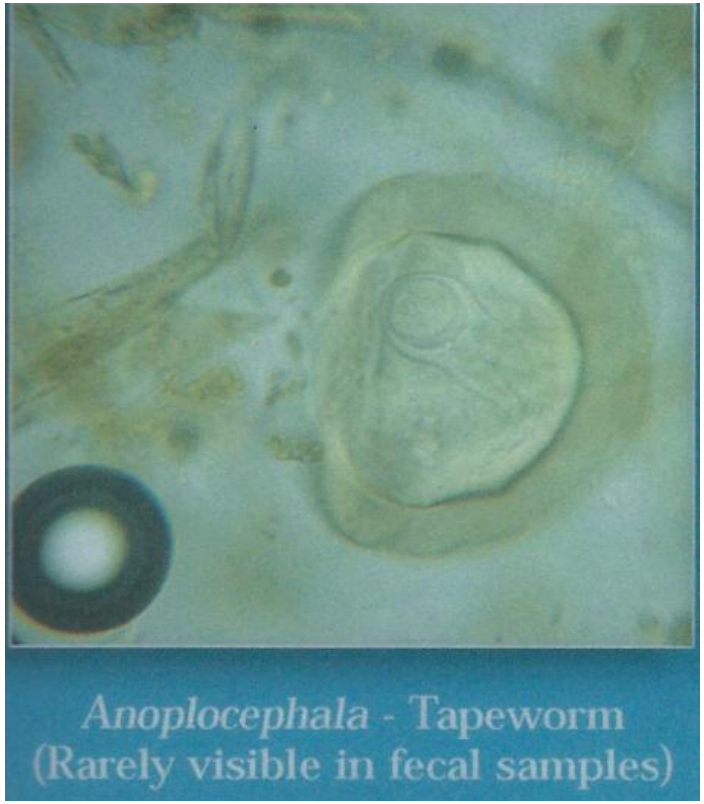


2-4 months

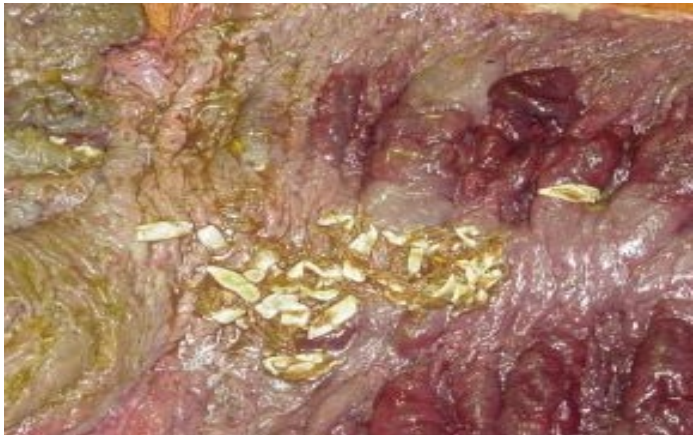
Tapeworm Seroprevalence in the US



Anoplocephala – Tapeworm



Anoplocephala - Tapeworm
(Rarely visible in fecal samples)



Equine Tapeworm Antibody Detection ELISA

- University Of Tennessee Veterinary Diagnostic Lab
- Test number 180759

Anoplocephala – Tapeworm

- **Prepatent period: 1 ½ - 4 months**
- **Resistance: none reported**
- **Most efficacious drug/s: Praziquantel or Pyrantel at 13.2 mg/kg (double dose)**
- **Immunity: none**
- **Environmental control: none**

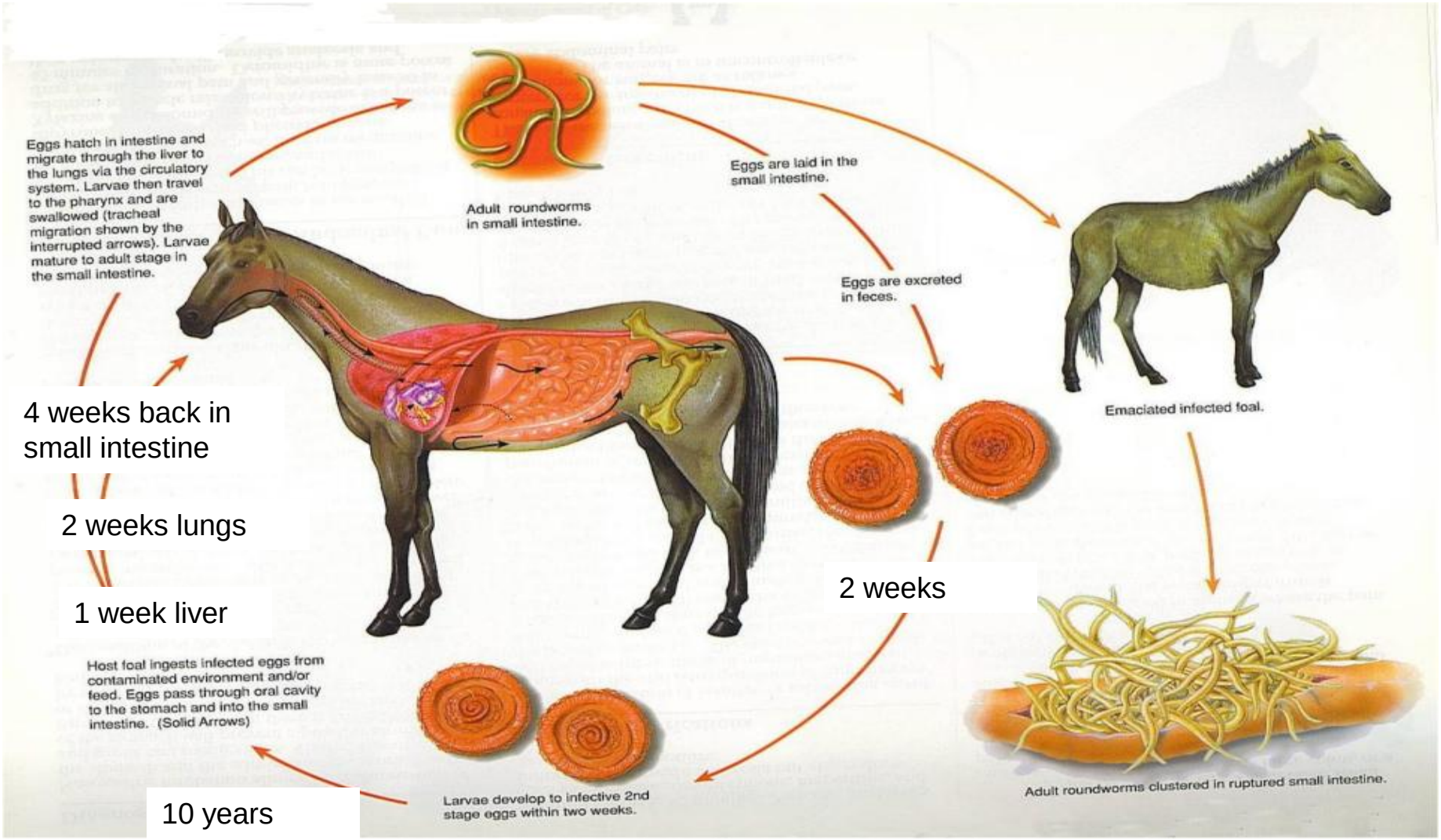
WHAT WORKS AGAINST TAPEWORMS?

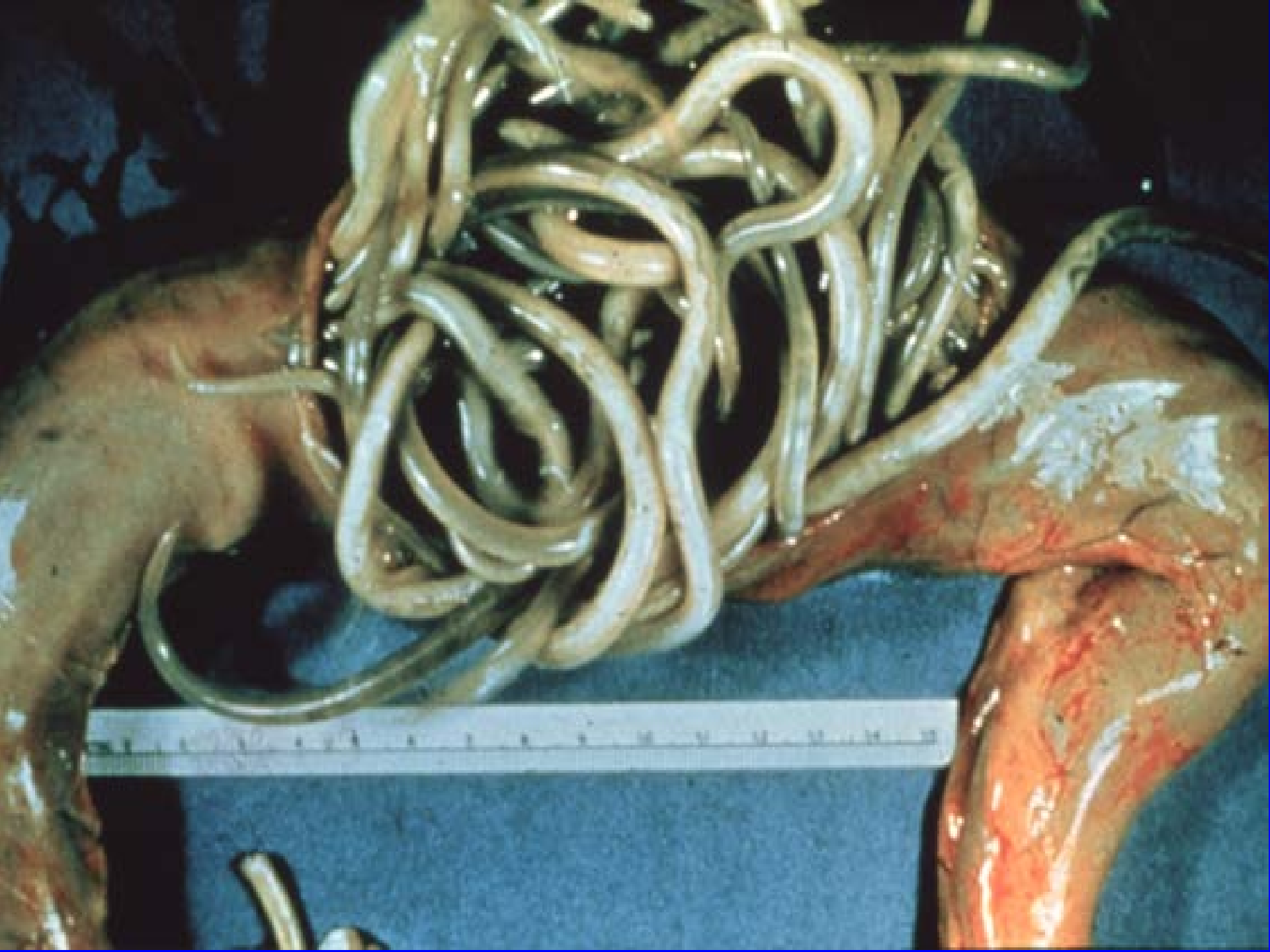
PRODUCT (MANUFACTURER)	INGREDIENTS			LABEL CLAIMS	
	FORMULATION	NEMATOCIDE DOSAGE	PRAZIQUANTEL DOSAGE	PREGNANT MARES	MINIMUM AGE
Equimax (Pfizer)	Paste	Ivermectin (0.2 mg/kg)	1.5 mg/kg	Yes	1 month
Quest Plus (Fort Dodge)	Gel	Moxidectin (0.4 mg/kg)	2.5 mg/kg	No	6 months
Zimecterin Gold (Merial)	Paste	Ivermectin (0.2 mg/kg)	1.0 mg/kg	No	5 months
ComboCare (Farnam)	Gel	Moxidectin (0.4 mg/kg)	2.5 mg/kg	No	6 months

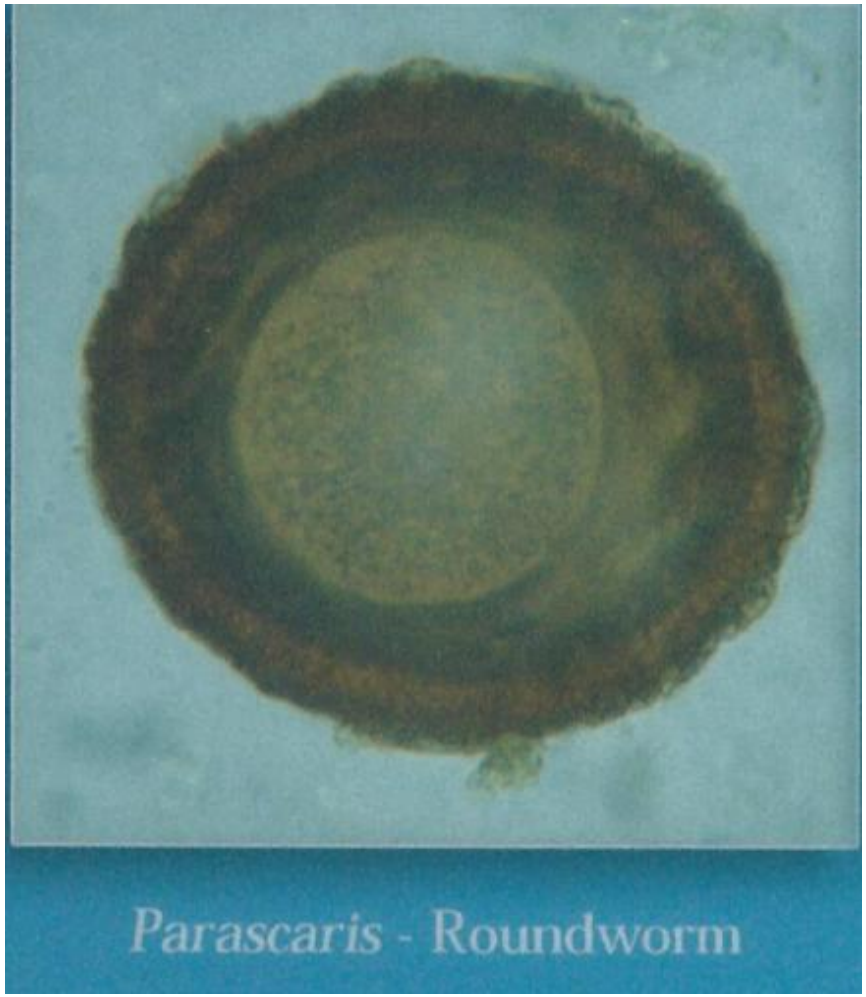
Comparison of combination anthelmintics currently approved for treatment and control of tapeworm infections in horses

Pyrantel 13.2 mg/kg - Double Dose

Parascaris Equorum - Round worm







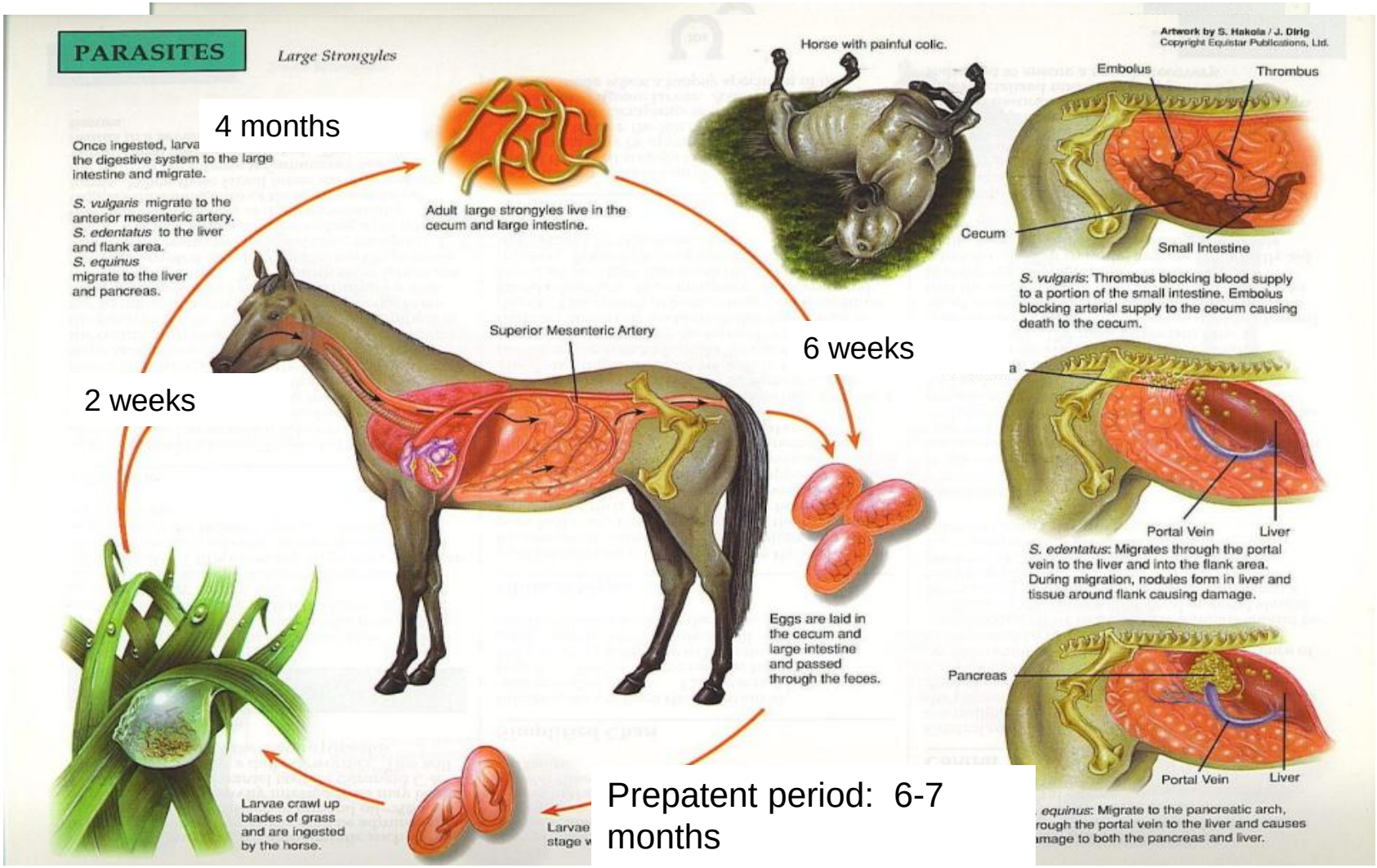
Parascaris - Roundworm

Parascaris Equorum - Roundworm

- Prepatent period: 2 ½- 3 months
- Resistance: Macrocyclic Lactones
- Most efficacious drugs: Benzimidazoles, Pyrantel
- Immunity: most by 18 months
- Environmental control: none

Fenbendazole Paste 10% is administered orally at a rate of 2.3 mg/lb (5 mg/kg) for the control of large strongyles, small strongyles, and pinworms. One syringe will deworm a 1,100 lb horse. For foals and weanlings (less than 18 months of age) where ascarids are a common problem, the recommended dose is 4.6 mg/lb (10 mg/kg); one syringe will deworm a 550 lb horse (Panacur or Safeguard)

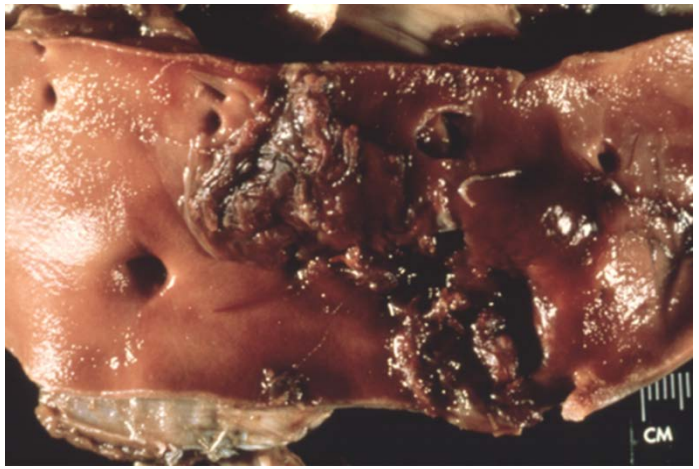
Strongylus Vulgaris – Large Strongyle



Prepatent period: 6-7 months

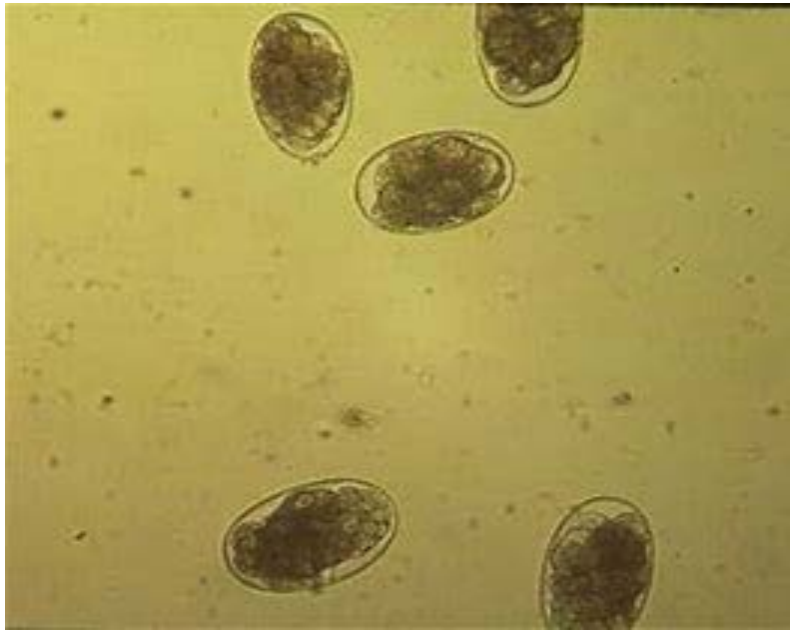
Large Strongyles (Strongulus vulgaris)

- Main parasite of concern in adult horses, prior to the development of ivermectin.
- Highly pathogenic – can cause severe and fatal disease.
- Adults attach to intestinal lining; larvae migrate throughout horse's body for 6 months.
- Obstruct arteries that supply blood to the gut and cause arterial lesions and colic.



Strongyle eggs

Difficult to distinquish eggs of large strongyles from small

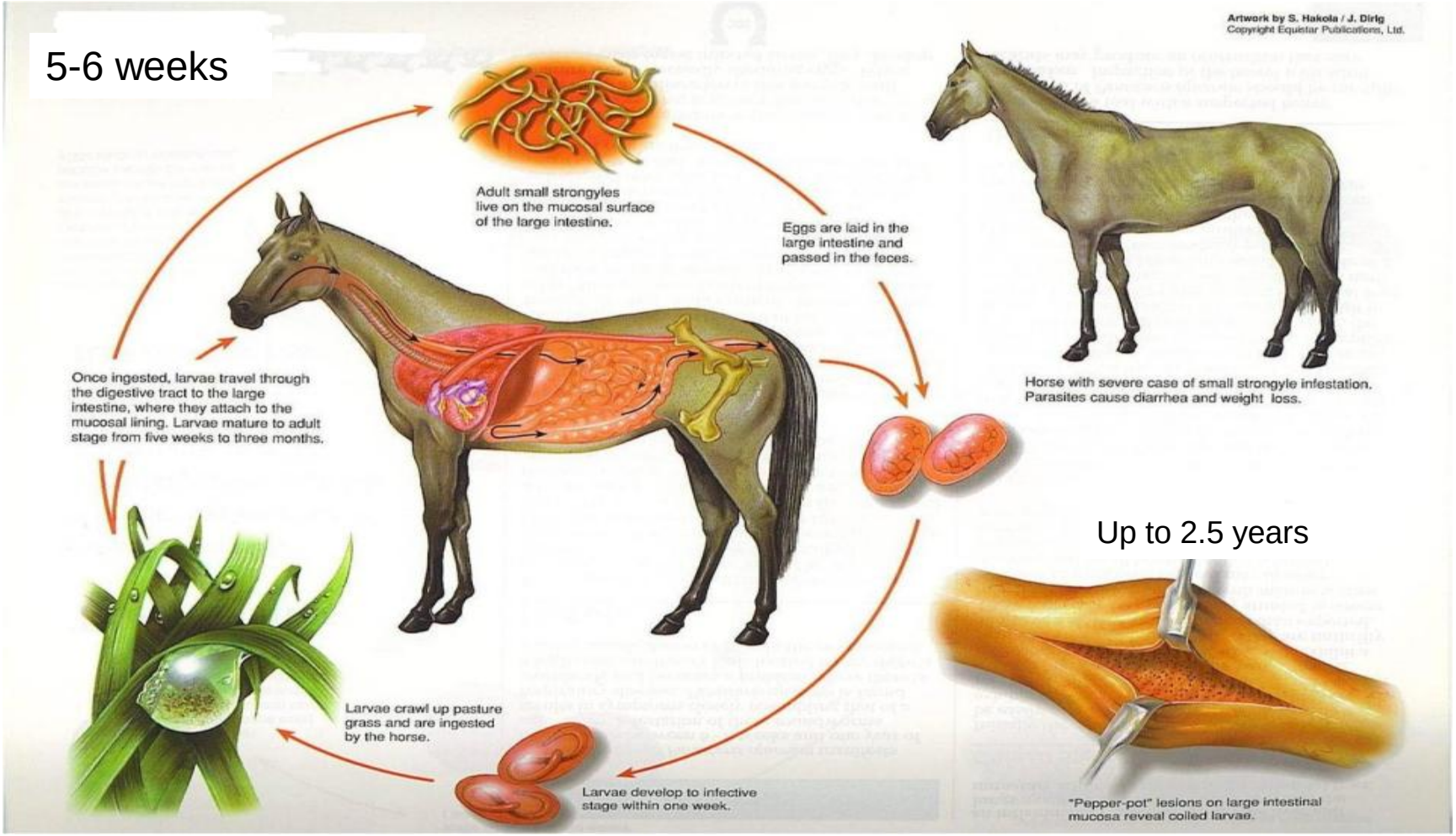


Strongylus Vulgaris

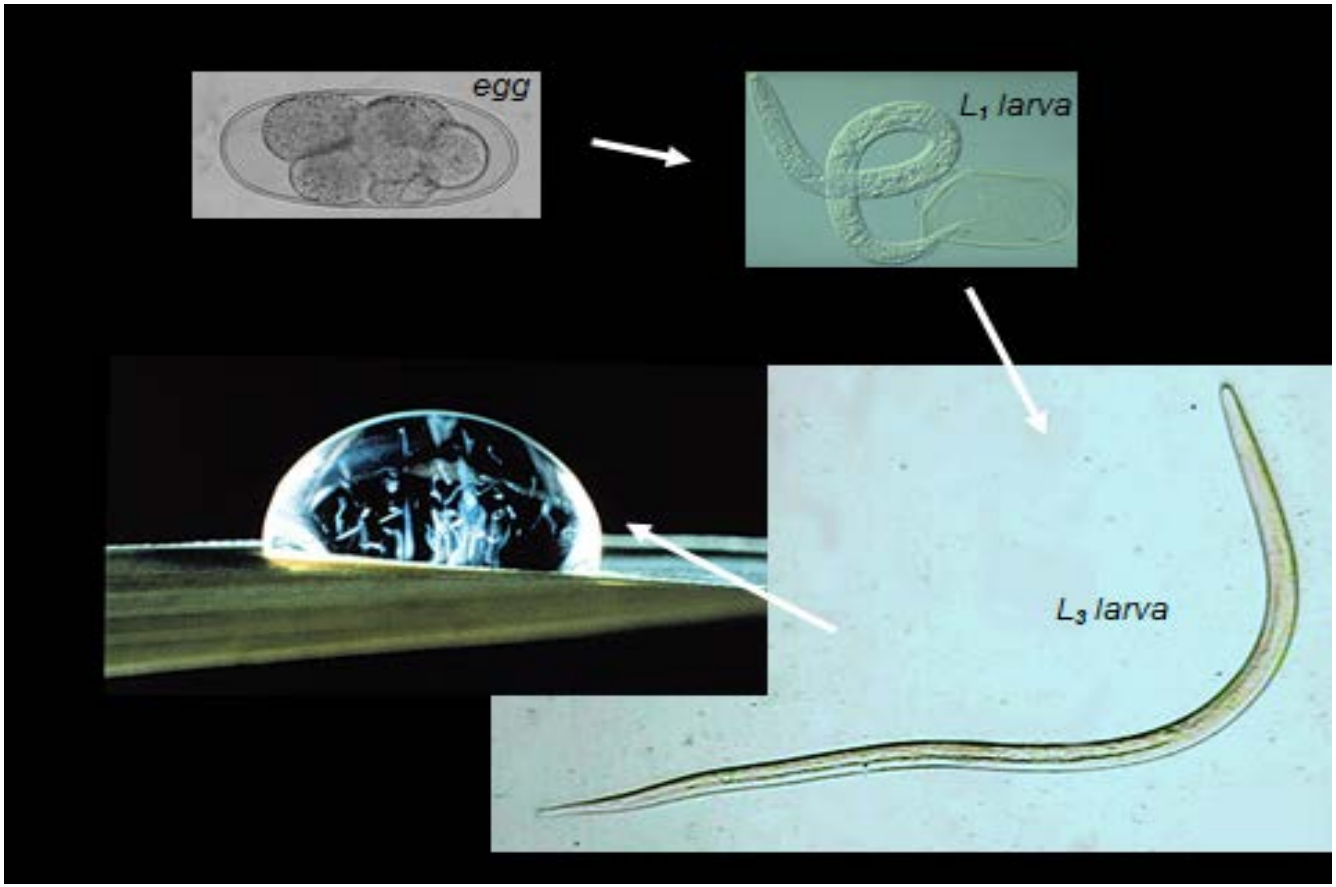
- Prepatent period: 6-7 months
- Resistance: none reported
- Most efficacious drug/s: larvacidal dewormers such as Macrocyclic Lactones or 5 day double dose Fenbendazole
- Immunity: none
- Environmental control: numerous ways – information in module 3

Cyathostomins – Small Strongyles

Prepatent period: 2 - 3 months



Small Strongyle Life Cycle



Small Strongyles (Cyathostomes)

- Present in all horses
- Are relatively mild pathogens
- Generally only migrate into the intestinal lining
- Only produce disease when the parasites are present at very high levels.
- Frequent deworming treatments are not needed to keep most adult horses healthy.

Natural Immunity

- Adult horses vary greatly in immunity to parasites and shedding of small strongyle eggs.
- Most adult horses have good immunity against small strongyles
- Adult horses tend to shed roughly the same number of eggs throughout their life time; low shedders will often remain low and high shedders have a tendency to remain high.
  - 40-60% of adults are low shedders
  - 20 to 30% are moderate shedders
  - 10 to 30% are high shedders
  - 80% of eggs come from 20% of the horses on a farm.

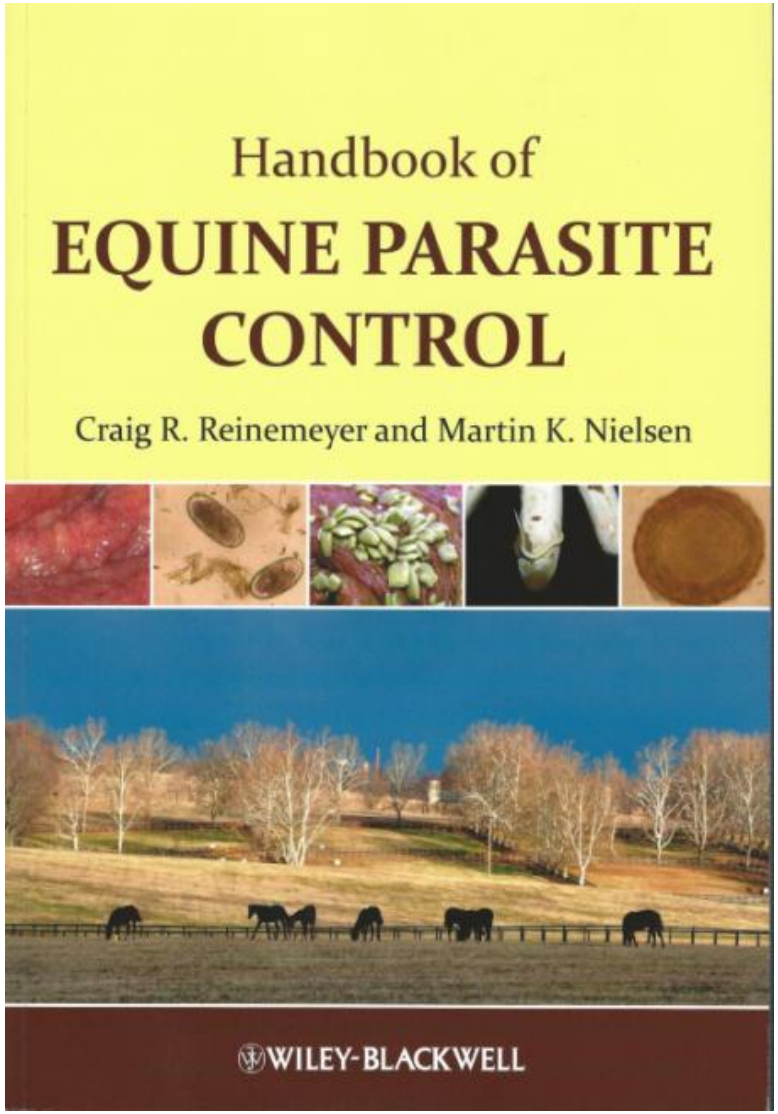
Arrested Development

- Some ingested larvae encyst in the gut mucosa and may reside in the horse for over two years.
- Eventually emerge from cysts, reproduce and produce eggs - usually at the on-set of the grazing season.
- Great adaptation - if you are a parasite – Why?
- Encysted small strongyles are not uniformly susceptible to any deworming regime.
- Eradication is not possible or desirable.

Encysted Small Strongyle Larvae

Cyathostomins – Small Strongyles

- Prepatent period: 2-3 months
- Resistance: Benzimidazoles – widespread, Pyrantel – developing, Macrocyclic Lactones- early
- Most efficacious drugs: Macrocyclic Lactones
- Environmental control: numerous ways – more information in module 2



AAEP Parasite Control Guidelines

Developed by the AAEP Parasite Control Subcommittee of the AAEP Infectious Disease Committee

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Mission Statement

Commonly used strategies for parasite control in adult horses are based largely on knowledge and concepts that are more than 40 years old. However, much has changed over this time necessitating a re-examination of recommendations for parasite control. In response to this need, the AAEP has formed a Task Force charged with producing a comprehensive set of recommendations for helping veterinarians develop improved strategies and programs for parasite control in horses of all ages. Guidelines will be specified separately for adult and young horses (less than 3 years).

Recommendations developed in this document are based on the following:

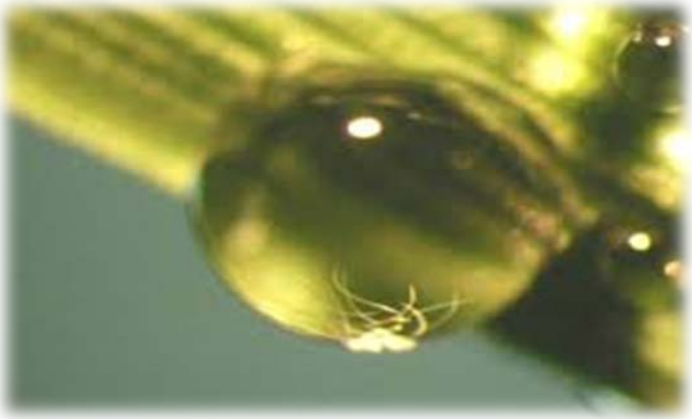
1. Important changes in the parasitic fauna of horses have occurred such that *Strongylus vulgaris* and other large strongyles are now rare, and cyathostomins (small strongyles) are now the major parasite of concern in adult horses, while *Parascaris equorum* remains the most important parasite infecting foals and weanlings.
2. Anthelmintic resistance is highly prevalent in cyathostomins and *Parascaris equorum*, and this must be factored into treatment decisions (Kaplan and Nielsen, 2010).
3. Adult horses vary greatly in their innate susceptibility to infection with cyathostomins and their level of strongyle egg shedding and thus, require individualized attention to their parasite control needs.
4. Horses less than about 3 years of age require special attention as they are more susceptible to parasite infection, and are more at risk for developing disease. This article will detail the separate approach taken for parasite control in this age group.

http://www.aaep.org/custdocs/ParasiteControlGuidelinesFinal.pdf

Next Module - Equine Parasite Resistance

How does it happen?

Can it happen on your farm?



This project is partially funded by:

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