REEDY FORK DAIRY FARM

History

The Reedy Fork Farm is set on 600 acres and houses both a feed mill and an organic dairy operation. The feed mill was started in 2007 when the dairy transitioned to organic, and they began providing feed for all Organic Valley farms in the region. Currently, they are marketing more chicken and goat feed than cow feed, and they are selling primarily to feed stores for people who have backyard laying hens. They produce three different chicken ration formulations (starter, broiler, and layer) in both soy and soy-free varieties. Since they have been producing chicken feed at their mill, they are considering acquiring 400 laying hens to test the balance of the organic rations within a pasture-based rotational system. Once they have this system in operation, the chickens will "graze" behind the cattle, but currently there are no other species that share pastures with the cattle. The mill tries to provide organic grain for their own dairy, but they unfortunately do not have the acreage or time to produce the quantity of grain needed to be self-sufficient and so must purchase some from other Organic Valley producers.

The Reedy Fork herd is primarily a closed herd, although new animals are occasionally brought in from another dairy. Breeding is done using live cover bulls, and bulls are rotated out after their productive lifetime or rotated to bring in new genetics to the herd. Right now they have both a Holstein bull and a Jersey bull; previously they had a red Holstein bull that sired calves with large body size which led to some calving difficulties for the Jersey crosses. Some new animals were brought in about a month ago, and their quarantine protocol is 3-4 days in a separate lot (dry cow lot) before introducing them in with the rest of the herd. They usually only buy animals from trusted dairies where they know that they can go see the animals and ensure they appear visibly healthy before purchase.

Calving on the farm is somewhat seasonal, with peak calving season occurring during the fall and winter. However, they are hoping to shift this towards occurring later in the spring to coincide with the growth of their pastures. The calf area is only used for dry cows while the land is resting between calving seasons. When a calf is born, it stays with its mother for 2 days to drink sufficient colostrum before being moved to an individual calf stall. The fresh cows are still milked out to obtain any residual colostrum and milk and this is fed directly to the stall calves on an individual basis, along with free access to calf starter grain. They do not have a system for efficient group feeding of milk yet, but they are working on acquiring one in the future. Calves are disbudded and castrated usually within 1 week of life. After 2-3 months in the calf stall, the new calves are weaned at 2-3 months and kept in a mixed-calf group on pasture. Calf stalls are then allowed to "rest" and the bedding is composted and spread onto the fields. The calf stalls are also Lymed as a sanitation measure. From 6-11 months of age, they are then kept on a different mixed group pasture (currently holding 45 calves between 6-7 months old and 13 calves that are 10-11 months old) and are given supplemental grain about 1-2 times weekly.. They will stay on this pasture until they are 1-1.5 years old (or until breeding age/proper weight) when they are moved to the "heifer pasture" where the live cover bulls are kept.

Pasture rotation for the 85 milk cows is as follows: polywire is used to section off grazing paddocks for the cows, and these animals are usually kept in a paddock for 1-4 days depending on grazing rate and the height of the grass. Pastures are then allowed to rest for 4-5 weeks before being grazed again, depending on the rain and weather. Forages grown on the farm include: oats, fescue, Marshall Ryegrass, red clover, sorghum Sudan grass, and triticale. They cut hay from

their own pastures to put up for the winter, but sometimes they have to obtain hay from other sources.

The farm has not used dewormer since 2013, however they have been adding diatomaceous earth in the feed. They also add supplements including: cow salt, North Atlantic kelp, molasses, and a premixed mineral supplement to the milk cows in their grain and soybean ration. Fly control protocols for the heifers and calves include predator flies on the pastures and peppermint fly spray for the horn flies. However the dairy cows can also walk through a fly vac set-up (installed by Wes Watson during initial research/design/testing phases of the equipment) which takes care of most of the horn flies. They have had some problems with blind quarters, possibly due to flies; however the presence of teat end/ and ventral abdominal lesions is relatively rare in this particular herd.

Results of Fecal Sample Collection:

ANIMAL ID	AGE GROUP	STRONGYLE-TYPE (reported as eggs/gram)	OTHER PARASITES NOTED IN SAMPLE
#582	Calf (born 3/28/14)	1 epg	none identified
#584	Calf	none identified	none identified
Pasture Sample 1	2-3 month olds	none identified	Coccidia (2+)
Pasture Sample 2	2-3 month olds	none identified	Coccidia (1+)
Pasture Sample 3	2-3 month olds	1.5 epg	Coccidia (1+)
#326	2-3 month olds	none identified	Coccidia (1+)
#575	2-3 month olds	23.5 epg	Coccidia (1+)
Pasture Sample 1	6-10 month olds	215.5 epg	Coccidia (1+) Nematodirus (2+)
Pasture Sample 2	6-10 month olds	766 epg	Nematodirus (1+) Nematode larvae**
Pasture Sample 3	6-10 month olds	152.5 epg	Coccidia (2+) Trichuris (1+) Nematodirus (2+)

Pasture Sample 4	6-10 month olds	99 epg	Coccidia (1+) Trichuris (1+) Nematodirus (1+)
Pasture Sample 5	6-10 month olds	205.5 epg	Coccidia (1+) Trichuris (1+) Nematodirus (1+)
Pasture Sample 6	6-10 month olds	309.5	Coccidia (1+) Trichuris (1+) Nematodirus (1+)
Pasture Sample 7	6-10 month olds	249 epg	Coccidia (1+) Nematodirus (2+)
Pasture Sample 8	6-10 month olds	165.5 epg	Coccidia (1+) Nematodirus (1+)
#542	6-10 month olds	25.5 epg	none identified
#567	6-10 month olds	65.5 epg	Trichuris (1+) Nematodirus (1+) Strongyloides (1+) Coccidia (1+)
#539	6-10 month olds	12 epg	none identified
#304	6-10 month olds	842 epg	Nematodirus (2+)
#310	6-10 month olds	190 epg	Nematodirus (1+)
Pasture Sample 1	1 year olds	7 epg	none identified
Pasture Sample 2	1 year olds	3 epg	none identified
Pasture Sample 3	1 year olds	0.5 epg	Coccidia (1+) Nematode larvae**
Pasture Sample 4	1 year olds	12 epg	Coccidia (1+) Strongyloides (1+)
Pasture Sample 5	1 year olds	168 epg	Coccidia (1+) Nematodirus (2+)
Pasture Sample 6	1 year olds	15 epg	Nematode larvae**

Untagged	3 wk old calf on heifer pasture	none identified	Coccidia (1+) Strongyloides (2+)
Untagged	Steer on heifer pasture	none identified	none identified
Untagged	Bull on heifer pasture	none identified	none identified
#747	Heifer	none identified	none identified
Pasture Sample 1	Heifer	none identified	none identified
Pasture Sample 2	Heifer	3 epg	none identified
Pasture Sample 3	Heifer	2 epg	none identified
#476	Heifer	1.5 epg	none identified
Pasture Sample 4	Heifer	1 epg	none identified
Pasture Sample 1	Cow	1 epg	none identified
Pasture Sample 2	Cow	1 epg	none identified
Pasture Sample 3	Cow	1.5 epg	none identified
Pasture Sample 4	Cow	0.5 epg	none identified
Pasture Sample 5	Cow	1 epg	none identified
Pasture Sample 6	Cow	none identified	none identified
Pasture Sample 7	Cow	none identified	none identified
Pasture Sample 8	Cow	none identified	none identified
Pasture Sample 9	Cow	none identified	none identified

Pasture Sample 10	Cow	none identified	none identified
Pasture Sample 11	Cow	0.5 epg	none identified
Pasture Sample 12	Cow	2.5 epg	none identified
Pasture Sample 13	Cow	none identified	none identified
Pasture Sample 14	Cow	3 epg	none identified
Pasture Sample 15	Cow	none identified	none identified
Pasture Sample 16	Cow	2.5 epg	none identified
Pasture Sample 17	Cow	none identified	none identified
Pasture Sample 18	Cow	1.5 epg	none identified
Pasture Sample 19	Cow	3.5 epg	none identified
Pasture Sample 20	Cow	1 epg	none identified
Pasture Sample 21	Cow	3 epg	none identified
Pasture Sample 22	Cow	0.5 epg	none identified
Pasture Sample 23	Cow	none identified	none identified

**Nematode larvae: freely-motile nematode larvae were noted in these samples. Under secondary inspection, these larvae were determined to be most likely free-living in the environment (environmental contamination of the collected samples) and should not serve as a souse of parasitic nor pathologic infection for these cattle.

Parasite Overview:

The most significant infection type noted was that with Strongyle-type ova. All members of the "Strongylida" order have this Stronglye-type egg. The two species of most concern in cattle are *Ostertagia ostertagi* and *Cooperia*. For these worms, the only source of infection is fecal-oral by way of infected pasture herbage. Hatching conditions from passing in the feces to first stage larvae are environmentally-determined: moisture, oxygen, and temperatures above 50°F. By planning to rotate cattle on pastures efficiently, one can decrease the parasite load on any individual field and reduce the worm burden in the herd. *Ostertagia* (aka: the "brown stomach worm") is the most important helminth that infects cattle. Infective larvae may either enter the abomasum and remain there as adult worms or enter the gastric glands and enter an arrested state. Signs of a high *Ostertagia* burden include: protein deficiency, anorexia, diarrhea, loss of body condition, or failure to thrive. Low egg counts do not necessarily translate to low worm burdens as these parasites may exist in an inactive state within the animal and not shed ova. Most infective L3 larvae are ingested during cool climate months, such as the fall and early spring. *Cooperia* is a second Strongyle-type worm that inhabits the proximal small intestine and is associated with enteritis in cattle. Signs are similar to those caused by *Ostertagia*. A fecal culture to acquire L3 larvae would be needed to determine the species of worm present. Cattle over the age of 2 years generally do not carry high Strongyle-type worm burdens.

Trichuris species (*T. discolor* in cattle) are present in the large intestine and cecum. Eggs passed in feces are highly environmentally resistant and long-lived. Low levels of *Trichuris* are not as problematic in cattle as they are in swine.

Nematodirus (*N. helvitianus* in cattle) are found in the proximal small intestine and, as they were present in low numbers in this herd, should not cause significant pathology. In high burden herds, this parasite could cause diarrhea, enteritis, and loss of body condition.

Strongyloides is an intestinal threadworm. Larvated eggs are passed in the feces. A host may be infected by either direct ingestion (may also transmit through colostrum) or by direct skin penetration. Rarely, clinical signs of anorexia, weight loss, and possible diarrhea may occur; however, this herd evidenced low *Strongyloides* worm burdens.

Coccidians found in the samples are a common parasite of cattle (especially calves); in low numbers they are not a species of concern. In some cases, watery diarrhea and "being unthrifty" may be associated with a more significant *coccidia* infection.

Results Summary and Recommendations:

Overall, the newborn to 3 month old calves show very low parasite burdens, however as *coccidia* are present, they should be monitored for signs of coccidiosis, especially immediately following weaning when they are under nutritional and environmental stress. Signs of *coccidiosis* include: diarrhea, dehydration, and general "poor doer" appearance (rough hair coat or slow growth).

Our primary concern is with the 6-10 month old mixed calf group. Trichostrongyle (*Ostertagia* and *Cooperia*) worm burdens for this group varied significantly, as did the overall

thriftiness and body condition of the group as a whole. Fecal worm eggs per gram ranged from 12-842 epg, with a majority of animals being above the acceptable cut-off of 100 epg for strongyle-type worm eggs in the feces of cattle. Since some, but not all, of these animals were identified, we would ideally want to target our treatment to those animals that show significant worm burdens; as the highest 20% of fecal egg shedders can be responsible for 80% of pasture contamination with worms. Of those animals we sampled that were identifiable, if any of the calves with the highest egg counts are bulls you may want to sell them or separate them from the others to get rid of the primary source of pasture contamination. However, since the pasture is presumably contaminated with strongyle-type worm eggs which will transition into infectious L3 larval stage, ideally you would want to move all of the calves to a new pasture followed by mid-summer move to yet again fresh pasture or pasture previously grazed by >2 year-old cows.

Calves in the 6-10 month age group are likely most-susceptible to higher worm burdens due to the fact that they are no longer in a grouping that allows for targeted feeding specific to their age group. This creates a competitive situation where the younger calves will fall behind the others which, when combined with the nutritional stress of being weaned from milk/grain to strictly pasture, makes them susceptible to worm infection. There were also other protozoa(*Coccidia*) and nematodes (*Trichuris, Strongyloides, and Nematodirus*) present that, while not present at a concerning level currently, should be considered as a reason to observe this group of calves carefully for signs of significant worm burdens (diarrhea, weight loss, dehydration, “unthriftiness”). It is recommended that the calves be moved to a different pasture, and if possible, that this pasture be sectioned to allow grouping the calves by age/weight for more targeted management and feeding, and further rotations to new pastures at mid-summer

The 1 year old calves showed relatively low worm burdens, with only one calf being above the 100 epg acceptable limit. We would recommend continuing the current management procedures with this group. In a few of the samples from this group, we noticed nematode larvae in the feces---however, as noted below the table, after further investigation these were deemed to most likely be inadvertent pasture contamination of the samples and are not believed to be pathogenic. The morphology of these particular larvae did not match the criteria for the lungworm *Dictyocaulus viviparous*, which was a concern in past years for this farm.

The heifer and breeding pasture and the milk cow pastures exhibited low parasite burdens, so the recommendation is to continue the current management strategies for these groups. Another option managing the 6-10 month calf pasture would be to use either the dry cows or the older, breeding-age heifers to “clean up” the affected pasture. Older cattle tend to have better immunity and can resist significant parasitic infection compared to calves. However, this must be done carefully to avoid spreading the egg contamination from your calves to all their new pastures, so an efficient rotation and resting protocol for pastures is highly recommended.