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"Interpretation of Fecal Worm Egg Counts in Sheep, Goats and Camelids using the Modified Wisconsin Sugar Flotation Technique"

Understanding the meaning of worm egg counts will provide veterinarians the necessary insight needed to help clients build a deworming strategy for a particular operation or operations. Factors that affect fecal worm egg shedding are numerous so a number of these factors need to be considered every time an analysis is made and a fair assessment of the worm egg counts generated. The age of the animal, the season of the year, the amount of exposure to pasture and the stocking rate of the animals on pasture all affect worm egg counts. The amount of rainfall or moisture on the pasture and the number of degree days with temperatures sufficient to promote parasite development on pasture are also very important to future infections. These factors directly affect egg count interpretation as infection levels build on the pasture and ingestion of these larvae increases and worm burdens rise in the animals themselves. Furthermore, the health of the animals, the stage of gestation, stage of lactation, and the numbers and type of parasites present at each examination must be considered. Post-lambing worm egg counts, for example, are almost always higher than pre-lambing counts.

The five most common types of internal nematode parasites in sheep and goats that are routinely diagnosed present in fecal exams are: Stomach worms (primarily the barberpole worm - *Haemonchus* sp.), Intestinal worms (*Cooperia* sp.), threadworms (*Strongyloides sp.*), whipworms (*Trichuris sp.*), and Nodular Worms (Oesophagostomum sp.). All eggs are counted and included in the worm egg count total except for tapeworms and coccidia. Tapeworms and coccidia are commonly found but are listed on the worm egg count forms simply as positive at a low level (+) 1 to 10 eggs, medium level (++) 11-50 eggs or high level (+++) 50 eggs or greater.

One egg/gram equals 454 eggs/lb of manure, i.e., a count of 500 equals 227,000 eggs/lb. of feces so 5.0 lb. of feces per day would yield 1,100,000 eggs per day on the pasture per animal.

1). Quick Assessment for Sheep, Goats and Camelids Based on Fecal Worm Egg Counts:

	Eggs/gram Count	**Estimated Parasite Level**
Nematode Egg Counts Recorded on sheets:	**1-10 eggs**	**low**
	11-50 eggs	**Moderate**
	50+ eggs	**High***
	300+ eggs	**Very High***

- **At this level, it appears that parasites begin to stop developing and undergo inhibition in tissues.**

Positive worm egg counts for sheep and goats (other than very high counts) for the most part only indicate the presence or absence of parasites within a particular animal. It is impossible to determine how many parasites are present at any given time primarily because *Haemonchus* undergoes a phenomenon called inhibition or period of arrested development. This parasitic stage remains in the tissues for long periods of time and follow an annual development and inhibition cycle. The primary inhibition period begins about 45-60 days into a grazing period as the parasite contamination level on pastures build-up. These inhibited larvae can stage in the tissues through the beginning of the following grazing season.

The overall infection process begins when an infected animal grazes a pasture, it sheds worm eggs on a daily basis that pass in the manure. These eggs hatch and the larval offspring develop into infective larvae which re-contaminates the pasture thus exposing all animal grazing this pasture to new infections. If the pasture is already contaminated with infective larvae, the animals pick up new infections at the same time they shed eggs back on the pasture contributing a future contamination levels. This process continues until the grazing season ends. Depending upon temperature and moisture these parasite eggs hatch, develop into infective larvae and move away from the manure pats onto the vegetation where the reinfection process begins. The biggest and least understood issue with sheep and goats is that once *Haemonchus* infections reach a high level, the physiology of the gut changes. The parasites respond by stopping their development undergoing an arrested development period waiting for the physiology of the gut to return to normal. This why the simple guide (listed above) to predict parasite levels within an animal based on worm egg counts can be misleading.

The time of the year when the assessment is made can also have an impact on worm eggs as follows:

1). Winter: As winter progresses animals are no longer ingesting infective larvae off pasture, existing worm burdens begin to mature and die off as they age, conditions in the gut then start to return to normal which, in turn, triggers inhibited parasites to become active. If counts come back following treatment, this means inhibited are present or if worm egg counts are high during the winter these counts indicate that heavy worm challenge existed from the previous season.

2). Spring: When inhibited larvae are being released form the gastric glands; egg shedding can reach a high level which indicates the presence of high worms burdens carried over from the previous season. High egg shedding levels at this time is dangerous because egg shedding in the spring determine contamination levels for the rest of the year.

3). Summer: Once animals are on pasture and grazing begins, worm counts will begin to rise within three weeks. Once egg counts exceed 100 eggs/gram (45,400/lb of manure) worms burdens have reach a point when incoming larvae undergo arrested development and become inhibited larvae in the gastric glands of the abomasum.

4). Fall: The quick assessment chart (listed above) in most accurate in the fall at the end of the grazing season. Low counts indicate successful control of worm burdens while high counts indicate economic loss may be occurring and trouble controlling these infections due to inhibited worm burdens may be occurring.