

## Interim Progress Report

### A. Grant Data

- Today's date: July 31, 2008
- Category: Northeast Regional IPM Competitive Grants Program (RIPM)
- Project Title: Immune status of lambs, born of protein-supplemented periparturient ewes and creep-grazed in spring against *Haemonchus contortus*.

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States involved: West Virginia

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Funding: \$50,000

B. Nontechnical Summary. *Haemonchus contortus* is a common internal parasite of sheep and lambs. Anthelmintics have been used for pasture lamb production for many years. Resistance to these anthelmintics is now common. There is rapid growth in the ethnic populations in the NE that demand lamb. The NE has many acres of pasture. Both from a cost efficacy point of view pasture management needs to be reevaluated for parasite control. Sheep producers have become so dependent on synthetic dewormers that most believe pasture lamb cannot be produced without their use. However, experience over the past 6 years with our organic sheep flock has encouraged us to believe that grazing management alone can be used successfully to control internal parasites. In this experiment we compare three management practices that can readily be adopted by producers. Supplementing ewes with protein 3 weeks before and 2 weeks after lambing may increase the ability of both ewes and lambs to resist parasite infection. We are comparing two levels of protein supplementation. Animals become infected with the parasite by taking in infective larvae that are on the forage they graze. Creep-grazing lambs allows them access to forage that has low levels of infective larvae and forage allowance or stocking density may also influence how animals become infected. We are comparing creep-grazing and no creep-grazing and two forage allowances, 2.5 x and 1.5 x estimated daily forage intake. Lambs are born April 1-15. Approximately on April 15 we assign groups of 4 ewes and their lambs to paddocks and they graze 7 days in each at two stocking densities, some with and some without creep-grates. Each group of sheep and lambs rotate through 6 paddocks and each time they finish grazing the 6<sup>th</sup> paddock we weigh them and count the number of parasite eggs in the feces. We also compare their eye mucous membrane color against a standard color chart (FAMACHA) to determine their level of anemia, an indicator of level of parasite infection. We expect to provide grazing management recommendations for both conventional and organic sheep producers in the northeastern US. We expect to provide an integrated animal-pasture management solution to *Haemonchus contortus* parasitism without or with minimal use of anthelmintics.

C. Introduction. The most common and most important gastrointestinal parasite of economic importance for sheep in the northeastern region of the US is *H. contortis*, the “barberpole worm” also referred to as “stomach worm”, “wireworm” or “bankrupt worm”. This blood-sucking parasite pierces the lining of the gastrointestinal tract, causing blood loss, anemia, and poor growth. Monitoring programs rely on clinical symptoms e.g. pale color of mucous membrane, edema or bottle-jaw, severe loss of condition, diarrhea or by fecal egg counts. Young lambs are highly susceptible whereas older sheep can develop immune system responses that allow them to tolerate low levels of infection. Sheep exposed to parasites will, to a certain degree, be able to inhibit parasite development and egg-laying. A non pesticide approach in internal parasite control in sheep is to expose young lambs to low levels of infective larvae while boosting their immune response. Management and diet can be used in this integrated approach. Protein supplementation of ewes before and after lambing can improve the immune status of their lambs. Herbage allowance and creep grazing are pasture management strategies to reduce exposure of young lambs to infective larvae.

Sheep production has potential in the NE because it relies on grassland. Not only are large areas of grassland available in the region but, in addition, there is an emerging appreciation for grass fed animal products and ethnic demand for lamb, mainly for Middle Easterners, Hispanics, Greeks and Caribbean Islanders. In the Livestock and Field Crop Working Group IPM priorities for 2006 integrated management of significant pests affecting pastures was given high priority. Most grazing management research for parasite control does not control forage allowance. Simply rotating pastures is not adequate. Since gastrointestinal nematode infection in grazing sheep is universal most producers use anthelmintics on a routine basis, adding to yearly costs. Of greater concern, routine dependence on synthetic anthelmintics has resulted in buildup of resistance. Most sheep producers are skeptical when we present our experiences with organic lamb production. They are so accustomed to using anthelmintics that it will take some well controlled experiments to show that management alternatives are available.

We are not seeking multi-state involvement now. This is partly due to skepticism on the part of potential collaborators. It should be noted, however, that, as far as we know, the only organic experimental flock in the northeast is at WVU. We think that our proposed experiment needs to be carried out first to establish our theories. If successful our results will be applicable throughout the NE, both for conventional and organic producers.

#### D. Objectives.

- a. Determine the effect of a supplemental protein diet fed to ewes during the periparturient period (3 weeks before and 2 weeks after lambing) on the immune status of ewes and their lambs during the subsequent grazing season. This objective has not been achieved because we must have a second year of data (08), however preliminary analyses show that higher levels of protein increased lamb weights and reduced symptoms of parasitism.

- b. Determine the effect of creep grazing of lambs and herbage allowance on lamb performance (weight gain, immune status) and fecal egg count of *H. contortus*. Preliminary results show a benefit of both creep grazing and herbage allowance.

E. Approach. The experiment was conducted on the WV University Organic Research Farm. In March 2007 the sheep flock was divided in two and supplemented with either 120% or 80% of the daily requirement of metabolizable protein for 3 weeks, before and 2 weeks after lambing. Lambs were born in the first half of April and then 64 ewes and their lambs were assigned to a 2x2 factorial grazing experiment, 4 ewes and their lambs per treatment combination with 4 replications. One treatment was forage allowance (2.5x and 1.3x daily DM intake) and with or without creep gates. Each group of animals grazed 6 paddocks rotationally for two cycles with a 7-day occupancy per paddock. Lambs were weaned in July and both ewes and lambs grazed on clean grassland with a maximum 3-day occupancy for the rest of the growing season. At various times (end of each grazing cycle, weaning and end of growing season) all animals were weighted, fecal egg counts made and FAMACHA score taken. Herbage mass was estimated before and after each occupancy.

F. Progress. The experiment was conducted in 2007 as described and is being repeated in 2008.