

Horse Parasite Management

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Outline

- Internal parasite management
- Collecting a fecal sample
- External parasite management
- Manure management

Deworming Protocols and Management

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What does parasite infection look like?

Dull Hair
coat

Pot belly

Frequent
colic

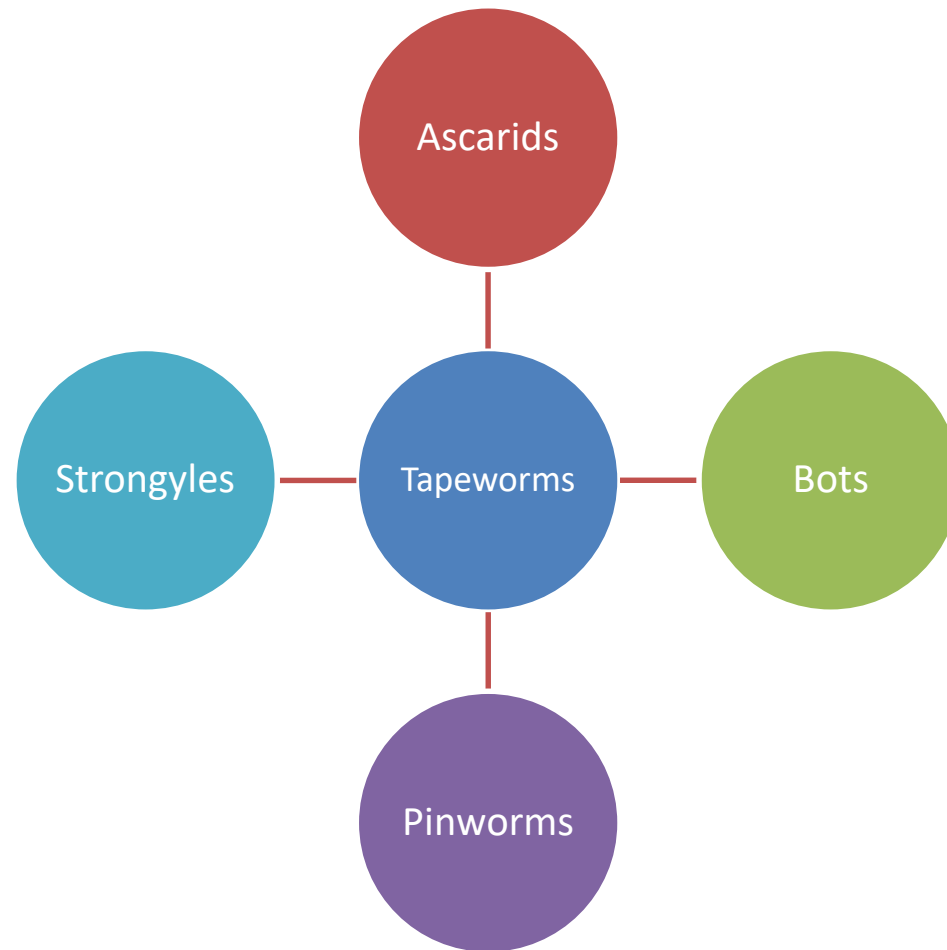
Diarrhea

Weight
loss

Lethargy

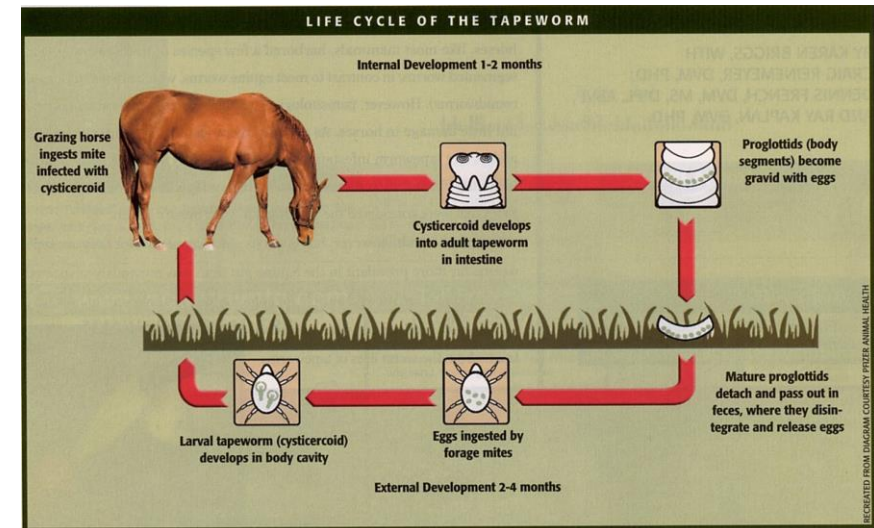


What are the common internal parasites?



Tapeworms

- More prevalent and dangerous than thought
 - U.S. average 54%; MN = 99.7%; MT = 44.8%
- Flat and segmented worm
- Cause severe inflammation at attachment site
 - Junction of small intestine and cecum
- Grass mite is the intermediate host



Ascarids or Roundworms

- Can be seen by the naked eye in manure
 - Especially after treatment
- Mainly a problem in young horses (< 15 months)
- Larva migrate:
small intestine - liver - lungs - up trachea - back to intestine
 - Can block small intestine causing colic



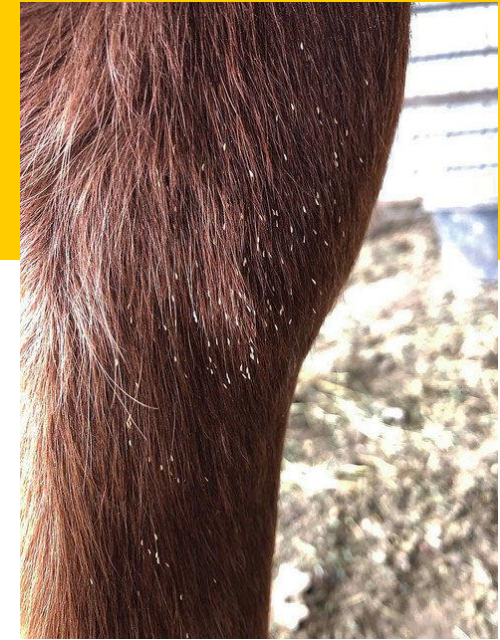
Strongyles or Bloodworms

- Two groups
 - Large –larvae migrate from intestine but return to intestine to mature and lay eggs
 - Small – invade large intestinal mucosa and encyst
- Damage: anemia, diarrhea, blockage of intestinal blood



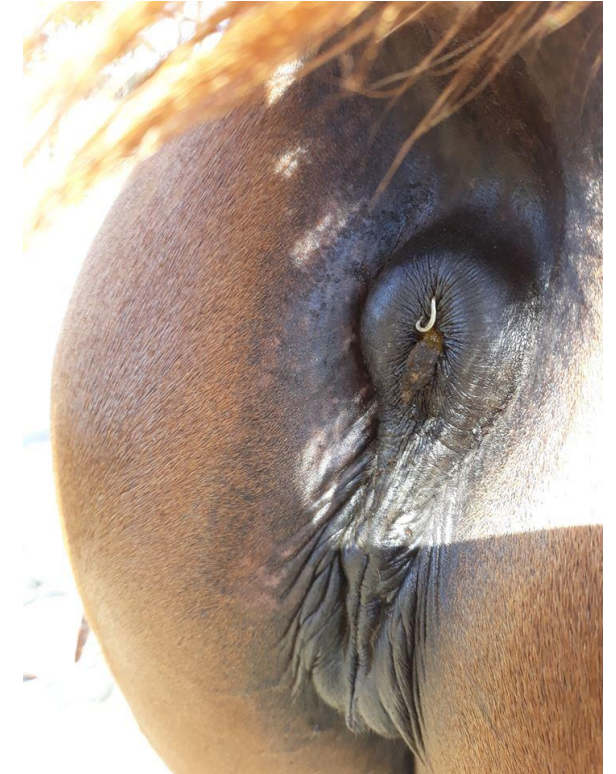
Bots

- Bot fly deposits eggs on body and horse ingests
- Enter mouth and migrate to stomach
 - Pass into manure in late spring
- Damage: oral lesions, lesions of gastric and intestinal mucosa



Pinworms

- Common, large parasite
- Inhabit large intestine
 - Females migrate to rectum to deposit eggs
 - Eggs attach to anus
 - Itches – horse rubs tail against any surface



SO HOW DO WE MANAGE PARASITES?

Goals for Parasite Control

- Minimize the risk of parasitic disease
- Control parasite egg shedding
- Maintain efficacious drugs and minimize resistance

How do we manage parasites?

- Traditional programs
 - Focused on rotational and regular interval deworming
 - Based on life cycle of *Strongylus vulgaris* (large strongyle)
 - Outdated
 - Problems with resistance
- Current recommendations = Targeted program
 - Individualized approach based on fecal egg counts (FEC)

What is a FEC?

- Microscopic evaluation of parasite eggs in manure
 - Low < 200 epg
 - Med = 200-500 epg
 - High >500 epg
- Best collected when effects of dewormer are gone
 - >16 wks after moxidectin
 - >12 wks after ivermectin
 - > 9 wks others



Why use FEC?

- Can be used to determine shedding status
 - 15-30% of horses are responsible for ~80% of parasite egg shedding
- Can evaluate dewormer efficacy
- Can evaluate type of parasite
 - Strongyle vs ascarid in young animals

Limitations of FEC

- Does not detect larval stages
- May miss tapeworm or pinworm infection

So what does targeted deworming look like?

FEC*	Risk	Deworming Action
< 200 epg	Low	Deworm 1-2 times per year (ex. spring and fall)
200-500 epg	Moderate	Deworm 2-3 times per year (ex. spring, summer, fall)
> 500 epg	High	Deworm 3-4 times per year (ex. Spring, summer, fall, winter)

* FEC should be performed 1-2 times/year depending on level of shedding

Which products should I use?

Active Ingredient	Name Brand	Ascarids	Large Strongyles	Small Strongyles *	Pinworms	Bots	Tape worms
Ivermectin	Zimectrin, Eqvalan	X - Resistance	X	X	X	X	
Moxidectin	Quest	X - Resistance	X	X*	X	X	
Fenbendazole	Safe Guard, Panacur	X	X	X - Resistance *(power pk)	X		
Oxbendazole	Anthelcide EQ	X	X	X - Resistance	X		
Pyrantel Pamoate	Strongid	X	X	X - Resistance	X		X (double dose)
Ivermectin + Praziquantel	Equimax, Zimectrin Gold	X	X	X	X	X	X
Moxidectin + Praziquantel	Quest Plus	X	X	X	X	X	X

Bottom line....

- Use FEC to make informed decisions
 - Individualized approach
- Use the correct deworming product to target the problem parasites

Collecting a Fecal Sample

Rachel Wald

McHenry County Extension Agent

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Collecting a Fecal Sample for Testing

- Fresh sample
- “Clean” sample collection
- Refrigerate if not immediately tested
- Double bag and label
 - Horses name
 - Age
 - Date collected

External Parasites

Paige Brummund
Ward County Extension Agent

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External Parasites: Ticks, Mosquitos, Flies

- Cause annoyance and pain to horse
 - Can result in weight loss
 - Can cause skin irritation
 - Extra hoof and leg stress
- Can vector diseases
- What you see is small fraction of what is in environment



Management Practices

- Reduce manure and wet areas
- Control weeds and tall grasses
- Shelters with screens
- Insecticides & repellants
- Barriers
 - Fly Sheets, Boots, Masks
- Feed Through IGR Supplement
- Traps



Managing Ticks

- Remove existing ticks
 - Check under tail, tail bone, base of mane, under jaw, ears, legs, and udder/sheath area
- Treat existing bites
- Apply insecticides to prevent bites
 - Spot on residual treatments and sprays labeled for tick control
- Keep out of wooded areas
- Mow tall grass
- Learn about diseases transmitted by ticks (Lyme's)



Managing “Filth” Flies

- Attracted to wet debris
- House fly
 - do not bite but still spread disease, cause annoyance
- Biting stable fly
 - Inflict pain, transmit disease



- Insecticides and Repellants
 - Temporary pyrethrums vs residual pyrethroids
 - Follow label directions, test first
 - Manual or timed application
- Parasitic Wasps
 - Kill developing fly pupae
- Traps
 - Sticky, UV electric traps, baits
- Physical Barriers

Managing Aquatic Flies

- Horse and Deer Flies
 - Large, painful bites
 - Active during day
- Black Flies
 - Small gnats, target ears and belly
 - Active during day



- Manage water
- Provide shelter
- Physical barriers
- Insecticides
- Traps not as effective

Managing Mosquitos

- Remove standing water
- Fog, sprays, larvicides
- Provide extra protection
 - dusk to dawn
 - in tall grass
 - near wet areas
- Protect against WNV, EEE, WEE



Rotate Insecticide Groups

Residual surface sprays to fly resting sites

Active ingredients	Insecticide Group Number*	Precautions and concentrations
Cyfluthrin 11.8%	3	Do not contaminate feed or water
Cyhalothrin 5.9 to 9.7%	3	Do not contaminate feed or water
Permethrin 7.4% to 40%	3	Do not contaminate feed or water
Spinosad 44.20%	5	Do not contaminate feed or water
Tetrachlorvinphos 50%	1	Do not contaminate feed or water

*Active ingredients classified in the same Insecticide Group number have the same mode of action or target site in a pest. Continued use of insecticides belonging to the same group can lead to resistance in the pest population. Rotation among groups will reduce the chance for resistance problems.

More complete lists of available insecticides labeled for horses can be found in the [AAEP External Parasite and Vector Control Guidelines](#)

Manure Management - Parasites

Watch the Manure Management Webinar here:

<https://www.youtube.com/watch?v=Yw0leiyTFFk&feature=youtu.be>

Mary Keena

Livestock Environmental Management

Extension Specialist

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Why Manage Manure?

- Manure contains valuable nutrients plants need. If the nutrients are not used they become a pollutant and are wasted.
- **Improper manure storage and land application**
 - Excess soil nutrients
 - Surface runoff
 - Leachate
 - Water-contaminated with manure



Harmful algal bloom. Photo courtesy: NDDEQ.

Other Manure Management Considerations

- Flies
- Bacteria and Pathogens
- Rodents
- Odors
- Internal parasites
- Weed seeds

Manure Stacking/Stockpiling Guidelines - ND

- Short-term Manure Stockpiles
 - Manure may **not** be stockpiled for **more than** nine months at short-term stockpile locations.
 - The same location cannot be used from year to year.
- Permanent Manure Stockpiles
 - Manure stockpiles **for more than** nine months must be stored at a permanent stockpile location.
 - Involves soil investigation and regulatory oversight.

Stockpiling Site Selection

- **Sandy soils have rapid permeability** that allows nitrate to move quickly through the soil to ground water (leaching), while **loamy or clayey soils have slower permeability** that helps retain nitrate in the soil profile.
- Depth to ground water and location of surface water

Stockpiling Site Selection

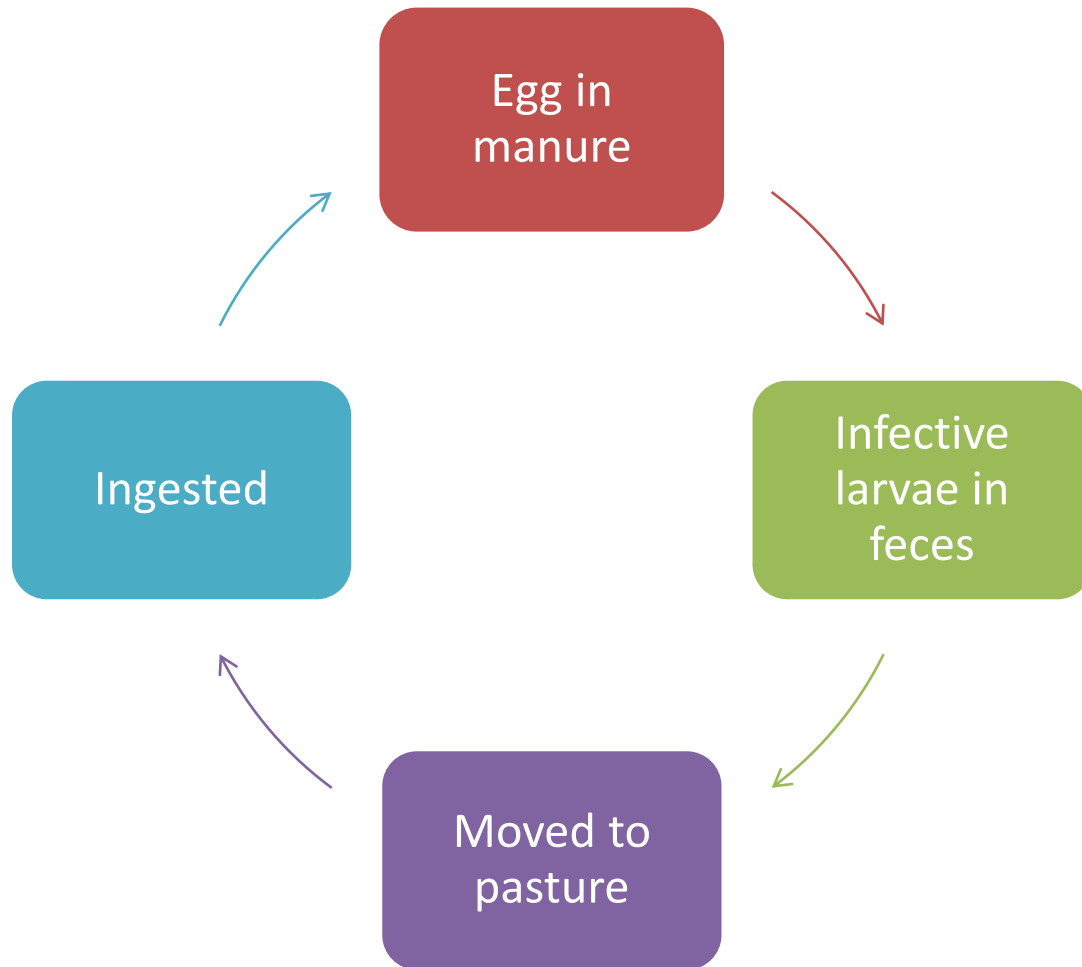
Manure stockpiles may not be located:

- In gravel pits, or any other excavations;
- Along streams or lakes;
- Within a flood plain; or,
- Within 50 feet of a private water supply well or 100 feet of a public water supply well

Can be covered with plastic to reduce odors and flies

- Anchor securely!

How Do Parasites Move?



No manure = no infection!?



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Environmental Conditions

- Moderate temperature and moisture
 - Cold slows/stops development
 - Excessive heat kills eggs and larvae
- It is possible to heat manure sufficiently to kill the parasites, including even ascarid eggs (Gould et al., 2012).
- Spreading non-composted horse manure on pastures is not recommended.

American Association of Equine Practitioners

Table 5. Effects of temperature on the survival, development and persistence of free-living stages (eggs, L1, L2, L3) of strongyles (Nielsen et al., 2007)

Development	Temperature Range	Survival
No development above this level	> 40 °C > 104 °F	Free-living stages die rapidly. Intact fecal balls may retain enough humidity to enable L3 to survive for some weeks.
Optimal temperature range for development of eggs and larvae. Reach infective L3 stage in as little as 4 days.	25 -33 °C 77 - 91 °F	Larvae survive on the shorter term (ie a few weeks), but conditions are too warm for long term survival
Eggs develop into L3 within 2-3 weeks.	10-25 °C 50-77 °F	L3 capable of surviving for several weeks to a few months
Lower limit for egg hatching is about 6 °C. At temperatures in this range, development will take several weeks to a few months.	6-10 °C 43-50 °F	L3 survive for many weeks and months under these circumstances
No hatching and no development	0-6 °C 32-43 °F	Eggs and L3 can survive for several months at temperatures just above the freezing point
No development during frost	< 0 °C < 32 °F	Developing larvae (L1 and L2) are killed, but unembryonated eggs and L3 can survive and persist for long periods (ie months)
Alternation between freezing and thawing will usually not lead to development unless temperatures exceed 6 °C	< 0 > °C < 32 > °F	Repeated freeze-thaw cycles are detrimental to egg and larval survival

Basics of Composting

- Moisture
 - 40-65% of pore space
 - “wet rag test”
- Temperature
 - Ideal = 131° F for 15 days
 - Kills pathogens
 - Kills weed seeds



Basics of Composting



Mixing Tools

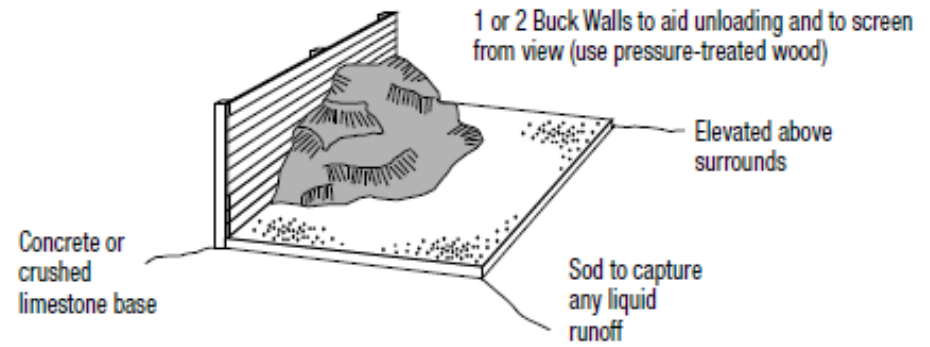
- Payloader
- Front-end loader
- Skid-steer
- Turner
 - Eco-mixer for smaller scale operations
- Pitchfork

Basics of Composting

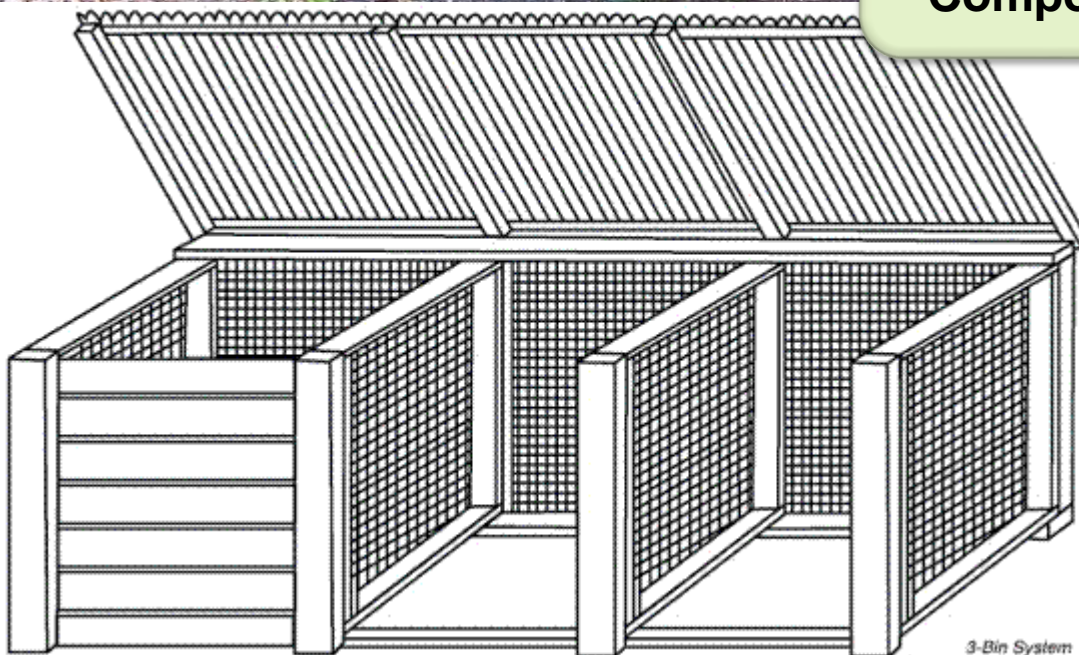
- Mixing
 - Helps maintain temperature
 - $> 5\%$ of pore space = O_2
 - 10 days to 2 weeks
- When is it done?
 - Temperature no longer spikes after turning
 - As little as 6 weeks or up to 6 months
 - Depends...



Figure 6. Simple manure stockpile pad with backstop, which is suitable for a small stable. Use a tarp or other cover to minimize leachate production from precipitation.



**Storage
&
Composting**



Basics of Composting

- **Now what?**
 - Let your pile cure until it reaches ambient temperature
- **Nutrient considerations**
 - Stable source of N
 - ~20% available vs. 50% in fresh manure
- **Spread at agronomic rates as fertilizer.**

Harrowing Pastures

- What's your environmental situation?
- Dragging breaks up the piles and exposes everything to heat which should lead to load reduction
 - This works if you're in a hot environment
 - Remember, warmth and moisture work against this and can cause a huge infective load all over the pasture that the horses can't get away from!

Management Practices to Reduce Parasites

- Remove manure daily from stalls and run-ins and weekly (or more frequently) from paddocks and pastures or rotate pastures
- Be sure pastures and paddocks are well-drained and not over populated.
- Use a feeder for hay and grain and avoid feeding on the ground.
- Keep water troughs and feed bins clean.
- This may include regular manure checks and a deworming program tailored to the needs of your horses.

Review

- Routinely examine horses for telltale signs of infestation.
- Understand what fecal egg counts are used for and how to collect a sample.
- Establish a parasite prevention and monitoring program with your veterinarian.
- Implement fly control programs.
- Think about where your manure stacking area will best be located.
- Compost manure rather than spreading it on fields where horses graze.

Resources



- **NDSU Livestock Environmental Mgmt. Spec.**
 - Mary Keena, Carrington Research Extension Center, 701-652-2951
 - mary.keena@ndsu.edu, www.facebook.com/ndsulem, www.twitter.com/ndsulem, @ndsulem
- **Manure Management Webinar:**
 - <https://www.ag.ndsu.edu/lem/horse-management-webinars>
- **eXtenion Horse Learning Community**
 - <https://horses.extension.org/horsequest-learning-lesson-horseexploration/>
- **NDSU Extension Composting Animal Manures**
 - <https://www.ag.ndsu.edu/publications/livestock/composting-animal-manures-a-guide-to-the-process-and-management-of-animal-manure-compost>
- **American Association of Equine Practitioners**
 - https://aaep.org/sites/default/files/Guidelines/AAEPParasiteControlGuidelines_0.pdf
 - <https://aaep.org/guidelines/external-parasite-and-vector-control-guidelines>

Webinar Q & A

1. Can any vet clinic do the FEC and guide me to use the proper wormer?
 - A. Yes! All vet clinics are set up to do FEC. They should be able to identify the parasites in their system and recommend a dewormer for your horses load.
2. When should foals be wormed for the first time?
 - A. The mare should be dewormed before foaling. Otherwise the foal should be at least 30 days of age before first treatment.
 - B. AAEP has some guidelines on page 17.
3. How effective/helpful are guineas and other birds when it comes to managing these insects?
 - A. Guinea hens are hunters of ticks, beetles, fleas and grasshoppers mainly. Other external parasites such as flies, and mosquitoes are in such large numbers that controlling it with a bird species isn't effective. The most common bird that would eat flies and mosquitoes would be barn swallows, though they sometimes turn into a nuisance themselves...