

Equine Parasite Control for Florida

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Why Are There So Many Parasite Problems in Horses?

- **Wild horses never had to develop the ability to resist parasites**
- **Horses evolved to live in dry, grassy plains and steppes**
 - Moved great distances daily, leaving parasite eggs far behind
 - Harsh, dry climate made it difficult for infective stages of parasites to survive on pasture

Why Are There So Many Parasite Problems in Horses?

- **Domestic horses live in a much different environment**
 - Milder, humid climate promotes parasite survival on pastures
 - Horses confined to limited pastures cannot leave their worms behind

Major Problem Parasites

- **Almost always present**
- **Will cause production losses**
 - Can be deadly
- **Must be controlled by regular preventive treatments**

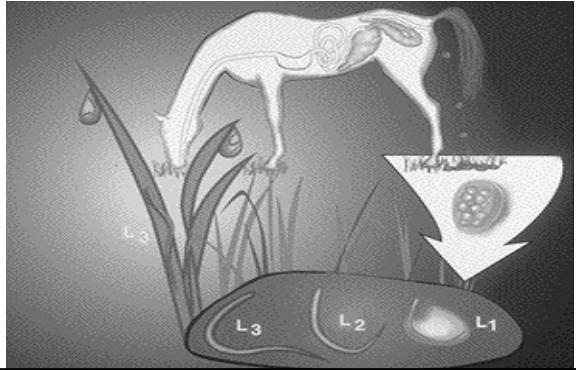
Major Problem Parasites in 21st Century Horses

- **Adult Horses**
 - Small Strongyles
- **Foals**
 - Small Strongyles
 - Ascarids (Large Roundworms)

Small Strongyles

- **Small (less than 1 inch) red worms that live in the large intestine of horses**
- **Occur in very large numbers**
 - 30,000-100,000

Small Strongyle Life Cycle



Small Strongyles

- Because worm larvae live on pasture they are killed by extremes of climate
 - Too hot
 - Too dry
 - Too cold

Small Strongyles

- Greatest numbers of infective larvae appear on pastures in Florida from November through April
 - Pastures are relatively free of small strongyle larvae during summer in Florida
 - Opposite of northern U.S. where most worm transmission occurs in summer/fall

Impact of Small Strongyles

- Small strongyles are “thieves” rather than “killers”
 - Weight loss/ill thrift
 - Diarrhea
 - Colic
 - Death is uncommon

Control Methods for Small Strongyles

- Interval
 - Treatment at fixed intervals year round
- Seasonal
 - Treatment at fixed intervals only during certain times of the year
- Continuous
 - Daily medication
- Selective
 - Treat only those animals having elevated worm egg counts

Interval Treatments

- The most expensive method
- Absolutely the most effective means of control over the short term
- Most likely to cause worms to develop resistance to wormers over the long term

Interval Control

- Ideally horses are treated within the “egg reappearance period”
 - Allows no worm eggs to be shed onto pasture

Egg reappearance period

- Interval between the time of treatment and reappearance of worm eggs due to reinfection
- For small strongyles:
 - Moxidectin: 2.5 to 3 months
 - Ivermectin: 6-8 weeks
 - Strongid-C: 4-6 weeks after last daily dose is given
 - Others: 4-6 weeks
- The shorter intervals **MUST** be used for foals & yearlings

Wormers

- Endectocides
 - Broad spectrum - kill most worms and bots
 - Not effective against tapeworms
 - Little strongyle resistance (yet) to endectocide
 - Resistant ascarids are becoming a problem

Wormers

- Endectocides
 - Ivermectin (Eqvalan, Zymectrin, & many others now that ivermectin is off patent)
 - 8 week egg reappearance interval
 - Re-administer after 2 months (6 weeks for yearlings)
 - New combination products add praziquantel to control tapeworms (Zymectrin Gold, Equimax)

Wormers

- Endectocides
 - Moxidectin (Quest)
 - Kills more encysted small strongyle larvae than ivermectin
 - 12 week egg reappearance interval
 - Re-administer after 3 months (2.5 months for yearlings)
 - Quest Plus adds praziquantel to control tapeworms

Wormers

- Pyrantel Salts
 - Do not kill bots or many less common worms
 - Resistance is emerging
 - Ascarids & small strongyles
 - One species of small strongyle (out of approximately 40 known species), *Cylicocyclus nassatus*, is not susceptible to pyrantel salts

Wormers

- **Pyrantel Salts**
 - **Pyrantel Pamoate (Strongid-T, Strongid-P, many others now that pyrantel is off patent)**
 - Single dose products
 - 2-3x dose kills tapeworms
 - **4-6 week egg reappearance interval**
 - Re-administer ~monthly

Wormers

- **Pyrantel Salts**
 - **Pyrantel Tartrate (Strongid-C)**
 - Administered daily in feed
 - Prevents reinfection (including tapeworms?)
 - Egg reappearance interval is 4-6 weeks after the last daily dose

Wormers

- **Benzimidazoles**
 - **Broad spectrum**
 - Do not kill bots or tapeworms
 - **4-6 week egg reappearance interval**
 - Re-administer ~monthly
 - **Resistance is THE big problem**
 - Mainly small strongyles
 - Some resistant ascarids
 - Resistance to one BZD generally means resistance to all

Wormers

- **Important Equine Benzimidazoles**
 - **Fenbendazole (Safeguard, Panacur)**
 - High doses kill larval strongyles
 - Not if worms are resistant
 - **Oxibendazole (Anthelcide EQ)**
 - May work (briefly) against worms resistant to other BZDs

Wormers

- **Other equine benzimidazoles**
 - Nearly identical to fenbendazole in all respects, including serious resistance problems
 - Oxfendazole (Benzelmin)
 - Febantel (Rintal, Cutter Paste)

Seasonal Treatment

- Nearly as effective as interval treatment
- Less expensive
- Somewhat less likely to cause worms to develop resistance to wormers

Seasonal Treatment

- Horses are treated within the egg reappearance interval only during times of the year when eggs are likely to survive and develop into large numbers of infective larvae on pasture
 - September-March in Florida
 - Cooler months in the rest of the southeast
 - April-September in northern US
- Few or no treatments are administered for small strongyles at other times of the year

Continuous Treatment

- Daily in-feed medication with pyrantel tartrate (Strongid-C)
 - Prevents infections from developing by killing incoming larvae
 - First-time cleanout treatment with another drug needed to kill existing adult worms
- Most expensive
- Very effective for horses grazing worm-infested pastures
 - Ideal for boarding stables lacking a uniform worm control program
- Probably led to the current increase in the prevalence of pyrantel resistant worms!

Selective Treatment

- 20% of adult horses in the herd shed 90% of the worm eggs
 - Many adult horses shed only a few eggs
- Repeatedly treat only those horses shedding large numbers of worm eggs
 - Interval or seasonal basis

Selective Treatment

- Suitable horses more than about 4 years of age
- Not suitable for foals and yearlings
- Between 2 and 4 years of age, many “shedders” convert to “nonshedders” as immunity strengthens

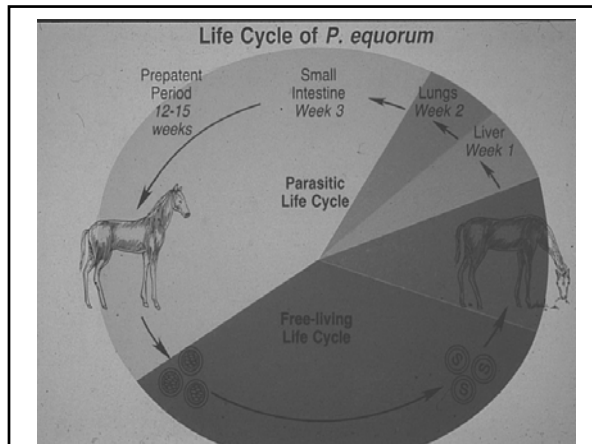
Selective Treatment

- Best program for preventing drug resistance
 - Untreated horses provide “refugia” for susceptible worm genotypes
- Disadvantage: Worm egg counts are more expensive than worming
- Treat all adult horses once or twice annually to control other species of parasites

Ascarids

- Large (6-9 inch) cream-colored worms that live in the small intestine
- Affects primarily foals under 6 months
- Adult horses are relatively immune





Ascarids

- **Ascarid eggs are very tough**
 - Live for one or more years on pasture
 - Not affected by vagaries of climate
 - Transmission occurs year-round
 - This year's foal crop is infected primarily by ascarid eggs shed by last year's foals
- **Ascarid eggs are shed by the millions**
 - Massive infections may result

Impact of Ascarids

- **Weight loss/ill thrift**
- **Diarrhea**
- **Pneumonia, "snotty nose"**
- **Colic**
- **Intestinal obstruction**
- **Death**

Control of Ascarids

- **Treat foals beginning at 2 months of age and every 2 months thereafter until 1 year of age**
- **All modern wormers are nominally effective**
 - Resistance has become a problem

Resistance to Antiparasitic Drugs

- **Ascarid resistance has arrived**
 - Resistance to ivermectin, moxidectin and pyrantel has become common
 - Benzimidazole resistance is now being reported in thoroughbreds in Kentucky
 - FBZ Power Pack is useful in cases of severe resistance by ascarids

Resistance to Antiparasitic Drugs

- **Small strongyles have become resistant to nearly all drugs**
- **Only the endectocides still work reliably**
 - Ivermectin
 - Moxidectin

Resistance to Antiparasitic Drugs

- Egg reappearance intervals for these drugs have become shorter
 - Especially among thoroughbreds
 - Less so for general pleasure horses
- Internationally, 1 unequivocal report each of strongyles resistant to ivermectin moxidectin.

Resistance to Antiparasitic Drugs

- Resistant small strongyles are widespread
 - In 2001 a major study was carried out in Florida, Georgia, Kentucky, Louisiana & South Carolina
 - 44 farms tested for small strongyles resistant to antiparasitic drugs

Resistance to Antiparasitic Drugs

- Percent of farms demonstrating the presence of resistant small strongyles:
 - Fenbendazole - 100%
 - Theoretically side resistant to oxfendazole and febantel
 - FBZ Power Pack is not particularly effective when resistant small strongyles present
 - Oxibendazole – 67.4%

Resistance to Antiparasitic Drugs

- Percent of farms demonstrating the presence of resistant small strongyles:
 - Pyrantel Pamoate - 47.6%
 - Ivermectin - 0%
 - Theoretically no resistance to moxidectin

Resistance to Antiparasitic Drugs

- You must confirm annually that the drugs you intend to use will indeed work on your property
- Worm egg counts
 - Immediately before treatment
 - 2 weeks after treatment

Resistance to Antiparasitic Drugs

- What to do?
 - Minimize frequency of worming
 - Use seasonal rather than year-round interval treatment
 - Strongly consider selective treatment
 - Identify your “problem” horses
 - Aggressively worm them

Resistance to Antiparasitic Drugs

- What to do?
 - Minimize the use of Strongid-C
 - Resistance to pyrantel salts appeared shortly after the introduction of daily Strongid-C
 - Ideally, use it to protect your horses on properties, such as boarding stables, lacking a uniform, commonly applied worming program
 - Untreated horses act as refugia

Resistance to Antiparasitic Drugs

- What to do?
 - Rotate classes of wormers if possible
 - Macrolides (ivermectin & moxidectin)
 - Benzimidazoles (fenbendazole, febantel, oxfendazole, oxbendazole)
 - Pyrantel salts
 - Benzimidazoles and pyrantel pamoate can be co-administered with piperazine to restore efficacy against small strongyles
 - Piperazine usually requires tube worming

Resistance to Antiparasitic Drugs

- What to do?
 - Use accurate dosing – never underdose
 - Good sanitation, minimize stress & crowding

Resistance to Antiparasitic Drugs

- Will dragging my pastures help?
 - “Yes” in hot/dry weather
 - Late April through mid September in Florida
 - Infective larvae quickly dry out and die
 - “No” in mild weather
 - October through March in Florida
 - Infective larvae are spread around the pasture where they will happily survive until the weather dries up and warms up in the latter part of April

End Note:

- No new classes of antiparasitic drugs are likely to come to market within the next 5-10 years
- What will we do if all of the currently used drugs fail . . .

