Worms, Bugs, and Grubs

Parasite Control in the Desert Environment

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Acknowledgments

- Acton-Agua Dulce Public Library
- Valerie Bailey
- Joan Fry
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- AAEP

Overview

- Short History Lesson
- Summary of Equine Internal Parasites
- Internal Parasite Control
  - Fecal egg counts
  - Deworming
    - Frequency, time of year, which products to use
  - Environmental Management
- Summary of External Parasites
- External Parasite Control
  - On the Horse
  - In the Environment
- The Internal/External Double Whammy
  - Bots
  - Summer Sores

A Brief (Relatively Recent) History of Equine Parasite Control

- "The Old Days" (1950s-1970s)
  - Chemical dewormers (mostly organophosphates and piperazine) were very caustic
    - Administered via nasogastric tube passed through the nose and directly into the stomach
      - Required veterinary assistance
    - Side effects common
    - Variable efficacy
    - Resistance
  - Primary parasite targeted was large strongyle ("blood worm")
    - Verminous arteritis, death from colic

A Brief (Relatively Recent) History of Equine Parasite Control

- The "Good Days" (1970s)
  - Introduction of Paste Wormers
    - Benzimidazoles
    - Pyrantel
  - Less expensive
  - More efficacious
  - Safer
  - No longer required NG tubing to administer
  - Large strongyles still major target of deworming and a major health problem for horses

A Brief (Relatively Recent) History of Equine Parasite Control

- The "Glory Days" (1980s-2000s)
  - Introduction of ivermectin
    - Profoundly effective against large strongyles
      - Nearly eradicated cases of verminous arteritis
    - Very safe
    - Easy to use
    - No resistance
  - Use of rotational deworming schedules
  - Introduction of moxidectin

A Brief (Relatively Recent) History of Equine Parasite Control

- "Modern Days"
  - Increasing resistance to all dewormers, including ivermectin
  - Recognition that some degree of parasitism is not necessarily a bad thing
  - Recognition that some horses are more susceptible to parasitism than others
  - Necessity for a more targeted approach to deworming.

Parasite Life Cycles

- Fecal-oral transmission is most common
- Eggs are laid by adults in the intestine, then pass in the manure.
- The eggs of many species require a period of time in the environment to develop into an infective larval stage.
- Infective eggs or larvae are ingested by the horse
- Variable migration (depending on species of parasite) through tissues.
- Maturation in digestive tract

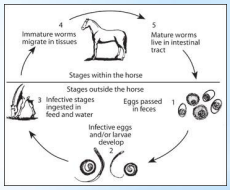


Image by University of Missouri

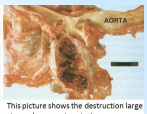
Summary Of Equine Intestinal Parasites

- Large Strongyles (Bloodworms)
  - Uncommon in our climate
  - Currently uncommon in managed horses
- Small Strongyles (Cyathostomins)
  - Uncommon in our climate
- Tapeworms (Anoplocephala)
  - Uncommon in our climate
- Ascarids (Roundworms)
  - Problematic in horses under 2
- Pinworms
  - Common in our area
- Habronema (Stomach Worms)
  - Common in our area
  - Cause of summer sores

Large Strongyles (bloodworms)

- Fecal-oral transmission
- Parasite of grazing horses (pasture)
- Larval stages migrate through blood vessels
  - Verminous arteritis causes damage to vessels , including aneurysms and blood clots. Can cause fatal colic
- Uncommon since advent of ivermectin

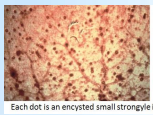

These are large strongyles in fecal material



This picture shows the destruction large strongyles cause to arteries.

Images by University of Kentucky

Small Strongyles (cyathostomins)


Each dot is an encysted small strongyle in the intestinal wall

Images by University of Kentucky

- Fecal-oral transmission
- Parasite of grazing horses (pasture)
- Larval migration only through intestinal walls
- Can encyst in small intestinal wall; disease occurs when large numbers of larvae burst out all at once, causing intestinal damage.
- Few dewormers are effective against encysted small strongyles
  - Moxidectin (Quest)
  - Double dose fenbendazole x 5 days (Panacur Power-Pak)
- Adult worms also widely resistant

Tapeworms (anoplocephala)

- Require an intermediate host
  - Oribatid mite (forage mite), lives on pasture
- Adult worm attaches in small intestine near cecum
- Associated with intermittent spasmodic colic
- Treated with Praziquantel (found in Quest Plus, Ivermectin Gold, or EquiMax) or double dose pyrantel (Strongid)

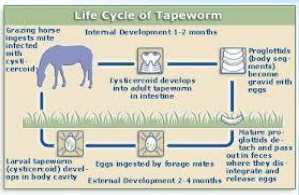


Image by thehorse.com

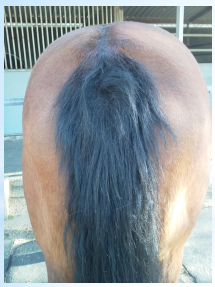
*Ascarids (roundworms)

- *Fecal-oral transmission
- *Affect grazing horses as well as those on dry lots
- *Most problematic in horses under 2 years old
  - * Mature horses develop some immunity
- *Eggs are very persistent in environment
- *Migrating larvae can cause damage to liver and lungs
- *Fast kill of large numbers of worms can cause severe colic due to intestinal obstruction.

This picture shows the intestinal rupture caused by heavy ascarid infestation

Images by University of Kentucky

*Pinworms



- *Cause itching around the anus and tail
  - * Hypersensitivity to the cement secreted by the female worm laying her eggs around the anus
- *Eggs are hardy in the environment
- *Little serious clinical disease, but difficult to eradicate
- *Commonly seen in our area
- *Some resistance to ivermectin
  - * Usually respond to fenbendazole or pyrantel

*Habronema (stomach worm)

- *Cause of summer sores
- *Adult worm lives in stomach of the horse, does not cause a clinical problem
- *Eggs shed in the feces, develop into larvae
- *Fly larvae developing in manure ingest worm larvae, which are then carried by the adult fly.
- *Fly deposits worm larvae in moist areas of the body, including eyes, lips, genitalia, and wounds

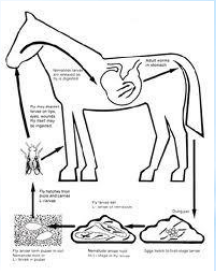
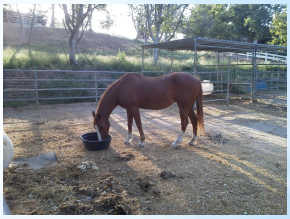


Image by Merial

What Do We Need To Worry About in the Desert?

- Ascarids
  - Young horses
  - Breeding farms
- Pinworms
  - Itchy butts and broken tail hairs
- Habronema
  - Summer sores



What Can We Do Besides Worry?

- Targeted, logical chemical deworming
  - Use appropriate product
  - Use at the right time of year
  - Use fecal egg counts
- Treatment and isolation of horses coming from other parts of the country
- Environmental management

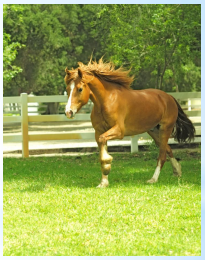


Photo by Craig Andrews

Fecal Egg Counts

- Semi-quantitative analysis of feces to determine how many eggs are being shed
- Most useful for evaluation of strongyle and ascarid infestations
- Occasionally will identify tapeworm eggs
- Can be used to evaluate efficacy of dewormers and to determine which horses in a herd are chronic shedders of parasite eggs.
- In our environment, annual fecal analyses are probably sufficient unless a clinical problem is present.
- Breeding farms should perform more frequent analyses, particularly on broodmares, weanlings, and yearlings to monitor for resistant ascarid populations.

Limitations of Fecal Egg Counts

- Worms lay eggs intermittently, so false negative results can occur
- Do not accurately reflect the numbers of worms in an individual horse
- More meaningful on a herd basis than an individual basis for evaluating effectiveness of deworming.
- Some parasites will not be detected via fecal analysis at all (pinworms)
- Will not detect encysted small strongyles or larval forms of parasites
- Cannot differentiate between large and small strongyle eggs
  - Large strongyles in significant numbers are currently only found in neglected or feral horses
- Samples must be handled appropriately for accurate results

Fecal Sample Handling Guidelines

- Submit feces in airtight container
- Manure should be fresh
- Refrigerate immediately
  - Eggs in room-temperature samples may hatch into larvae which will not be counted during the analysis
- Normal manure should be used for quantitative sampling
  - Soft feces can be analyzed for the presence of parasites but egg counts are not meaningful

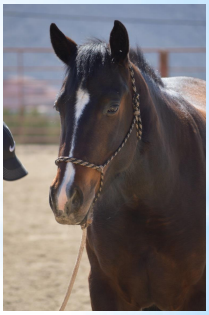
Deworming Guidelines for Adult Horses In Acton/Agua Dulce

Photo by Craig Andrews

- Fecal egg count 1-2 times yearly (spring, or spring and fall)
- Twice yearly deworming with ivermectin or moxidectin (spring and fall)
- Additional treatments if needed for specific clinical problems
  - Pinworms
  - Summer sores
- Tapeworm treatment probably not necessary

Deworming Guidelines for Horses Up to Two Years Old

- Ascarids are main concern for young horses
- Give at least 4 treatments during the first year of life
  - 2-3 months
    - Benzimidazole for best action against ascarids and avoidance of fast kill
  - Just before weaning (approx. 6 months)
    - Check FEC
  - 9 and 12 months
    - Tapeworm treatment once
- Give 3-4 treatments during second year of life.



Deworming Guidelines for Horses Arriving From Other Areas

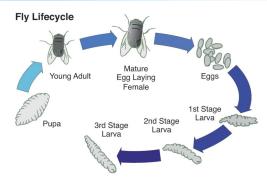
- Check fecal egg count
- Deworm with larvicidal product that will also treat tapeworms
  - Moxidectin + Praziquantel (Quest Plus)
- Avoid turnout with other horses for one week post-deworming
- Second fecal egg count to evaluate residual or resistant parasites

Photo by Monica Henken

Environmental Management

- Pick up manure from stalls and corrals daily and from larger turnout areas at least weekly.
  - Remove manure before parasite eggs have a chance to become infective
  - Reduce exposure to parasite eggs
- Do not spread manure in turnout areas
  - Poop is not bedding!
  - Poop is not footing!
- For pinworms
  - Wash area around anus with soap and water and rinse well
  - Wash down walls and fences with soap and water and/or 10% bleach solution (rinse well to prevent corrosion)
- For summer sores
  - Fly control, fly control, fly control!

*Common External Parasites of Horses



*House Flies
*Stable Flies
*Horse Flies
*Horn & Face Flies
*Gnats
*Ticks
*Bot Flies
*Mites, Lice

*House Fly

*Most common fly in our area
*Sponging mouthparts
  *Do not bite
*Eggs are laid in manure and rotting vegetation
*Attracted to manure, wounds, mucous membranes, moist areas in environment
*Transmits Habronema larvae (summer sores)

*Stable Fly

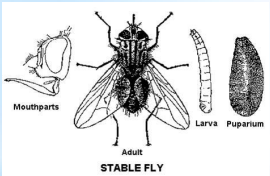
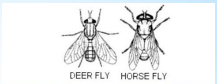


Image by University of Kentucky

*Appearance similar to house fly
*Biting mouthparts
  *Suck blood
  *Preferred feeding places are legs and flanks
*Breeds in manure and other decaying organic matter
*Implicated in fly allergies
*Transmits larvae of Habronema (summer sores)

Horse Fly

- Large, slow-moving, black fly
- Slicing mouthparts
  - Cut a crescent-shaped hole in skin, then mop up blood to feed
  - Feed slowly
- Very painful, irritating bite
- Attracted to dark colors
- Prefer sunny areas; provide shade for protection
- Breed in moist areas such as banks of creeks or areas around stock tanks



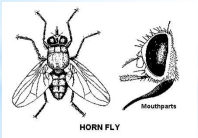
Black horse fly and horse fly

Deer Fly

* Image by University of Kentucky

Horn and Face Flies

Face fly.



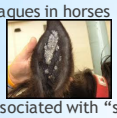
HORN FLY

* Images by University of Kentucky

- Primary parasites of cattle
- Require cattle manure to breed
- Face flies have sponging mouth parts and feed on secretions from the eyes, nose, and wounds.
- Horn flies suck blood, and feed around the ears and eyes
- Speculation that these flies may play a role in transmission of bovine papilloma virus, a suspected cause of equine sarcoids.

Gnats

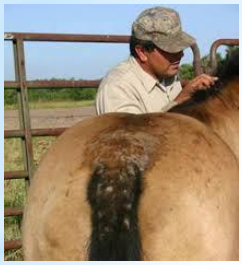
- Small biting flies of several species
- Associated with aural plaques in horses



- Associated with "sweet itch," a hypersensitivity reaction that causes severe itching of the base of the mane, tail, and under the belly
- Breed in moist areas and decaying organic matter.
- A good reason to use a fly mask with ear covers!

* Top image: bugguide.com
* Left Image: University of Minnesota

*Ticks



* Image by Texas A&M University

Favored sites on horses are base of tail and mane, ears, under jaw, behind elbows, flanks, and genitalia.

* Arachnid (8 legs)
* Females climb up brush or grasses, hitch a ride on a passing mammal, feed, then fall off to lay eggs
* Lyme-transmitting species are uncommon in this area
* Apply permethrin spray, wipe, or spot-on prior to trail rides. Inspect horses after returning home and remove any hitch-hikers.
* Sites of tick-bites may develop hair loss, yellow serous crusts, and itching in sensitive horses.

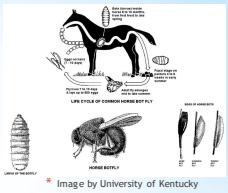
*Mites and Lice

Both mites and lice cause intense itching and hair loss.

* Several species of mites infest horses
* Uncommon in our area except on horses with heavy feathers (draft horses, gypsy horses)
* Can be difficult to control, though some species are sensitive to systemic ivermectin and topical treatments.
* Lice are species specific
* Uncommon in well-managed herds
* Do not survive long in environment; entire life cycle occurs on the host
* Multiply during colder weather in long winter coats.

*Bot Flies

* Uncommon in this area
* Lay eggs on legs of horses
* Larvae mature in the stomach
* Stomach larvae rarely cause a clinical problem
* A dose of ivermectin in the fall usually keeps bots in check.
* Eggs can be removed with bot blades or blocks



* Image by University of Kentucky

Habronema (stomach worm)

- Cause of summer sores
- Adult worm lives in stomach of the horse, does not cause a clinical problem
- Eggs shed in the feces, develop into larvae
- Fly larvae developing in manure ingest worm larvae, which are then carried by the adult fly.
- Fly deposits worm larvae in moist areas of the body, including eyes, lips, genitalia, and wounds

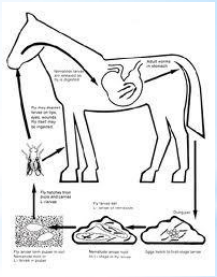


Image by Merial

Summer Sores (Habronemiasis)

Image by DVM360

Larvae of stomach worm laid in wounds or mucous membranes (eyes, lips, genitalia)
Aberrant part of parasite life cycle; cannot migrate normally
Inflammatory reaction
- Ulceration
- Swelling
- Tissue production
- Sulfur granules
- Itching

- Treatment
  - Double dose ivermectin orally
    - May need to repeat
  - Debulking of lesion
  - Local injection with corticosteroid
  - Topical treatment with antibiotic/corticosteroid ointment
  - Excellent fly control
    - Fly clothing
    - Repellants
    - Manure management

Control of External Parasites

- On the horse
  - Chemical
    - Oil-based lasts longest
    - No products last as long as label claims
    - Apply prior to trail rides for tick control
    - Wipes, roll-ons, and lotions work well on faces
  - Mechanical
    - Fly masks
    - Fly sheets
    - Leg protection

Control of External Parasites

- Environmental Management
  - Minimize breeding habitat
    - Clean stalls and pens daily
    - Dispose of manure in closed containers or compost
    - Clean up excess feed and keep areas around waterers as dry as possible
- Feed through fly control
  - Solitude IGR (insect growth regulator)
    - Prevents larvae from maturing to adult flies by inhibiting chitin formation
    - Species specific for house and stable flies
- Fly predators
  - Stingless wasps whose larvae feed on fly larvae
  - Require regular replenishing throughout fly season
- Traps
  - If contain attractant, place away from horse living areas

Take Home Points

- Minimal risk of strongyle infestation due to lack of grazing
- Main internal parasites of concern in Acton/Agua Dulce
  - Ascarids (young horses)
  - Pinworms
  - Habronema (cause of summer sores)
- Twice yearly deworming and annual fecal egg count is sufficient for most adult horses, with additional treatments as indicated by clinical disease
- Environmental management is key to parasite control
  - Clean pens daily
  - Compost manure or dispose in covered receptacles
  - Do not spread manure; if you must, spread it very thinly and break up the fecal balls to cause rapid drying.
- Pesticide use can be minimized
  - Mechanical barriers
    - Fly clothing
    - Fans
    - Screens
  - IGRs
  - Fly predators

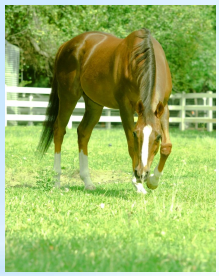


Photo by Craig Andrews

Questions?