Early Lamb Weaning in a Pasture System to Reduce Summer Parasites and Chemical Dewormer Use

Final Report for FNC07-652

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Project Coordinator:

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Cline Family Farms

Project Information

Summary:

BACKGROUND

The Cline Family Farm is located in southeast Ohio near Albany and has been in the family since the late 1800's. From the time of the grant application process until the start of the project the farm went through some significant management changes. Due to the rising cost of inputs it was decided to let the hay production go and expand the sheep operation. Currently the farm has 250 ewes with plans to increase that number over the next few years until the maximum number of animal units is achieved to coincide with the farm without any detrimental affects to the land. Currently, the farm has 120 acres of pasture developed and is in the process of developing 50 more acres.

The Cline Family Farm knew about the positive impact sheep have on the environment and the positive effect it has on public perception for agriculture food production from past experience with raising sheep in the 1980's. When purchasing a commercial flock in the mid 1990's, the farm put into motion several sustainable practices. Most of the practices in the beginning were pasture development. Pasture use for livestock production is a must for most ruminant animals to help control input cost. There has been a lot of research done on the benefits of a grazing based operation along with the positive public perception grass fed animals have on the consumers.

The Cline Family Farm has used EQUIP (Environmental Quality Assurance Program) through the NRCS (Natural Resource Conservation Service) to install fence for pasture divisions, waterlines for drinking water for the livestock and a heavy use feed pad with a manure storage facility for winter time feeding. The farm also uses a GPS system for soil fertility management accurately placing lime and fertilizer only where needed at the variable rate required. During 2007 and 2008, The Cline Family Farm was recognized for these sustainable environmental practices by being awarded the Ohio Livestock Coalition Environmental Stewardship for sheep production, the American Sheep Industry award for Environmental Stewardship, and

most recently was awarded the Athens County Cooperator of the year from the Athens County Soil and Water District. It is a top priority for the farm to make day-to-day decisions that are sustainable to the future of sheep production as well as the farm's future generations.

With the past year's experience behind us, it is even more obvious the role grazing has in small ruminant animals' production on controlling rising input costs, as well as the political pressure livestock production is seeing across the nation from animal welfare groups. Grazing has advantages along with some disadvantages for small ruminant animals. The benefits range widely from lower input costs to manure distribution, but along with these advantages come some disadvantages. The single largest obstacle to deal with in a grazing system is the Haemonchus contortus (Barber poll worm).

The barber poll worm plays havoc on the sustainability of grazing lambs profitably. The traditional way to control the barber poll worm was the use of chemical de-wormers at regular intervals through the summer grazing period. However, with current trends pointing to a large number of flocks with heavy resistance to these chemicals a new non-chemical approach is needed if not a necessity to continue grazing lambs.

Lambs grazing pasture while nursing the ewe before weaning can become heavily burdened with internal parasites. The typical weaning time for lambs nursing on pasture is generally 90-120 days and sometimes longer. Pasture can be managed to help decrease this parasite burden, but the length of time until weaning (90-120 days) presents a challenge to the effectiveness of pasture management. It takes a minimum of 4 days in ideal conditions for a HC to go from the egg to the L3 development stage. The L3 stage is what is ingested by animals grazing pasture. One mistake on length of rotation or rainy/dry weather conditions that effect grass growth can undo weeks of work. The goal of this project is to reduce the length of time that lambs graze with ewes by weaning early at 60 days. This should make for more manageable and effective pasture rotation. Some shepherds believe that 60 days is too early for pasture raised lambs to be weaned without adverse effects on growth.

PROJECT DESCRIPTION AND PROCESS

Lambing season began in the barn the fourth week of February and continued till the fourth week of March. Lambs were selected for two groups, a test and a control that were the same age, born twins and were matched to include both whether and ewe lambs in each group. The goal for selection of study animals was to have both groups as similar as possible considering the reality of an on-farm study. In the past, the ewes lambed in the barn and were turned out to pasture as soon as pasture was suitable to graze and this year was no different. But that was where the similarities ended. The ewes with lambs were managed on pasture to follow the life cycle of the barber pole worm and were moved to a fresh pasture every 4 days. The thought behind this was the lambs are not born with parasites so the supply comes from co-grazing with the ewes during lactation on pasture. The ewes are shedding a high number of eggs on pasture due to their inability to handle internal parasites during lactation. If the lambs and ewes are moved within 4 days there should be no or a reduced number of L3 larva present for the lambs to ingest. The grazing began on April 2nd in a field with permanent mixed grass. No sheep had been grazed on this pasture since the fall of 2007.

It is widely believed that Haemonchus contortus has a low survivability over the winter months. It is also believed that cool temperature and low moisture has an effect on the lifecycle on the haemonchus. Low temperature was present in early April so pasture rotations went for no longer than 5 days. Temporary electro netting

was used to subdivide pastures to allow for the stocking rate and grass available to last for 4-5 days without over grazing. Lambs and ewes were grazed on permanent pasture until April 24th. They were moved to a field that was planted by a method of no-till to winter rye in November of 2007. Electro netting was used to maintain a reasonable rotation length due to forage available.

The FAMACHA system was chosen to monitor the lambs for anemia (a side affect of parasitism) as well as being a method of identifying a study animal in need of rescuing. The FAMACHA system uses a colored chart matched with the center lower part of the eyelid of small ruminants to measure the level of anemia. It is used in conjunction with the treatment of the small percentage of animals (usually around 20%) that carry the majority (usually 80%) of worms that shed eggs on pasture. Advantages of the FAMACHA system are that it decreases the frequency of treatment for the majority of the flock, slows the development of anthelmintic resistance, allows for identification of chronically parasitized animals and lowers cost associated with purchasing the drug by not deworming the entire flock. It is not without its disadvantages. It only will detect Heamonchus Cortortus infections, other causes of anemia do exist, animals must be closely monitored (every 7-10 days) which takes extra labor, and it can't be the sole component of the management program. The FAMACHA system was developed by Dr. Faffa Malan and is distributed under the auspices of The South African Veterinary Association. Distribution in the USA is through the laboratory of Dr. Ray Kaplan (University of Georgia).

On May 5th group 1 (red group) was weaned (60 days) and fecal samples were taken along with weights for each lamb in the group. Lambs were identified by ear tags given to them at birth so individual data could be collected. Once collected, fecal samples were taken to a trained veterinarian to determine eggs per gram shed for each lamb. To avoid a bias in study the lambs were not identified in groups but were identified as individuals so the veterinarian had no means of group identification The group of early weaned lambs went to a pasture that was seeded in the fall of 2007 with a grass and clover mix. This field has had no sheep grazing since seeding in 2007. Tillage was used to plant the grass so there should have been no existing larva or eggs present in these fields for the lambs to ingest. It was thought that the lambs should have no or very low contamination of haemonchus at this point and that levels should remain low if no larvae were present on the pasture. Group 1 was moved every 5 days within the field but to a different location to maintain a "Safe" grazing environment. Group 2 (blue group) was moved to a permanent pasture on May 5th, that was grazed in the Fall of 2007. This group was still nursing their mothers. The field was subdivided into sections to maintain a grass management system. Pasture rotations were maintained within that field until May 29th when they were moved to another permanent pasture where they grazed until June 1st.

The red group (early weaned lambs) was rotated within the newly seeded pasture with the protocol as described above to maintain a "safe grazing pasture" free from L3 larva of the haemochus contortus. On June 5th the blue (control) group was weaned. Fecal samples, Famacha scores, and weights were taken from both groups. Due to the wet weather experienced in the month of May, foot issues with both groups were noticed especially with the early weaned group. It was decided to keep the lambs in the dry lot for 7 days to treat their feet. Some lambs were removed from the study due to their feet affecting their grazing ability which would impact the data. Hay and grain was fed to both groups at this time.

On June 11th, both groups were taken back out to pasture. The red group (early weaned) was placed in the pasture that they had grazed when first weaned. This decision was made due to their very low FEC at weaning time. It was felt that the

pasture should be a safe grazing pasture. The blue group (control) was placed in a pasture that was a new seeding in the fall of 2007 and has had no sheep grazing since seeding. Both groups remained on the above mentioned pasture rotation to keep a clean grazing environment.

On June 23rd, both groups were brought in to the barn where fecal samples as well as Famacha scores and weights were taken for each lamb. They were returned to a pasture that sheep had grazed in March of 2008. The 4-5 day rotations were maintained until the project's end.

PEOPLE

Decisions on grazing rotations, intervals between Famacha scoring and animal welfare were made during the study based on FEC (fecal egg counts), Famacha scores as well as forages available. These decisions were made with the assistance of cooperators of the study. These people were selected for their known experience within their field. The Ohio State University Extension played an important role in the study. Dr. William Shulaw, OSU Extension Veterinarian for sheep and beef and Rory Lewandowski, Athens County Extension Educator helped with fecal collection, Famacha scoring, data analysis as well as advice for the project. Rory Lewandowski also helped with the grant application process. Dr. Steve Abfall of Abfall Veterinarian Clinic in The Plains, Ohio performed the clinic work on the fecal egg counts as well as provided advice on the study. It is very important to have highly qualified advisors who understand the goals of a study like this. Fortunately, these advisors were willing to work with me on the project.

RESULTS

Several lessons were learned during the project including some that were unexpected. The first fecal egg counts were expectedly low due to the young age of the lambs (60 days) along with the pasture rotation that was followed. What was unexpected, was on the next collection date of June 5th we did see FEC levels rise in the early weaned group. Given the lag time of 21 days from time of ingestion of the L3 larvae to the mature adult in the rumen to produce eggs and the "clean" grazing environment during this period it was believed that the lambs actually had an infection of parasites at the time of weaning on May 5th. Pasture grazing records were examined to try to figure out where this could have happened.

During the period of April 18-24th, while these lambs were still grazing with their mothers, the paddock in that rotation was grazed really tight to the ground. This should have been acceptable given the fact that there were no sheep in the pasture since the fall of 2007 and the short length of time they were grazing the paddock in the spring. It has been generally accepted that the haemachus contortus does not survive very well over the winter months on pasture but it is highly suspected to not be true in this case in Southeast Ohio. There should have been no other source for the infection other than over wintered larvae on pasture. Also during the time period of April 24th-June 1st, the lambs and ewes grazed a field planted to rye in the fall of 2007 by method of no till into sod. It was assumed at the time of planting that burning off the grass with roundup and "drying" the environment where the haemachus contortus lives should kill off any parasites. Most methods of planting annual forages where tillage of the soil is used will kill any parasites that are present. When the no till method was used, it allowed an environment for them to remain down under the dead vegetative matter. This also suggests that over wintered larvae were present since the field had no sheep grazing since planting in the fall. If this is in fact true, it adds another complicated aspect to an already complicated issue. More research needs to be done in the future on the issue of over wintered larvae.

Another lessoned learned with the study was the importance of health within the flock when managing intensive rotations with a high stocking rate. With the wet weather and high density stocking rate to accomplish 4 day rotations, foot issues were a bigger problem than in the past. This is not limited to only the foot but includes all health issues.

It is known that good record keeping is essential for monitoring production whether it is with livestock or grain. The same applies with good recordkeeping in conjunction with Fecal Egg Count (FEC) and using the FAMACHA system. When lambs are being monitored on a 10 day schedule (recommended for small lambs) and treatment is required, it may take 14 or more days after treatment, depending on the individual animal and its nutrition at the time, to recover a whole FAMACHA point on the score chart. In that case, it is important to have records of each animal treated so over treatment is avoided. Using individual FEC is a good tool but it should not be used for managing levels of flock infestation. Paragraph 3 of PROJECT DESCRIPTION AND PROCESS mentioned that 20% of the animals harbor 80% of the parasites that shed eggs. When collecting fecal samples it is important to collect from a large enough portion of the flock to get an accurate measurement. By large enough I mean 20% of the flock. Given the expense and time to accomplish this task accurately individual FECs are not the answer but should be considered a part of the entire program. Work is being done on developing a composite sampling system that would use several fecal samples combined into a large sample then tested. The goal of this is to reduce labor and lab work and to develop a tool that is useful for large flocks to measure pasture and flock contamination.

When interpreting the data from FAMACHA, one should be careful not to use the average of the group but should track the percentage of the group in scoring a 1 or a 2 and so on. Figure 3 shows that 77% of the early weaned lambs scored a 1 and 23% scored a 2 on May 5th. On June 5th, the number moved to 64% scoring a 2. That meant that 41% moved from a 1 to a 2. By looking at the average score of the group for the same time period, 1.3 to a 1.9 it would appear the lambs are in good shape in respect to infection. But the reality is by looking at the percentage of what the particular animals are scoring, it is clear to see that the group is moving quickly to a higher FAMACHA score and requires checking more often. Lambs can move to a higher FAMACHA score very rapidly and things can get out of hand in just a couple of days.

Figures 1 & 2 reflect data collected on May 5th, June 5th, June 23rd and July 28th. Figure 1, June 5th data shows the significant difference between individual lambs FECs. FECs ranged from 50 EPG (eggs per gram) to 1900 EPG which further shows 80% of the eggs shed comes from 20% of lambs. Also, the data shows an individual lamb’s ability to be resilient against parasitism and maintain a positive weight gain. Tag number 1024 shows this with an egg count of 10,000 and a weight gain of .3 lbs/day during the time period of June 23 to July 8th. Further supporting the misleading information by individual egg counts, lamb tag number 1035 (Fig 1) showed an egg count of 5800 on July 8th but a FAMACHA score of 5 (poor) and lamb tag number 545 (Fig 1) showed an egg count of 6050 and FAMACHA score of 2 on July 8th. This difference could be explained by an infection staying steady but over a long period of time or by an individual lamb’s inability to handle (resilience) parasites. There are measurable differences between lambs to handle parasite loads. This difference could be genetic and passed to the offspring in the next generation. Selection for these animals to be used as replacement ewes or rams could work to help build a resilient flock but great care should be taken to not over look production. A lot of the time a ewe that could be shedding a high number of eggs might be nursing triplets as opposed to a ewe nursing twins. A lot of data should be collected i.e.: weight gain, lambing percentage, BCS, FEC, FAMACHA, diet,

grazing management, over a period of time before one should consider if a certain genetic line is resilient/resistant. If one studies the charts, it is obvious that a total system approach is necessary to measure and manage internal parasites.

When comparing the two groups of lamb weights, it is not surprising to see the late weaned group of lambs had a slight weight gain advantage over the early weaned group. This is most likely due to having a high fat diet from their mothers' milk. Weight gain should be looked at subjectively based on actual pounds of frame/muscle to frame/muscle/fat. This could be measured by body condition score (BCS). Lambs grazing pasture typically lose some body condition directly after weaning due to the loss of rich milk diet from the mother. For profitability of the operation, one should take into consideration the timing of their market and weaning. If your market dictates a young "milk fat" lamb, weaning weights are probably important. If your market dictates a lean feeder lamb, weight from fat at weaning does not add to profitability and can be misleading and most likely will be less desirable for feed lot lambs if they are marketed directly after weaning. Even though there are some differences in each data set, in Figures 1 & 2, the final column in the chart shows only a .05 lb. difference in weight gain between groups, .15 early weaned and .20 in late weaned. When all management is taken into consideration and overall farm profit, there is in my opinion, no negative impact on profitability from weight gain by early weaning. In fact, there are arguments to the sustainability of the sheep operation to support early weaning of lambs on pasture (60 days) in the Midwest. The main advantage is that early weaning leads to less acres being heavily contaminated with eggs from ewes during lactation. By shortening the lactation period there are more acres that are cleaner or safer for lambs. Another benefit is lambs are not competing with ewes for the quality forage in the pasture. Ewes also see a benefit from early weaning. During lactation ewes will often sacrifice body condition score thus leaving them more vulnerable to succumb to general sickness from their lack of BCS. Lactation also lowers their immune system response, making them vulnerable to parasite infections. After weaning, non-lactating adult ewes have a strong immune response against parasitism and can graze pastures following behind lambs. Adult ewes while not lactating can graze pastures following lambs due to their immune system against parasitism as opposed to the lactation time period in which their immune system is lowered due to milk production.

Data shows that the early weaned group had a higher percentage of lambs moving to a higher FAMACHA score than the late weaned group. But early weaning had lowered the amount of larvae on the pasture because the non-lactating ewes were shedding fewer eggs. By rotating through pastures and using early weaning we were able to lower the amount of chemical dewormer used. We also were able to see a higher pasture production by using higher stocking density and frequent rotations. Data collected in 2009 from other research on our farm showed a greater positive impact than in 2008 by using early weaning and pasture rotation of no more then 4 days. More effort has been placed on fall pasture management to setup cleaner pastures for spring grazing.

In closing, one should not interpret this data in a manner of being able to duplicate this procedure with the same exact results. Rather, one should learn the following steps in order to remain profitable and sustainable in a lamb grazing operation.

Learn and understand the biological life cycle of the haemochus contortus. Without understanding the life cycle, one cannot manage to co-exist with haemochus contortus. Learning to co-exist with haemochus contortus is key for a grazer's sustainability. Using chemical dewormers as the only means to manage parasites is not going to be sustainable in the near future for most grazers in the mid west.

Adopt a pasture management plan with the understanding of the biological life cycle of the haemochus contortus and the plants to be grazed. Interweave these life cycles and match a grazing system to maximize pasture use with the limiting factor of the parasite haemochus contortus and adapt a total grazing system with these two factors.

- Early Weaned Lambs, Figure 1
- Late Weaned Lambs, Figure 2
- Early Weaned Lambs, Figures 3 and 4
- Late Weaned Lambs, Figures 5 and 6

Research

Participation Summary

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