

Fecal Egg Count Interpretation Document:

Attached to this document you will find the results of the fecal egg counts for the samples that you submitted to the Parasitology laboratory at Virginia Tech as part of Northeast SARE project LNE19-381

The procedure we are using for the fecal egg counts (FEC) is the Modified McMaster procedure, the most commonly used method for evaluating small ruminant fecal samples. As you look at the results, here are some things to keep in mind:

Fecal evaluation of eggs of gastrointestinal nematodes (GIN) is useful for assessing parasitism in animals and, in the case of barber pole worm, we know that in general, the more eggs there are in the manure the more worms there are in the stomach. But there are several factors that affect the accuracy of FEC:

- Parasite eggs are not necessarily evenly distributed in the animal's manure and we are only looking at a very small portion of the total daily output.
- A number of GIN produce eggs that look like barber pole worm eggs so we can't know exactly which species we are looking at (on your report they are called **strongylid** eggs). In the late summer we expect the large majority of the eggs to be from barber pole worm. The other GIN making similar eggs aren't nearly as prolific as barber pole worm (for more information on these worms see the footnote section at the end of this document).
- FEC only allows us to see evidence of adult, egg producing worms. We ask for samples in the late grazing season as this is when we expect the population of egg producing adults to be highest. During the winter, barber pole worm and others in the strongylid group can be found in animals, but they are in a larval stage and not producing eggs so a FEC would not be helpful in evaluating susceptibility to parasites.
- **We would like to stress that animals cannot be truly compared unless they are managed in exactly the same way and are exposed to the same parasite challenge (they should be on the same pasture).**

As there is a heritable component to susceptibility to parasites, we are hoping that you are doing these fecal egg counts on young stock to help you make selection decisions. We also are asking that you FAMACHA[®] score your animals at the same time that you take the fecal samples because it is the combination of the two that will help you make the best selections for susceptibility to parasites.

For example, you may have 2 lambs with a FAMACHA[®] score of 1 (not anemic), but one has a much lower FEC than the other. The lamb with the low FAMACHA[®] score of 1 and the low egg count is more likely to be resistant—its egg count is low because it is better able to limit the number of worms present. This is the animal that would be considered more parasite resistant. The low FAMACHA[®] score in the animal with the higher egg count means that the animal is resilient and able to tolerate a higher worm burden without adverse effects, however it can still, very happily, contaminate your pastures.

So how much of a difference in egg counts is needed to say an animal is more or less resistant? You need a big difference—remember we said that the McMaster test is not 100% accurate in reflecting the number of parasites in an animal. It is very important to have adequate numbers of eggs in order to make a comparison. If all your egg counts are less than 1000 epg you will not be able to make an accurate comparison. With small groups of animals there may not be obvious differences.

In this table of FEC from randomly sampled lambs in August there are not meaningful differences:

Lamb #	Strongylid Eggs/g
64	1150
105	750
120	1650
89	1050
116	850
88	2000
108	900

It becomes easier to evaluate animals when 2 fecals are carried out on each animal. In this next example you can see that there is greater variation among animals and it can be seen where animals are consistently higher or lower.

Lamb #	Strongylid Eggs/g July	Strongylid Eggs/g August	FAMACHA SCORE	
101	50	NS	1	More resistant
110	3000	6000	4	More susceptible
192	500	400	1	
64	600	1150	2	
105	800	750	2	
120	500	1650	3	
89	350	1050	2	
95	1000	4050	4	More susceptible
116	300	850	1	
100	500	1900	3	
75	150	100	1	More resistant
88	100	1050	2	
108	400	900	3	

On your results you may see IS which means “insufficient sample” or NS which means “none seen”. But if one animal in the herd has parasites, assume that they are all exposed and probably have some even if it says none seen.

FOOTNOTE: Strongylid nematode worms (GIN)

All the worms described below contribute to the clinical syndrome known as Parasitic Gastroenteritis (PGE). While we associate barber pole worm with the anemia and bottle jaw seen in the summer months, the presence of other parasites doesn't help the animal, and contributes to a burden of worms that the sheep or goat host has to deal with.

Haemonchus: This is the barber pole worm. It lives in the abomasum (true stomach) and feeds on host blood. It is the most important member of this group of parasites in the eastern U.S. The larval stages of this parasite do best on pasture under warm, humid conditions and large numbers can lead to heavy worm burdens in susceptible animals causing anemia and loss of condition. The most severely affected animals may die. This parasite is very successful and very common and it is reasonable to assume that virtually all grazing small ruminants are exposed to infection in the summer.

Teladorsagia: (also called *Ostertagia*): This is the brown stomach worm and is another parasite of the small ruminant stomach that is better adapted to cold weather than *Haemonchus* and would be expected to be more important during the cooler seasons of the year. Large numbers of parasites can cause diarrhea and loss of condition.

Trichostrongylus: Small ruminants can be infected with several species of *Trichostrongylus*. One common species lives in the stomach and others are found in the small intestine. This worm genus has broad environmental tolerance and can be found in hot summer weather. Heavy infections can cause diarrhea and condition loss in some situations. Very heavy infections could be fatal in susceptible animals.

Cooperia: This is another small intestinal parasite, but it usually is not considered to be a major player in causing clinical disease.

Oesophagostomum/Chabertia: These are 2 different worms that live in the large intestine. Heavy worm burdens could cause diarrhea and poor condition, but they rarely present in large enough numbers to be associated with clinical signs.



This information sheet was developed by Anne Zajac, DVM, Ph.D. and Roger Ramirez-Barrios, DVM, MS, PhD, Parasitologists at the Virginia -Maryland Regional College of Veterinary Medicine / Virginia Tech and Katherine Petersson, Ph.D, Animal Scientist, Department of Fisheries, Animal and Veterinary Science, College of the Environment and Life Sciences, University of Rhode Island. September 2016 (revised April 2021). This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, through the Northeast Sustainable Agriculture Research and Education program under subaward number LNE19-381 and NIFA Hatch Project 1007290. URI provides equal program opportunity.