History:
MINKA Farm is an approximately 100 acre farm that was obtained by current owners, Kimberly and Brian Harry, in late 2007. The Harrys currently have approximately 100 head of mixed Angus, Horned Hereford, Senepol, and Gelbvieh crossed cattle that are entirely grass fed and range in age from <1 month old to 11 years old. They are both a cow/calf and finishing operation. The Harrys initially finished the cattle on grain before converting to an entirely grass fed operation. Other residents at the farm besides the cattle include goats, sheep, ducks, cats, dogs, horses, donkeys, chickens, and turkeys. The farm has recently become an American Grassfed certified producer.

Cattle on site are identified through an ear tag system consisting of a letter-number designation. A letter indicates birth year, and a number is assigned to each animal. Males are given odd numbers, and females are given even numbers.

Only four cows were bred this year as the owners are trying to switch from a double breeding season--calving in both the spring and the fall--to calving only in the spring. The previous year's double breeding season produced 35 calves with a loss of three, two stillborn and one to angular limb deformity. The calves are normally not weaned for approximately nine months, but there is no standard procedure. The owners do not own a scale to measure production parameters so they estimate based on visual assessment, but most of the cattle are ready between 30 and 36 months. The cattle are given a clostridial vaccine (Ultravac 7) and a BVD vaccine (Cattlemaster) twice per year. Previous testing for BVD (ear notching) and Johne's disease has been negative. The dogs on the farm are treated with a topical product (most likely Revolution) to control any endo- or ectoparasites as well as annual vaccinations. The cats on site are also vaccinated.

Parasitology History:
The cattle are rotated throughout numerous pastures based on grass height. Initially, the cattle were dewormed twice yearly but are now dewormed sporadically (approximately once per year). They were last dewormed in October 2012 with an albendazole product. The bulls housed on site were not dewormed at that time or in the time in between. For parasite control, the previous owner of the farm used almost exclusively a pour-on ivermectin product. When the cattle have had problems with face flies and horn flies in the past, the Harrys have used a topical pyrethrin product (Atroban 11). In 2011, a fecal sample was submitted to Rollins for diagnostics. Samples included were from two approximately one year old cattle, one male and one female. Results showed evidence of few or very few Eimeria, Monezia, and strongyle-type eggs. The results also indicated negative for Giardia and Crypto.

There are 17 total pastures on the farm with approximately 7-11 acres per lot, and most pastures are a mixture of fescue and clover. There is a stream in pasture 18 as well as two ponds that are accessible during rotation. Over the winter season, the cattle were kept on pasture 18. Currently, the farm's two bulls are located in pasture 1. The remaining cattle (cows, calves, and steers) were located in pasture 10E previously but were moved to pasture 11E the day prior to our visit on 5/1/13. The owner informed us that the group would be moved to pasture 11W after we left the farm. The bulls and remaining cattle are kept separate from one another outside the breeding season (May 15th - August 15th) when they are split into three groups: two smaller groups of about 15 cows each paired with a bull and then the remaining cattle. The small ruminants are not

housed with the cattle and are used mainly for “weed control” in cleaning up the pastures.

Sample collection:
Fresh fecal samples were taken from the cows, calves, and steers in pasture 11E. The animal was identified when it defecated, and a sample was collected and labeled with the ear tag number. Several anonymous samples were taken from pasture 11E as well. A fecal sample was also taken from pasture 2S, which one of the bulls was housed in the day prior to our visit.

Testing:
Samples were processed using a double centrifugation technique. Strongyle-type eggs were observed and quantified via microscopic examination and the total eggs per gram calculated. Any additional ova or parasites were also noted and quantified.

Fecal Sample Results:

MAIN HERD						
AGE	**ID**	**Strongyle Type Eggs (EPG)**	**Coccidia**	**Strongyloides**	**Monezia**	**Nematodirus**
2.5 months	A1	3	Negative	TNTC	0	0
6 months	Z42	24	Positive	Few	0	Few
6 months	Z43	300	Positive	Moderate	0	Moderate
6 months	Z45	1	Negative	0	0	0
7 months	Z36	13	Negative	0	0	Few
7 months	Z37	2.5	Negative	0	0	Few
11 months	Z13	12	Positive	0	Few	Few
1 year	Z2	7	Positive	0	0	0
1 year	Z4	1	Negative	0	0	0
1 year	Z11	16	Negative	0	0	Few
1.5 years	Y13	0	Negative	0	0	0
2 years	Y1	2	Negative	0	0	0
2 years	Y3	0	Negative	0	0	0
2.5 years	X27	0.5	Negative	0	0	0
2.75 year	X21	0	Positive	0	0	0
3 years	X6	5	Negative	Few	0	0
4 years	W4	6	Negative	0	0	0
4 years	W10	0	Positive	0	0	0
>5 years	9	5	Negative	Few	0	0
BULL PEN						
4 years	-	0	Negative	0	0	0
RANDOMIZED PASTURE SAMPLES						
	1	22	Negative	0	0	0
	2	0.5	Positive	Few	0	0
	3	0	Negative	0	0	0
	4	2	Negative	0	0	0

Recommendations:
Considering the very low levels of nematode eggs found in the fecal samples collected from cattle of Minka farms, we believe that under efficient and well orchestrated pasture rotation that the use of anthelmintics can be greatly minimized and possibly discontinued. The biggest advantage of the farm is the considerable acreage and extensive fencing separating multiple pastures that are suitable for grazing.

The nematodes of greatest concern are *Ostertagia and Cooperia spp.*, which are both members of the Trichostrongyloidea superfamily. They cause decreased weight gain, anorexia, and diarrhea, which all negatively impact beef cattle operations. Both these parasites have three week prepatent times--period between infection and shedding of eggs--and once eggs are shed they require one to two weeks to develop into infective stage 3 larvae on the pasture. The development of infective larvae depends on the temperature and humidity of the environment (under optimal conditions of 80ºF and high humidity development takes only one week, but it is more likely to take closer to two weeks under pasture conditions). The infective larvae can survive on pastures for three to four months again depending on their environment. The hotter the temperature and greater exposure to the elements decreases the survivability of the larvae. Using the numerous pastures available for grazing and knowledge of the life cycle of these nematodes, we could effectively eliminate any impact on weight gain. At this point in the season, those cattle affected acquired their parasites mostly during their time on the winter pasture in which they were confined to a single area for an extended period of time. The confinement facilitated the spread of the parasitic infection by limiting the ability of the cattle to avoid the infective larvae by switching pastures as well as increasing the density of the infective larvae on the pasture. Now that it is spring, rotating the cattle to different pastures every two weeks would prevent them from inhabiting the same pasture at the same time as infective larvae. Then, considering the extensive land available, not returning the cattle to that pasture for three to four months would allow the parasite load to drop dramatically. It is also advisable to leave pasture 18 ungrazed for the summer to ensure all nematode eggs that collected over the winter to hatch and die.

Generally, only a small percentage of the herd, 15-20%, and only the younger cattle, less than one year old, will harbor significant strongyle infections. It could be warranted to deworm select cattle if fecals are done periodically to monitor herd and pasture health. Sporadic testing focusing on the young calves would increase the likelihood in detecting the persistent egg shedders. Moreover, not checking egg counts routinely to monitor the success of the pasture rotation could lead to unexpected increases in nematode eggs on pastures and lead to an uphill battle against high worm burdens. Cattle caught with higher than average egg counts, like Z43, could be dewormed to eliminate them as a future source of contamination.

The youngest calf of the herd sampled, A1, had high levels of *Strongyloides sp.* eggs, and calves Z43 and Z42 had lower levels. These parasites invariably came from its mother's milk and/or skin penetration from the winter pasture. These are normally of no concern and require no treatment in either the mother or calf. It is likely that all nursing calves have this parasite and show no clinical signs. Usually the parasite will only cause clinical symptoms in two week to two month old nursing calves with heavy burdens. Clinical signs include diarrhea and congested lung sounds due to larval migration.

Nematodirus spp. eggs were detected on fecal examination, and they are not of any clinical concern in cattle at the levels indicated by the epg. However, high levels of *Nematodirus* eggs on the pasture of grazing sheep can lead to severe enteritis due to the synchronized emergence of infective stage 3 larvae called a “larval storm” in early spring (string of warm days after the winter).

Coccidia spp. were also detected in many fecal samples, but the levels detected were not worrisome considering the lack of clinical disease in the cattle. Many cattle carry the protozoa without any detriment, and we do not believe any action needs to be taken to eliminate it.

The owner’s plan to go to spring calving should minimize exposure of the susceptible 2 to 3 month calves to trichostrongyle infective larvae that may accumulate on the winter pasture. The level of exposure on this pasture has no significant impact on calves greater than 5 months of age as indicated by the results reported here.