



Management Practices for Horse Farms that Aid in Control of Equine Parasites

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This time of year, we don't normally spend much time thinking about problems with flies or internal parasites of horses, but I suggest this is a good time to do so as it provides time to develop a plan to implement when conditions favor parasite development. In previous newsletters, we have discussed strategies to control internal and external parasites of horses. This is important not only for the comfort of the animal, but internal parasites can cause colic and other complications while flies and mosquitoes are the vectors responsible for transmission of many viral diseases that infect horses. In this article, I want to draw your attention to some management practices we can use that can help reduce parasite problems on your horse operation.

Since many equine parasites rely on equine manure, rotting feed, forage, and hay, as well as standing water to provide an environment for development, good sanitation practices are the most important methods of controlling parasites. These include proper management of manure, soiled bedding, and wasted feedstuffs as well as minimizing stagnant water available for insects to breed.

Routine manure management

The best recommendation for manure management is to develop a composting system as the high temperatures (130°F+) that are reached in the process will destroy both internal and external parasite larvae that infect horses. Although composting does require more labor and time than simply spreading manure across pastures, it does a better job in destroying parasites while producing a valuable soil amendment. The University of Massachusetts Extension Service has a brief guide (3) on composting that will work well for owners with a couple of horses. The Michigan State University Extension Service has more in-depth information (7) on developing a composting structure and plan for larger farms.

Horses shed internal parasite eggs through the feces, and these parasites begin their journey to adulthood from there with various stages of the life cycle occurring in the manure and on pastures (Figure 1). Using the small strongyle as an example, Table 1 shows how ambient temperature impacts the development and survival of different stages of the parasite. Exposing these stages to high temperatures and low moisture levels by physically breaking up the fecal balls by drag-harrowing pastures can reduce parasite survival. However, this needs to take place in the hot summer

temperatures and horses should not be grazing pastures when the manure is spread as this will likely increase the chance of infection. The ideal situation would be to keep horses from a pasture where equine manure has been spread for at least one grazing season to allow the equine-specific parasites to die before horses return to grazing there. Alternatively, the pasture could be grazed by a non-equine animal (cattle, sheep, goats, etc.) as the most common equine internal parasites are host-specific (6). If horses cannot be removed from grazing the pasture after spreading uncomposted manure, then spreading that manure on pastures used for other livestock, fallow ground, or composting the manure is advised.

Many species of flies also rely on moist manure and decaying organic matter (wasted hay and soiled bedding) as breeding grounds. The life cycle of these flies is measured in days. For example, under optimal conditions the house fly can grow from egg to adult in about 10 days. Therefore, it is important that fresh manure be removed, and properly disposed of, from barns and corrals at least every 4 to 5 days during warm, summer months to disrupt fly development. In colder, winter months that do not favor fly breeding, the disposal schedule can be less frequent. In instances where manure cannot immediately be added to the compost system or spread over suitable ground (weather delays, etc.), it has been recommended that covering the manure pile with plastic film or a tarp will reduce filth fly development (5).

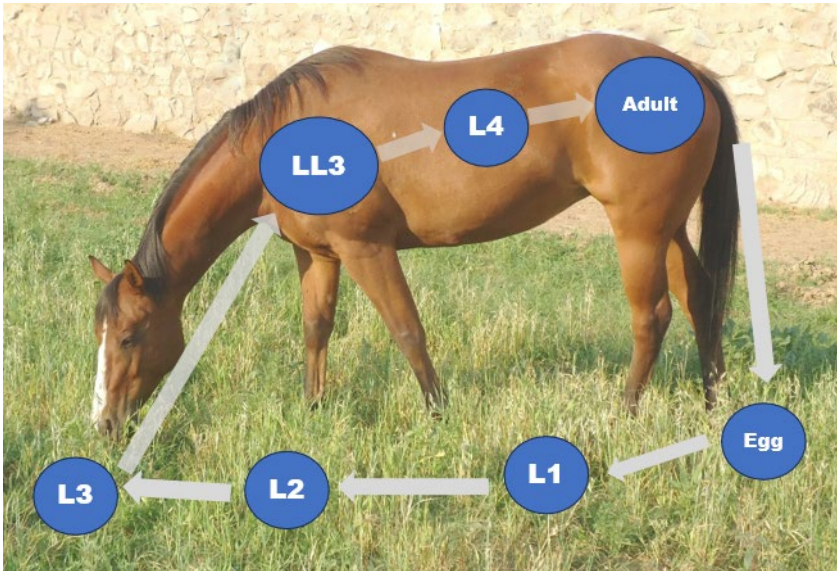


Figure 1. Small strongyle parasite life cycle. Specific developmental stages occur within the horse and on the forage environment. Adult females in the cecum of the horse produce fertilized eggs which are excreted in the feces to contaminate the grazing area. These eggs then hatch into the first-stage larva (L1). Within the feces, the L1 develops into the second-stage larva (L2), and then into the third-stage larva (L3). The L3 migrates from the feces onto the forage where it is ingested by the horse. Within the horse, the L3 develops into the late L3 (LL3) stage, the fourth-stage larva (L4), and then into the fifth-stage (L5), or adult, that produces eggs.

Pasture Management and Grazing Plans

Good pasture management is a constant challenge on many equine operations, but it is worth the added time and effort. It not only promotes forage health, but it can also have benefits in parasite control. Horses are known to be selective grazers and show “avoidance behavior” where they avoid grazing in areas where they defecate when they have a choice. This behavior becomes evident when we look at pastures and can observe “lawns” and “roughs”. The lawns are the closer trimmed areas

where they graze higher quality regrowth of the grass, and the roughs are those taller, more mature plants that inhabit the areas where they normally defecate. As parasites migrate from the fecal balls to complete development, this behavior helps the horse avoid ingesting larger loads of parasites. Some lines of thought promote mowing pastures to minimize the rough areas to distribute the grazing more evenly across the pasture. As flies, mosquitoes, and other external parasites may use the rough areas as cover to congregate, there may be times when it is beneficial to mow the roughs for the purpose of minimizing external parasite habitat. However, encouraging grazing in the rough area may increase ingestion of internal parasite larvae. Therefore, mowing rough areas (and drag-harrowing fecal piles) might best be done when horses are removed from a pasture followed by a long period of rest or grazing by non-equine livestock so that the level of internal parasite infection can be reduced prior to any follow-up grazing by equines.

Proper stocking density, or number of animals per acre of pasture, is important in maintaining the health, quality, and production of the forage in the lawn areas. Developing internal parasites tend to live in the “thatch” layer near the base of growing plants to take advantage of the higher moisture in this area. If pastures are overstocked, then the lawns are grazed extremely close such that horses are grazing closer to that thatch layer where they may ingest more parasites. In extreme cases of overstocking, the lawn areas may have a high degree of fecal matter which further increases the likelihood of ingesting more parasite larvae (Figure 2).



Figure 2. Example of an overstocked pasture where there is little distinction between the lawn and rough areas which increases the likelihood of horses ingesting internal parasites.

Another use of grazing plans involves grouping horses based upon the number of parasite eggs that they shed in their feces. It has been estimated that 20% of the horses in a herd are responsible for

80% of the strongyle eggs shed into the environment (6). This can be determined by performing a fecal egg count (FEC) test on each horse. The 2019 AAEP guidelines (2) suggest the following categories based upon FEC results: low shedders have less than 200 eggs per gram of feces (EPG), moderate shedders are in the range of 200 to 500 EPG, and high shedders excrete more than 500 EPG of feces.

In developing a grazing rotation plan, low shedders would graze the cleanest pastures first since they excrete the lowest number of eggs onto a pasture. As the rotation proceeds, the moderate shedders would graze after the low category, and the high shedders would follow the moderate group. Another approach might be to simply group horses into the above categories and have them graze separate pastures knowing that the higher shedding groups will be ingesting more parasite larvae. In the absence of FEC test results for horses, a manager might group horses simply according to age. Generally, horses less than three years old do not have the level of immunity to internal parasites that is found in horses aged four and over. Consequently, these young horses are likely to be in the high shedder category, and they can be grouped and grazed separately from older horses. The primary goal of this approach is to minimize the ingestion of parasite larvae by those horses that are in the low shedding category, so they do not need to receive deworming as often as those in the higher shedding categories.

Table 1. Effects of temperature on the free-living stages of strongyles. The red boxes indicate temperatures that inhibit development and/or survival, green boxes identify temperatures that favor parasite existence, and the orange box shows the range that favors development, but not survival.

Development	Temperature Range (°F)	Survival
No development occurs above this level.	> 104	Free-living stages die rapidly. L3 stage may survive for some weeks inside intact fecal balls.
Optimal range for egg and larvae (L) development to reach L3 stage (infective) in as few as 4 days.	77 to 91	Larvae may survive for a few weeks, but temperature is too high for long-term survival.
Eggs develop into L3 within 2 to 3 weeks.	50 to 77	L3 can survive for a few months.
Development takes several weeks to a few months.	43 to 50	L3 can survive for many weeks and months.
At temperatures below 43, eggs don't hatch, and development doesn't progress.	32 to 43	At temperatures slightly above 32, eggs and L3 can survive for several months.
	< 32	Non-embryonated eggs and L3 can survive for several months; developing larvae (L1, L2) die.
	+/- 32	Repeated freeze-thaw events diminish egg and larval survival.

Modified from: AAEP Internal Parasite Control Guidelines. 2019.

Practices for Stabled Horses

For horses maintained in stables, more routine care and inspection allows for management to be implemented at the individual level. It is good practice to regularly inspect the horse and its surroundings for parasites while completing tasks such as grooming and stall cleaning. While grooming, a bot comb or knife can be used to remove bot fly eggs from the haircoat which will minimize ingestion of the larva by the horse. If ticks, mites, or lice are discovered, then appropriate

treatments can be applied. The AAEP External Parasite and Vector Control Guidelines (1) is an excellent resource for selecting appropriate treatments for horses suffering from external parasites. As mentioned above, routine removal, and proper disposal, of manure and wasted feed from stalls at least every other day, if not daily, will help disrupt the life cycle of parasites. If flying insects are a nuisance, then owners should consider fly sheets, masks, and leggings as other options that complement the use of insecticides and repellents on their horses.

Other Complementary Practices

Reduce standing water which provides an area where mosquitoes or filth flies can reproduce. This includes draining water from any item that can hold water (e.g., old tires, flowerpots, children's toys, etc.). Filling low spots or creating a sloping grade around water sources will help minimize standing water in these areas. Tanks or other water sources for animals should be cleaned at least once per week to prevent mosquito growth. When the water source can't be "cleaned", use of an approved larvicide, such as *Bacillus thuringiensis israelensis*, can reduce mosquito numbers. To further minimize the risk of exposure, coordinate riding or turn-out times outside of peak mosquito activity, which is normally around dusk and dawn, and avoid turning on lights in the stables during the evening or overnight period.

The use of parasitoid wasps to control certain filth flies, such as house and stable flies, on horse farms has become popular in recent years. However, the successful suppression of flies with this method has shown mixed results. These wasps deposit eggs into the fly pupa, and the developing wasp kills the host fly as they develop. For a more thorough understanding on the use of parasitoid wasps, the report by Machtinger et al. (2015) is recommended reading.

Conclusion

As with any management practice, application of these suggestions will require more thought and labor to carry out than choosing not to implement them. However, these best practices are routinely recommended as the most effective non-chemical means of controlling parasites on the horse farm. Now is a good time to give thought to how you might make use of these recommendations before the warmer months are upon us.

References and Further Reading

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