SUPPLEMENTAL FEEDING OF DAIRY SHEEP AND GOATS
ON INTENSIVELY MANAGED PASTURE

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1999 is the first year of a SARE funded on-farm research project to determine the optimal level of supplementation for dairy sheep and goats on intensively managed pasture.

For background, let me quote directly from our project proposal:

JUSTIFICATION and BACKGROUND

Over the past ten years, the number of dairy sheep and goat farms operated as commercial agricultural enterprises in Vermont and New Hampshire has been growing. In the past five years, there has been an increase in the demand and price for sheep and goat milk cheeses (Major - 1996, Nielsen - 1996). This, combined with the availability from Europe of East Friesien dairy sheep genetics and the utilization of high quality intensively managed pastures as the major roughage source, has made these enterprises economically feasible and sustainable.

It is a well established management practice to supplement the ration of lactating sheep and goats with concentrates. This is done to increase the level of saleable milk in early lactation or to increase the weight gain of nursing offspring. This practice is supported by a large amount of research, but this research was conducted using stored feeds as the forage source. (NRC, 1985)

Sound research-based data on supplementation of high producing dairy sheep and goats on high quality intensively managed pastures is not available.

In an attempt to gather this information, David Major of Westminster West, Vermont, in the summer of 1997, ran his own on-farm feeding experiment. He randomly divided his dairy sheep flock (160 ewes) into two groups. One group was fed approximately 1 lb of a corn/barley supplement, the other group was fed 2 lbs of the same supplement. His results showed that group 1 averaged 201 lbs milk per ewe for the lactation while group 2 averaged 186 lbs milk per ewe, just the opposite of what might be expected. But because there was no control group and no valid experimental design, the results were meaningless, and as David said, "It just goes to show how much in the dark we are."

In mid October, David Major discussed these results with Bruce Clement, UNH Extension Livestock Program Coordinator. Bruce had also worked closely with Keith and Leslie Quarrier of Acworth, New Hampshire, dairy goat producers who have fed their herd on high quality intensively managed pastures since 1996. The Quarriers had also expressed frustration in getting sound data on which to base their pasture supplementation decisions.

Bruce convened a meeting in mid-November which included David Major and Mike Ghia, dairy sheep producers; Keith and Leslie Quarrier, dairy goat producers; Allison Hooper, Vermont Butter and Cheese Company; John Porter, UNH Extension Dairy Specialist; Chet Parsons, UVM Sheep Specialist; and Heidi Smith, NRCS Soil Conservationist. The need for this research project was confirmed and the decision to develop this proposal was made at that time.

Since then, Dr. Doug Hogue, Cornell University Sheep Specialist, Dr. Jim Welch, UVM Ruminant Nutritionist; and Dr. Nelson Escobar, Goat Specialist, E.de la Garza Institute for Goat Research, Langston, Oklahoma were contacted. All three have not only expressed support for this project but have provided substantial help in designing this experiment.

We feel this proposal is an especially timely one. It addresses a management question that producers, researchers, and Extension personnel have identified as having the highest priority for two economically and environmentally sound agricultural alternatives for small farmers not only in New Hampshire and Vermont but throughout the Northeast.

Approach and Methods

This project will use a team approach involving farmers, researchers, UVM and UNH Cooperative Extension, and NRCS personnel. The project will be conducted at two on-farm sites, Major Farm (dairy sheep), Westminster West, Vermont and Quarrier Farm (dairy goats), Acworth, New Hampshire.

The experimental design was developed by Dr. James Welch, UVM. In year one, we will conduct two experiments using a Randomized Complete Block design. All available animals will be identified according to previous milk production, genetic potential for milk production, number of offspring nursed, weight and age. Animals which are similar will be assigned to blocks of three according to the above criteria. Animals within blocks will be randomly assigned to treatments 1, 2, or 3.

In the first experiment we will look at the effect of different levels of supplementation on early lactation. The animals on each farm (150 ewes and 60 does respectively) will be divided at weaning into three treatment groups using the above described experimental design. Each animal will be identified by ear tag or tattoo and by a colored leg band for quick ID at milking.

The three groups will receive different levels of a nutritionally complete supplement designed by Dr. Hogue, Cornell University. This supplement will be designed utilizing the current information available on feeding high milk producing sheep and goats and will utilize readily available feedstuffs. The National Research Councils "Nutrient Requirements of Sheep," 6th edition, 1985 and "Nutrient Requirements of Goats," 1981, will be used to determined the nutrient requirement baseline on which the level of supplementation will be determined.

Group 1 will be the control group. All animals in group 1 will receive pasture plus a minimal level of supplement (10-15% of their National Research Council (NRC) requirement). Group 2 will receive pasture plus a medium level of supplement (30-35% of their NRC requirement). Group 3 will receive pasture plus a high level of supplement (50-60% of their NRC requirement).

All three groups will be grazed together. They will be allowed unlimited consumption of the same high quality pasture. At milking each animal will receive the supplement according to which of the three groups it has been assigned. After milking the animals return to a single group. Animals will receive new pasture after every milking.

All animals will receive care at the best management level from the last trimester of pregnancy through to weaning. Animal care will be monitored weekly by Extension Specialists or a licensed veterinarian. Weaning will occur at day 1 or 2 postpartum for does and day 25-30 postpartum for ewes. As animals are weaned, the first experiment will begin and will continue until all animals have been on the experiment for a four-week period.

At the completion of the first experiment, the data will be immediately analyzed. The second four-week experiment will be conducted as soon as the data from the first experiment has been analyzed. The purpose of the second experiment is to look at the effect of different levels of supplementation on mid to late lactation. The same animals and the same experimental design will be used in the second experiment as was used in the first experiment.

The following measurements will be taken:

Weight - all animals will be weighed at the beginning of the last trimester of pregnancy, within 1-2 days postpartum and at the beginning and end of each experimental period.

Milk- milk will be weighed and analyzed weekly during each experiment for fat, protein, and somatic cell count. The milk will also be taste tested by an experienced milk grader. The milk will be analyzed at the New York DHIA lab.

Pasture- during each experiment pasture dry matter yield will be measured and recorded at each change of pasture (every 12 hrs). A rising plate pasture meter designed and made in New Zealand will be used for this measurement.

Soil- soil tests will be taken at the beginning and end of each experiment. Soil tests will be done at UNH Analytical Lab and will measure pH, P_2O_5, K_2O, Ca and Mg.

Health- animal health and overall condition will be assessed by a licensed veterinarian at the beginning of the last trimester, and at the beginning and end of each experiment. Health treatments will be administered under the direction of the veterinarian.

An intern on each farm will assist in taking these measurements and recording and compiling the data.   All data compiled will be statistically analyzed.   In years 2 and 3, we will refine the feeding levels used in year one using a regression analysis design with several feeding levels. This will allow us to identify optimum feeding levels on which to base management decisions.

We are in the process of summarizing and statistically analyzing the data from the two trials done this summer. I will have a written report for distribution at the Great Lakes Symposium in November.