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 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

Small Strongytes Life Cycle

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

- **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

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

**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

- **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
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**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 oxendazole and febantel
    - FBZ Power Pack is not particularly effective when resistant small strongyles present 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, oxibendazole
    - 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 . . .