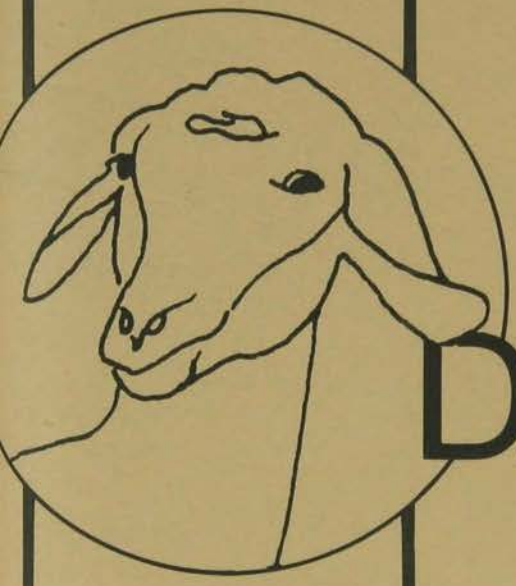
MN 2000 DGC - 9th, 1988



9th Annual DAIRY GOATS Conference

PROCEEDINGS

UNIVERSITY OF MINNESOTA
DOCUMENTS
DEC 12 1988
ST. PAUL CAMPUS
LIBRARIES

February 20,1988

Minnesota Extension Service
University of Minnesota

This archival publication may not reflect current scientific knowledge or recommendations.
Current information available from University of Minnesota Extension: http://www.extension.umn.edu.

DAIRY GOAT CONFERENCE
FEBRUARY 20, 1988

TABLE OF CONTENTS

INTERNATIONAL DAIRY GOAT RESEARCH CENTER
Prairie View A&M University

Thian Hor Teh
Research Leader

INTRODUCTION

The Cooperative Agricultural Research Center (CARC) at Prairie View A&M University is actively seeking new and innovative approaches to produce food and fiber more effectively. The establishment of the International Dairy Goat Research Center (IDGRC) in late 1979 added another dimension to our research thrust.

MISSION

The mission is to increase the knowledge of goats and to utilize this information to better serve mankind. Our long term goal is a commitment to pursue and excel in goat research to benefit goat producers locally, nationally, and internationally.

GOALS

*Promote the dairy goat locally, nationally and internationally.
*Improve the reproductive and productive efficiency of the dairy goat.
*Promote and develop dairy goat products.
*Utilize the dairy goat to serve mankind.

FACILITY, SOURCES OF FUNDING AND ADMINISTRATIVE STRUCTURE

The Center was established by grants from the Science and Education Administration-Cooperation Research of the U.S. Department of Agriculture (SEA-USDA). The eleven acre Center complete with milking parlor, laboratories, surgery room and barns was officially dedicated on May 7, 1983. The Center is administered by the Research Director of the Cooperative Agricultural Research Center (CARC). Research funding is provided by Evans-Allen Funds (Public Law 95-113, Sec. 1445) through the Cooperative State Research Service (CSRS). Some contributions and fundings for research projects have been obtained from other funding agencies, private foundations and corporations.

CLIENTELE

Those benefitting include local, national and international goat producers, hundreds of commercial goat dairies in the United States, hobbyists, 4-H'ers, FFA members, extensionists and millions of small holder, low income persons who produce milk and its by-products for home consumption.

Our scientists have presented workshops and/or seminars in China, Brazil, Guatemala, Dominican Republic, St. Vincent, Korea, Panama, El Salvador, Jamaica, Barbados, Mexico, Egypt and Malaysia. Technical exchanges and linkages have been established with special universities and research centers overseas. Our staff has trained professionals from Barbados, Jamaica, Egypt, Costa Rica and Honduras on dairy goat technology.

CURRENT RESEARCH PROJECTS

*Effect of colostrum quality and sources on survival of neonatal goat kids.
*Protein requirement of growing goats.
*Phosphorus requirement of growing goats.

*Nutritional evaluation of alternate feedstuffs for dairy goats.
*Physiological evaluation of diarrhea in dairy goat kids, prevention and treatments of diarrhea kids.
*Caprine arthritis encephalitis: determination of non-medicinal method of interrupting the dam-daughter transmission of the CAEV.
*Comparative anthelmintic study of dairy goats.
*Study of the factors affecting post thaw viability of goat embryos.
*Determination of time of pre-ovulatory luteinizing hormone surge using prostaglandin hormones for improving artificial insemination and also induced parturition in dairy goats.
*Preliminary study with in-vitro fertilization of follicular stage goat ova.
*Survey of producers, processors and consumers of goat meat.
*Chemical and biological characteristics of dairy goat milk products.
*An assessment of the profit potential of goat milk production in Texas.

EXTENSION

The Center has been working closely with the Prairie View A&M University and Texas A&M University Extension Services to promote a statewide 4-H Dairy Goat Project. Our 4-H Dairy Goat Giveaway will be expanded statewide and 20 registered doelings will be given away. Again, the project depends on the contribution of dairy goat breeders and those willing to contribute registered doe or doelings are urged to contact the Center. The Center will also host the Texas 4-H Dairy Goat Judging Contest. Tentative date is set for June 16, 1988. Eight classes of goats will be judged and three sets of reasons will be evaluated. All 4-H clubs are requested for form their team and start training their members. The Center will host a 4-H fitting, showing and judging workshop during the Field Day to assist and promote state 4-H dairy goat shows and judging contests. By the way, the theme for this years Fifth Dairy Goat Field Day is "Developing and Marketing Strategy for Dairy Goat Products". Tentative schedules and speakers have been identified for a very informative Field Day. Mark your calendar for an educational day, May 7, 1988 at the Center.

RESEARCH PERSONNEL

*Dr. Thian Hor Teh, Research Leader, Animal Nutrition
*Dr. Enrique N. Escobar, Animal Nutrition
*Dr. Louis C. Nuti, Animal Reproduction
*Dr. Aubrey B. Watkins, Animal Health
*Dr. Young W. Park, Food Technology/Nutrition
*Dr. Alfred L. Parks, Agricultural Economics

Todd Dyste & Mary Korzeniowski, Contential Shelf

A synopsis of the presentation by Continental Shelf, Inc. to the Minnesota Dariy Goat Association on February 20, 1988.

CONTINENTAL SHELF, INC.

Continental Shelf was founded in 1985 for the purpose of developing and marketing specialty cheeses. The company completed the development of its initial product lines, Wisconsin Country Chevre and Wisconsin Country Cheddar-Style goat milk cheeses in 1987. These cheeses were commercially manufactured at the Bass Lake Cheese Factory in Somerset, Wisconsin.

PRODUCT

Wisconsin Country Chevre is a soft, fresh, french-style cheese. It is a mild cheese yet has the tang characteristic of many goat milk cheeses. This cheese is versatile and lends itself to a variety of uses. It is excellent served plain, or incorporated in salads, soups, main dishes, and even desserts. The cheese is available plain, or with dill, basil, rosemary, and garlic-chive. Standard retail packages are 6 and 12 ounces. The cheese is also packaged in bulk 4 pound logs for the restaurant and commercial market. The Cryovac packaging process insures freshness and good shelf life.

Wisconsin Country Cheddar-Style has a texture and body characteristic of standard cheddar. The flavor is rich with a pleasant goat undertone. The cheese is the natural color of milk since no dye or coloring is used during the manufacturing process. Excellent uses are grated, in salads, as topping on pizzas and spaghetti sauces, and in sandwiches. Retail packages come in 4 ounce shredded and 8 ounce blocks. Bulk packages are also available.

MARKETING AND PROMOTION

Continental Shelf's primary market for 1987 was the Twin Cities area. Through the firm's two distributors, product was sold at retail outlets such as Lund's, Byerly's, Dayton's, Surdyk's, many specialty cheese shops, and the food cooperatives. Several important Twin Cities restaurants are using Chevre in their daily menus.

Secondary markets in 1987 included Denver, New York, and Chicago.

Promotional activities during 1987 were carried out in three major areas: magazine and newspaper articles, promo's (cheese sampling at retail outlets), and a booth at the Minnesota State Fair. Continental Shelf entered its' Chevre in several cheese contests, taking sixth place in the miscellaneous category at the Minnesota State Fair and Third

place in the miscellaneous category at the June Educational Butter and Cheese Contest.

Continental Shelf also participated in the popular Food Fest promotions in Rochester, MN, the New York Fancy Food Show, The American Cheese Society 5th Annual Meeting, and the MGDA Products Promotion Committee advertisement in Restaurants and Institutions "Marketplace" magazine.

FUTURE PLANS

During 1988, Continental Shelf plans to expand its coverage in the Twin Cities retail and restaurant market. The customer base is continuing to expand in New York under current distribution arrangements. New distributors are currently being arranged for Chicago and Denver.

Continental Shelf will be once again represented at the Minnesota State Fair. A feature article on dairy products and cheesemakers in a spring issue of Midwest Living magazine will include information on the availability of Continental Shelf's cheeses.

KID MANAGEMENT - NEONATAL TO WEANING

Thian Hor Teh
International Dairy Goat Research Center
Prairie View A&M University

INTRODUCTION

Proper management of goat kids begins with the pregnant doe. Pregnant does should receive adequate nutrients to maintain production, physiological functions and growth of the fetus(es). Goat kids are born as monogastrics, i.e., without a functioning rumen, and early rumen development should be encouraged so that roughage or forage can be utilized at a young age.

Because kids are born with a limited defense mechanism against disease, colostrum or "first milk" is critical for kid survival. Colostrum contains antibodies that must be fed as soon as possible after birth. Absorption of immunoglobulins by the kid and the quality of colostrum of the doe decreases soon after birth. Hand milking the colostrum from the doe, using proper and sanitary procedures, and feeding the "first milk" artificially through a nipple is the best way of insuring milk consumption and protection against diseases. Surplus colostrum can be frozen and thawed for later feeding. A one-day feeding of colostrum will be adequate.

RESTRICTED MILK FEEDING TO ENCOURAGE RUMEN DEVELOPMENT

Overfeeding of milk can cause scours, stomach upset and reduce digestibility of nutrients and is also economically unfeasible. Kids on the average would consume 25% of body weight before 4 weeks of age and the amounts would be increased linearly thereafter which is considerably higher than those recommended for calves (8-9%) of body weight.

Goats being ruminants should be encouraged to develop their rumen early in order to utilize roughage, which is a cheaper source of feed. Dry, solid feed intake stimulates enzyme activity and volatile fatty acids from rumen fermentation to stimulate papilli growth.

Our studies have shown that limiting kids to 1.5-2.0 pounds daily milk intake encourages earlier dry feed intake. Kids restricted to 1.5 pounds daily started consuming feed sooner than kids on other treatments using 0.1 pounds (45 gm) feed consumption as one of the criteria for weaning. Average days for attaining that level of feed intake were 19, 22, 30, 36, 57 for treatments 1.5, 2.0, 2.5, 3.0 and control respectively. This study indicated that using a restricted milk-feeding regime, kids can be weaned earlier. However, the amount of milk should be increased at a rate of 10% during the winter months for each 1 degree farenheit drop below freezing.

USE OF MILK REPLACER

The first true milk replacers were developed about 1950. Previously milk replacers were milk extenders that consisted of linseed oil meal, wheat middlings, wheat, and oat flour. These were fed as gruels together with milk. Milk replacers are normally formulated with dried skim milk, dried buttermilk, dried whey, and animal fat. Since skim milk powders are extensively used for ice cream, it has become costly and substitutes such as whey, casein, soy protein concentrates, fish protein, fababean, rapeseed, and alfalfa protein concentrates have been incorporated into milk replacer. Many of these

ingredients may not be suitable for goats.

Fat in milk replacers include animal fat, hydrogenated vegetable oil, coconut oil, tallow, milk fat, palm oil, sunflower oil, soybean oil, hydrogenated soybean oil, and fish oil. Normally the fat is homogenized to improve digestibility and retention of nitrogen from milk replacers.

Studies at the International Dairy Goat Research Center to evaluate milk replacers and to determine the protein levels of milk replacers have shown that there were no significant differences in average-daily-gain when kids were fed goat milk with 24% and 26% crude protein milk replacer at 14.3% concentration. Kids adjusted well to the milk replacer, as fecal scores were not significantly higher for the milk replacer diet, except for the 26% crude protein. This study indicated that milk replacer should not contain less than 24% crude protein and 20% crude fat for optimum performance of goat kids.

In selecting milk replacers for goats, it must contain not less than 24% crude protein, 20% crude fat, and not more than 1% crude fiber, 22% lactose, and 10% ash. Skim-milk-based milk replacers are preferred over whey- or soybean-based-milk replacers. The high lactose content of whey and the reduced quality of processed soybean may create dietary scours with goat kids.

WEANING

As weaning is a critical phase of dairy goat management, weaning shock should be minimized during this transition from liquid to solid feed. Individual age, weight, and amount of solid feed consumed are criteria for weaning. Some kids are smaller at birth and grow slower than others. When selecting kids to wean, one of the following guidelines should be observed:

*Kids can be weaned successfully at 8 weeks of age.
*Wean when kids are 20 pounds of empty bodyweight, before feeding, or 17.5 inches at heartgirth.
*Wean when daily solid feed, forage and concentrate consumption is at 0.1 pounds.

Weaning shock is reduced when one of the above criteria is met. Prolonged weaning is not only expensive and time consuming, but it could also be harmful to the animal. Abrupt versus gradual weaning methods have been studied and no differences in growth performance have been observed. Abrupt weaning is the method of choice for early weaning.

MANAGEMENT

Coccidiosis is probably the most important factor of the parasitic diseases that affect kids. Mild coccidiosis is present most of the time, but during periods of stress, infestation manifests itself. Coccidia compete for nutrients, thereby causing irreparable damage to the lining of the intestine, blood loss and eventually leading to anemia and death. Effective use of coccidiostats added to milk, milk replacers and solid feed can control coccidiosis. Amprolium added to liquid feed for 5 days at the rate of 5 mg/kg of bodyweight is effective; however, long term use of Amprolium is questionable. Sulfonamides, or other long-active sulfa drugs, are also effective. Dosage of 50 mg/lb of body weight for 4 consecutive days per week for 2 weeks has been highly effective in treating coccidiosis. Monension supplied at a low rate of 20-40 ppm in solid feed has been effective in preventing outbreaks of coccidiosis. Recently, Decoquinate has been approved for use in goats. This drug is to be fed at 22.7 mg/100 lb of bodyweight per day for at least 28 days.

Routine veterinary care for deworming and vaccination programs against enterotoxemia, (Clostridium perfrigens C&D), tetanus, and other contagious or infectious diseases prevalent in the area should be established to enable the herdsperson to plan for effective management of his/her herd.

Heifer Project International

Dairy Goat Project

Sichuan, China

Vincent Maefsky

SICHUAN

CHINA'S HIDDEN HEART,

Sichuan Province covers 220,000 square miles, an area slightly larger than France. With more than 100 million inhabitants—nearly half the population of the United States—it is the nation's most populous province.

Heifer Project International (HPI) was founded in 1944 as a nonprofit organization. Its purpose is to help people produce food and income for themselves and to expand livestock production to help overcome worldwide protein malnutrition. The philosophy of HPI is based on the concept that "a helping hand is better than a handout." Each person helped "passes on a gift" by sharing in the increase provided by an HPI gift animal. Animals provided through the years, in addition to goats, have included dairy and beef cattle, sheep, pigs, rabbits, honey bees, poultry, and draft animals.

In addition to providing animals, HPI provides training in animal care through their representatives, extension workers, agricultural missionaries, Peace Corps volunteers and others. Assistance in planning livestock development programs is also given including attention to feed, disease control, breeding, management, and marketing needs. In the past four decades, HPI has sent nearly 70,000 animals and over 1.5 million poultry to people in 107 countries and 31 states of the United States. Current programs are being carried on in 34 countries and 11 states.

In 1985 HPI donated 78 Saanen and 80 Nubian goats to Ya an municipality and Jianyang County of Sichuan Province, China. As a followup to this donation of dairy goats, Dr. David Sherman, Associate Professor, Large Animal Medicine, University of Minnesota College of Veterinary Medicine and I, owner of Poplar Hill Dairy Goat Farm, Scandia, Minnesota were sent to Sichuan Province, People's Republic of China under the sponsorship of HPI for the purpose of evaluating HPI-supported dairy goat development projects and to provide training for farmers, veterinarians and veterinary technicians. Dr. Laurie C. Miller, Dr. Sherman's wife, accompanied us on the trip. Although not directly involved with HPI activities, Dr. Miller did lecture at various medical colleges and county hospitals in Sichuan Province on renal and arthritic diseases of children.

During the visit, which lasted from September 14 through October 4, 1986, we were under the excellent care of the Sichuan Province Bureau of Animal Husbandry. Our main areas of activity began with a tour of farms in villages around Jianyang County that had HPI Nubian donation goats. That tour was followed by a two day seminar for goat owners. We then went on a tour of farms in the Ya an City area which had HPI Saanen donation goats; that tour was also followed by a two day seminar for goat owners. We then conducted a five day training conference for veterinarians and technicians in Ya an City. Participants in that conference represented 23 counties in the Province. The seminars and conference dealt with veterinary care of dairy goats, feeding, management, breeding, and selecting for good type. We were also able to visit the Chengden Municipality Jing Liu District Dairy Goat Breeding Station for a half day. A Toggenburg herd was maintained there.

Sichuan, "the land of heavenly abundance", is the most populous province of China. It is situated in the south central part of the country. It has a population in excess of 100 million people, almost half the population of the entire United States. China itself has a goat population well in excess of 80 million, the largest goat population in the world. The goats in Sichuan Province, although numbering in excess of 5.5 million, are primarily used for meat and fiber. By the end of 1985, the total dairy goat population of Sichuan Province was 13,646. This number included the goats donated by HPI. Only within the last ten years have the officials of Sichuan Province began putting emphasis on dairy animals as a way of increasing protein in the diets of the population, especially young children and infants. They imported 5,000 dairy goats from other provinces of China and imported 44 Toggenburgs, 39 Saanens and 10 Nubians from England. In addition to the 78 Saanens and 80 Nubians donated by HPI, those with their offspring, comprised the 13,646 dairy goats in Sichuan.

The arrival in 1985 of the goats from HPI to Ya an City was heralded with great fanfare. A report from the Animal Husbandry Bureau of Ya an City of Sichuan Province, described the arrival of the donated animals, "Some leaders from the city came to see the goats after they arrived. Reporters of the local broadcast and Sichuan Daily came to interview people concerning the project and recorded video pictures as well. They reported the good news to all the farmers in the city. The Sichuan Daily put the news on the front page on December 8, 1985 and January 7, 1986." In anticipation of their arrival, training courses on dairy goat care were given to the recipients of the HPI goats. Upon their arrival, a number of animals were retained at Breeding Stations for training of technicians and experimentation in management and feeding. Others went to farmers in the countryside. Under contracts signed with the local officials, the first two offspring of HPI goats were to be given to other farmers, and thereafter, one offspring of those animals were to be donated to other farmers so as to be a self-perpetuating project. For a farmer in rural Sichuan, China to receive an HPI dairy goat was an economic boon of great significance. The per capita income in rural areas is the equivilant of less than $100 a year.

The income from a single respectably producing dairy goat could double the annual income for the farmer. One can see the significance and economic importance of the dairy goat to them.

In addition to maintaining the lines of the purebred dairy goats that they received, experimentation is being done in the area of cross breeding dairy breeds of goats with six local varieties of goats. These local goats are of small to medium size. They have high production of meat and hair, and high adaptability, but very low milk production. The research results of Sichuan Animal Husbandry and Veterinary Institute in crossing some of the Toggenburgs that they had obtained from England several years earlier with the native Ma goat, showed an increase in milk production in the first generation of from 184% to 333%. There is little doubt in my mind that increasing the number of quality dairy goats in Sichuan, China will have great benefits in producing more protein for people of the province and will also be a great economic benefit to the farmers in the rural areas.

This trip to China left deep and moving impressions upon me, not only as regards the beautiful countyside of this vast land, but even more so of the people of China. I went to China with a sense of curiosity about the country and its people. There was also an uncertainty as to whether any meaningful contribution could be made by us, or, at least by myself. I looked upon myself as a small pebble being cast far out upon a vast sea, for China is enormous. I felt whatever small ripple I might make would be almost meaningless in the face of China's huge size and enormous population.

After three weeks in Sichuan, China, I must still say that my contributuion was but a small ripple. But, I must also say that the manner in which we were received by our hosts, the farmers, the technicians, the veterinarians, and even public officials, made us feel as if we were nothing less than a tidal wave. The courtesy and hospitality shown to us as representatives of Heifer Project International were nothing less than complete.

I have always had positive feelings about the fundamental principles involved in Heifer Project International, but, until now, they had always been in the realm of the abstract. Seeing the HPI goats in Jianyang County and Ya an City quickly brought the reality of the meaningfulness of HPI to me. I have always had the feeling that the acceptance of a gift should be accompanied by a sense of gratitude and a proper respect for gift giver and the gift. And this gratitude I expected from the Chinese. I expected, as HPI representatives, to hear a polite thank you for the gift of dairy goats. What I did not expect to see was this message to HPI proclaimed on the sides of buildings. I did not expect to see farmers so caring for the HPI dairy goats that they had them, in some cases, housed under the same roof as their families. I did not expect to see veterinary stations specially adapted to house some of the dairy goats and new construction planned (as in the case of the Jianyang Breeding Station) to further the dairy goat project started by the HPI donations. Nor did I expect to see public officials wait hours to greet us as in the case of Madam Chung, magistrate of Jianyang County. And, I certainly did not expect to have the mayor of Ya an City and later the vice governor of Sichuan Province come to our hotel room to welcome us, as HPI representatives, to China. In short, I was amazed by the appreciation of the HPI dairy goats shown by all concerned.

I feel the HPI dairy goat donations to Sichuan, China have met the goals of a succesful and self perpetuating program. With a population of over a billion and the average farm size of less than 1/2 acre, there seems little question that the need in Sichuan is great. But, even though rural China is poor, there is among the people a sense of purposefulness, of great industriousness and, underlying it all, a sense of true dignity. These characteristics tend to promote the success of the individual goat projects and also the long term goal of self perpetuation. For these reasons and others, I feel the HPI Dairy Goat Project in Sichuan is a success and I would expect that additional dairy goat projects in this area of China would also prove to be successful.

MAKING THE RIGHT CHOICE IN BUYING FEED FOR DAIRY GOATS - KNOWING THE REQUIREMENTS OF YOUR GOAT AND SELECTING INGREDIENTS AND MINERALS

Thian Hor Teh
International Dairy Goat Research Center
Prairie View A&M University

Knowing the nutrient requirements of dairy goats is critical in managing goats for maximum production. Goats require protein, carbohydrates, fat, minerals, water, vitamins and fiber. The amount required depends of the function and class of the animal, age, sex, size, activity and number of feti/fetuses and also on the amount of milk produced and the milk composition. It would be perfect it we could feed all our goats individually according to their individual requirements, but it is not practical and is very expensive. Table 1 shows the suggested requirements for specific classes of goats; however more research is needed to closely refine these requirements.

TABLE 1: SUGGESTED NUTRIENT COMPOSITION FOR VARIOUS CLASSES OF DAIRY GOATS

Classes	Protein	Energy(TDN)	Ca	P
Kid Starter	>16	75	.6	.4
Growing Ration	>14	65	.6	.4
Mature Ration	>11	55	.3	.2
Lactating Ration	>16	70	.6	.4
Dry Animal	>11	55	.35	.26

After knowing the nutrient requirement, the next thing is to determine the forage source to go with concentrate or complete mixed ration. If concentrate is used, smaller amounts of feed are needed. Complete mixed rations have forage or fodder added to increase fiber content. Table 2 shows a recommended grain ration of 16% CP and 75% TDN to complement different pasture quality.

Goats are more susceptible to enterotoxemia (overeating disease) and a complete mixed ration is one way of correcting this problem. Table 3 is a recommended complete mixed ration for various production levels.

Table 4 is a list of nutrients and their sources. Knowledge of what is palatable and unpalatable to goats is essential. For example, recent studies have shown that goats do not produce well on hydrolyzed feather meal.

Table 5 is a list of minerals and their sources. It is important for you to know what minerals are deficient or in excess in your area. Your county agent will be able to provide you with this information. It is equally important that you supplement the mineral that is deficient and insure that the proper amount is consumed. For example, studies in our Center show high salt intake decreases dry matter intake and depresses growth rate. Goats fed concentrates with a high salt content drank more water. Minerals are best supplemented in trace mineralized salt blocks which usually contain 95% common salts and 5% trace minerals.

When buying feed, always look at the feed tags. Determine what the nutrient composition is and then what ingredients are used. If you are not supplementing minerals and/or vitamins, free choice, purchase a feed that contains all the essential nutrients. Always follow the instructions on the label.

TABLE 2: AMOUNT OF CONCENTRATE TO SUPPLEMENT DEPENDING ON FORAGE QUALITY FOR A 140 LB DAIRY GOAT CONSUMING 3.5 LB DRY MATTER FROM FORAGE

	Forage Quality(+)		
Milk Production (4% Fat)	Low (10% CP)	Medium (14% CP)	High (18% CP)
(lb)	----------Pound of Concentrate (lb)---------		
3	1.1	---	---
4	1.8	.9	---
5	2.4	1.6	---
6	3.1	2.2	1.3
7	3.7	2.8	1.9
8	4.3	3.4	2.6
9	4.9	4.0	3.2
10	5.6	4.7	3.8
12	6.8	5.9	5.0
14	*	7.2	6.3
16	*	*	7.6
18	*	*	*

+ Assuming that forage consumption will be 3.5 lb daily.
* Excessive grain is not recommended, therefore need to increase quality of forage and concentrate (higher protein)
CP crude protein

TABLE 3: RECOMMENDED NUTRIENT CONTENTS OF RATION FOR DAIRY GOATS BASED ON LEVEL OF MILK PRODUCTION (+)

	Group by Production		
Nutrient	Low	Medium	High*
Crude Protein (%)	10	14	18
TDN (%)	50	60	75
Calcium (%)	0.4	0.5	0.7
Phosphorus (%)	0.3	0.4	0.5

+ Calculation based on medium size mature goat (140 lb) and average milk fat (4%)
* Average daily milk production for low, medium, high is 3, 6, 10 lb, respectively

TABLE 4: SELECTING NUTRIENT SOURCES

Protein

Animal: Meat meal
Tankage
Feather meal
Blood meal
Fish meal

Vegetable: Soybean
Cottonseed meal
etc.

Non Protein Nitrogen Sources: Urea
Ammonium polyphosphate
etc.

Energy

Cereal grains
Tuber
Roots
Fruit
Fat
etc.

Mineral

Major: Calcium
Phosphorus
Salt (Sodium Chloride)
Magnesium
Potassium
Sulfur

Minor: Cobalt
Copper
Fluoride
Iodine
Iron
Zinc
Selenium
Manganese
Molybdenum

Toxic: Lead
Cadmium
Mercury

May Be Required: Chromium
Silicon
Vanadium
Tin
Nickel

TABLE 5: MINERAL SOURCES

Calcium: Limestone (calcium carbonate)
Oyster shell
Bone meal
Dicalcium phosphate
Defluorinated rock phosphate

Phosphorus: Monosodium phosphate
Diammonium phosphate
Dicalcium phosphate
Defluorinated phosphate

Salt: Loose salt
Block salt
Iodized salt
Mineralized salt

Magnesium: Magnesium oxide
Magnesium phosphate
Magnesium sulfate

Cobalt: Cobalt pellet
Cobalt sulfate
Cobalt carbonate

Iron: Ferrous sulfate
Ferric citrate
Ferrous carbonate
Ferric oxide
Iron phytate

Zinc: Zinc sulfate
Zinc oxide
Zinc methionine
Zinc carbonate

Potassium: Potassium chloride
Potassium bicarbonate
Potassium sulfate

Sulfur: Elemental sulfur
Sulfur containing protein or amino acids
Potassium sulfate
Sodium sulfate
Ammonium sulfate
Calcium sulfate

Copper: Copper sulfate
Copper EDTA
Copper carbonate
Cupric carbonate
Cupric oxide

Fluoride: Soft rock phosphate
Ground rock phosphate
Triple superphosphate
Diammonium phosphate
Phosphoric acid

Iodine: Iodized salt
Calcium iodate

Selenium: Sodium selenite
Sodium selenate

Manganese: Manganese oxide
Manganese proteinate

QUALITY FORAGE FOR DAIRY GOATS

Craig C. Sheaffer
Department of Agronomy and Plant Genetics
University of Minnesota, St. Paul

What Is Quality Forage?

The ultimate determination of forage quality or feeding value is animal performance. True feeding value or forage quality is best described as a product of the plant-animal complex shown in Figure 1. Potental forage feeding value is a product of potential nutritive value, antiquality factors, and potential intake.

While we can observe animal milk production or weight gain from feeding a particular forage, we often have no way of knowing forage feeding value before feeding or when we are buying hay. In judging feeding value before feeding, two methods are commonly used. These involve sensory and laboratory appraisal.

Sensory appraisal: Your subjective evaluation of hay can tell you about it's potential quality. Visually you can estimate the legume, grass, and weed composition of hay. Leafiness, color, moldiness, dustiness, and weather damage can also be estimated. Sometimes odors can be detected which are associated with reduced forage quality. Sensory appraisal can often be related to forage feeding value but quantification of sensory appraisal is difficult.

Laboratory appraisal: Laboratory testing of feeding value involves sampling of the hay and determination of the forage composition by chemical methods. The results of these determinations can be used as an indication of relative nutritive value and intake potential or in ration balancing. Chemical evaluations or indices commonly used to express forage quality are shown in Table 1. After the composition of your forage has been chemically evaluated, you can determine the relative nutritive value by comparison with standards such as those provided by NRC (National Research Council) or with other known values (Table 2). If you're balancing a ration, the ultimate way to determine the value of a forage is to determine how changes in a component such as CP affects the amount of concentrate supplement you will need to purchase.

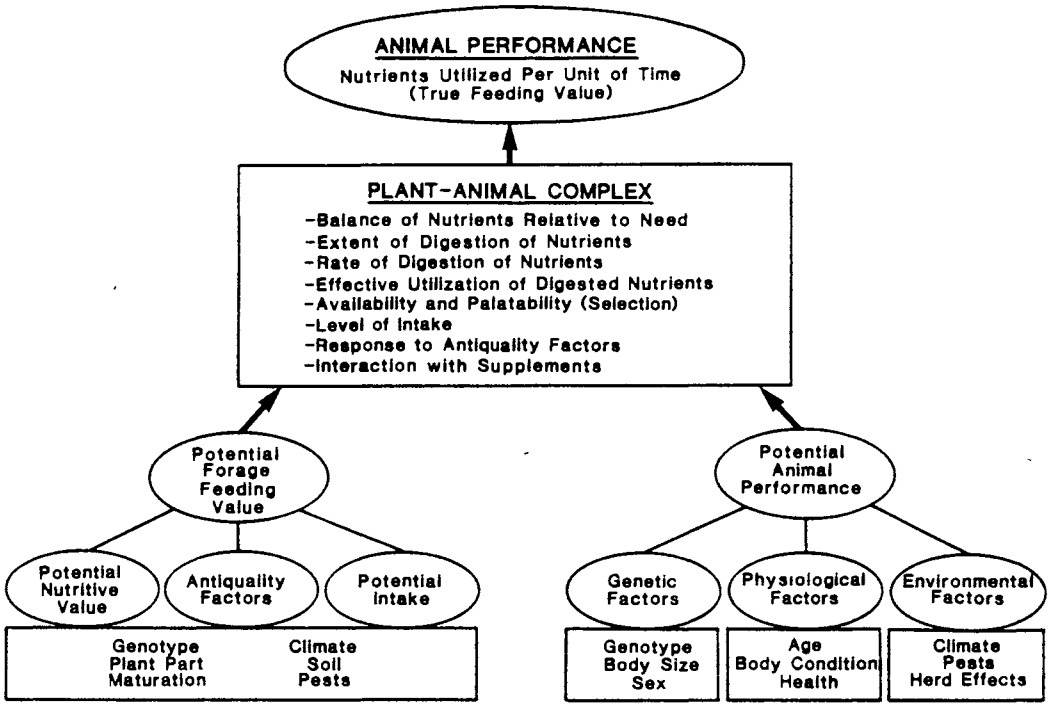


Fig. 1. Plant and animal factors affecting the feeding value of forages. Source: Marten, 1985.

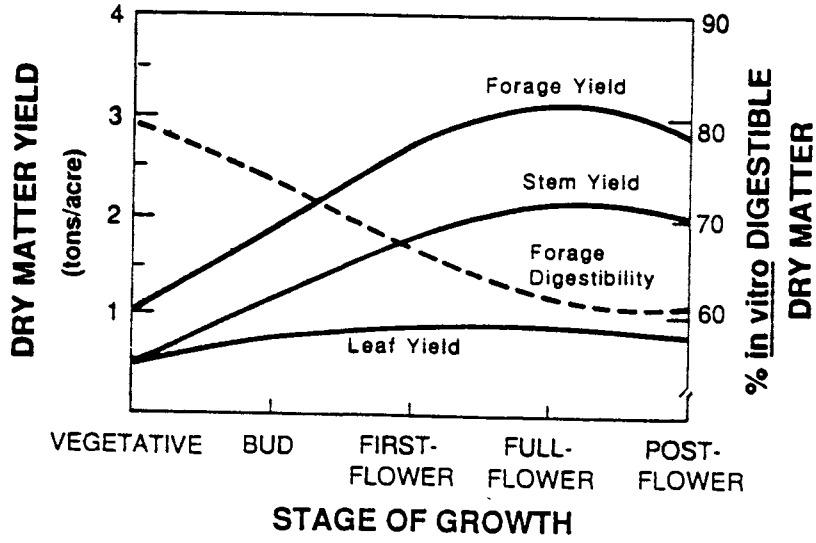


Fig. 2. The effect of maturity on yield and quality of alfalfa. Source: Sheaffer and Marten, 1987.

Table 1. Indices of forage quality determined by chemical evaluation.

Index	What it means	Use/comment
1. Crude protein (CP)	Crude protein content Represents true protein and NPN	Ration balancing
2. Adjusted crude protein (ACP)	CP available to animal	If heat damaged CP is >12% ACP should be used in ration balancing
3. Total digestible nutrients (TDN)	Energy content	Ration balancing
4. Net energy lactation (NE_L)	Energy content for lactation	Ration balancing More precise than TDN
5. Neutral detergent fiber (NDF)	Intake potential (neg. related to intake)	Ranking of intake potential Hay grades
6. Acid detergent fiber (ADF)	Digestibility potential (neg. related to dig.)	Ration balancing Hay grades To calculate TDN and NE_L
7. Minerals	Mineral content	Ration balancing

Table 2. Average nutrient composition of some common Minnesota forages.

Forage	CP (%)	NDF (%)	ADF (%)	ADL (%)	CF (%)	NE_L (Mcal/lb)	TDN (%)	Ca (%)	P (%)
	100% DM basis								
Alfalfa—									
Prebloom	22	41	31	8	24	.66	65	1.8	.30
Early bloom	18	48	38	10	31	.59	58	1.2	.23
Mid-bloom	16	50	40	11	33	.57	56	1.3	.22
Full bloom	15	52	42	12	35	.55	54	1.3	.20
Alfalfa-Grass mixture—									
average	17	52	36		29	.56	55	1.2	.26
Bromegrass—boot	11	68	40	4	33	.57	56	.29	.28
Clover, red									
Early bloom	19				23	.66	64	2.3	.38
Full bloom	15	56	41	10	30	.60	59	1.0	.27
Corn silage—dent	8	51	31		24	.70	70	.27	.20
Corn stover	6	67	39	11	34	.59	58	.38	.42
Orchardgrass—boot	15	61	34	5	31	.64	62	.27	.34
Sorghum-sudangrass—									
average	9	65	40	5	36	.56	55	.46	.21
Timothy—boot	9	61	32	4	28	.60	59	.53	.25

Source: Linn and Martin (1985).

Relative feed value (RFV) is a new way to express the quality of a forage. RFV is an index which combines an important nutritional factor (digestibility) and potential intake into one number for a quick, easy and effective method of evaluating forage quality (Linn and Martin, 1987). Digestibility and potential intake are determined from ADF and NDF analysis, respectively, and are used to calculate a RFV index. The RFV index is used to determine the relative quality of the hay in terms of quality standards (Table 3). Quality standards (hay grades) based on RFV have been used at quality-tested hay auctions in Wisconsin and Minnesota. At these auctions all hay is tested on site before sale. Forage composition is rapidly determined using a mobile van equipped with an NIRS (near infrared reflectance spectroscopy) instrument. The results of auctions at three Minnesota locations are shown in Table 4. Within locations, higher prices are consistently paid for the higher grades of hay. This indicates that buyers recognize the value of quality forage and have confidence in the standards.

Hay Sampling

The accuracy of any laboratory method of determining forage quality is influence by forage sampling method (Ellingboe and Martin, 1987). When sampling your own hay or buying hay, it is imperative to have a sample which is representative. Some tips for obtaining a representative sample are:

1. Sample from a 'lot' of hay. A 'lot' of hay is hay coming from the same field and cutting and which is harvested, handled, and stored in a similar manner.

2. Obtain representative samples from each 'lot' of hay using a core sampler. The recommended procedure is:

   a) Use a core sampler or hay probe with a sharpened cutting tip, with a minimum cutting diameter of at least 1/2 inch but not more than 1-1/2 inch and with a minimum penetration of 12 inches.

   b) Sample at least 15-20 bales from each 'lot' of square bales or sample at least 10 bales from each 'lot' of round bales.

   c) Drill 12 inches into the center of a square bale from the butt end. Round bales should be cored from each side.

   d) If the hay probe is used in an electric drill, operate only at low speeds.

   e) Store and ship hay samples in airtight bags or containers to prevent a change in forage moisture.

Table 3. Legume, grass and legume-grass mixture quality standards (Grades)[a].

Hay Standards	RFV[e]	Analysis[b] CP	ADF	NDF	DDM[c]	DMI[d]
		----- % of DM ------			%	% of BW
Prime	>151	>19	<31	>40	>65	>3.0
1	125-151	17-19	31-35	40-46	62-65	3.0-2.6
2	103-124	14-16	36-40	47-53	58-61	2.5-2.3
3	87-102	11-13	41-42	54-60	56-57	2.2-2.0
4	75-86	8-10	43-45	61-65	53-55	1.9-1.8
5	>75	<8	>45	>65	<53	<1.8

[a] Standard assigned by Hay Market Task Force of AFGC.
[b] Analysis associated with each standard; CP = crude protein, ADF = acid detergent fiber, and NDF = neutral detergent fiber. CP is not used in calculation of RFV.
[c] Dry matter digestibility (DDM, %) = 88.9 - 0.779 ADF (% of DM).
[d] Dry matter intake (DMI, % of body weight) = 120/forage NDF (% of DM).
[e] Relative Feed Value (RFV) calculated from (DDM x DMI)/1.29. Reference hay of 100 RFV contains 41% ADF and 53% NDF.

Source: Linn and Martin, 1987.

Table 4. Number of lots tested with average price of hay at three quality tested hay auction sites, Minnesota 1985-86.

Hay standards	Relative feed value	No. of lots	Avg. price $/T	No. of lots	Avg. price $/T	No. of lots	Avg. price $/T
		- Preston -		- Caledonia -		- Zumbrota -	
Prime	151	1	85.00	2	76.50	6	114.17
1	125-151	7	86.57	10	84.30	32	104.38
2	103-124	7	72.17	23	79.54	67	90.37
3	87-102	6	57.33	12	70.33	22	79.88
4	75-87	1	52.50	3	64.67	10	74.25
5	<75	0	---	1	60.00	4	80.00

Source: Martin and Ellingboe, 1986.

f) Do not sample by using the 'grab' method or by removing a flake of hay. In the grab method, in which fistfulls of hay are pulled from bales, many of the leaves are stripped from the stems resulting in a sample which underestimates the forage quality. Flakes of forage are difficult to handle and do not usually represent a 'lot' of hay.

3. To make use of forage nutritive value information, it is important to plan ahead. Schedule forage sampling and testing in advance so that you have the information on hand at decision time.

Factors Affecting Nutritive Value

The content and availability of essential nutrients is a key aspect of forage quality. For milk producing animals, protein, energy, and mineral concentration are important nutrients. If you're growing or buying forage, a knowledge of crop maturity, species, and handling will help you to manage or estimate its nutritive value.

Crop maturity: Forage quality is affected by maturity or morphological development of forages at harvest (Table 2). Timing of harvest is generally the most effective way to insure quality forage. Using alfalfa as an example (Figure 2), it is apparent that forage quality (digestibility) is greatest when forages are immature and vegetative. Nutrient concentration declines sharply with increasing maturity. This change is associated with increases in lignin and other fibrous constituents of the stem and a decrease in leaf proportion. Because leaves are more nutritious than stems (Table 5), any reduction in leaves relative to stems (whether due to maturation, insect attack, or leaf disease) will decrease overall forage quality. The risk of leaf loss with maturity is greater for legumes than for grasses and is greater for alfalfa than for red clover.

Species: The greatest differences among forage plants are evident when we compare grasses and legumes (Table 1). Grasses contain less crude protein than legumes unless grasses are fertilized with high rates of N. Under favorable soil condition, legumes obtain N from the air through a process called symbiotic N fixation. Legumes generally contain higher mineral concentrations than grasses; however, the high Ca:P ratio in alfalfa may predispose dairy animals to milk fever unless the diet is properly balanced.

Legumes have greater rates of digestion and greater intake potential than grasses although total digestibility may be similar. Differences in rate of digestion and intake are related to fiber composition. Legumes usually contain more lignin, but less hemicullulose and total cell walls (neutral detergent fiber) than grasses.

Table 5. Digestibility and crude protein concentration of alfalfa and birdsfoot trefoil forage.

Species	Stage	Digestibility		Crude Protein	
		Stem	Leaf	Stem	Leaf
		%			
Alfalfa	Vegetative	68	85	18	35
	First Flower	55	81	12	31
Birdsfoot trefoil	Vegetative	75	83	15	31
	First Flower	60	81	10	30

Source: McGraw and Marten, 1986.

There are many grass and legume species suitable for forage (Table 1). The primary legumes used for stored feeding in Minnesota are alfalfa, red clover, and birdsfoot trefoil. The primary forage grasses are smooth bromegrass, timothy, reed canarygrass, and orchardgrass. Although species do sometimes differ in nutrient content, these differences are relatively small compared to those due to crop maturity.

Weed contamination of forage may or may not reduce the quality depending on the weed species and maturation. Table 6 shows the nutritive value and palatability of several weeds harvested when alfalfa was at bud. It is not possible to conclude that all weeds reduce forage quality. For example, although dandelion, which frequently invades alfalfa, has a slightly lower crude protein concentration than alfalfa, it is frequently more digestible. Seed stage dandelion has a lower palatability than alfalfa, but vegetative dandelion has equal palatability. In contast, contamination of forage with weeds such as hoary alyssum and Canada thistle may not effect forage nutritive value but will consistenly reduce forage palatability.

Forage handling and drying conditions: The quality of the standing forage crop is usually greater than that of the forage (hay or silage) removed from the field. The loss in quality starts when the cut forage is drying. The energy content of the forage is reduced by plant respiration which consumes readily digestible carbohydrates. Handling of forage during raking, baling or chopping, and hauling routinely leads to forage dry matter losses of about 25%. These losses are mostly highly nutritious leaves. Losses in forage quality are usually greater for hay than silage systems.

Exposure of drying hay to rain may have a dramatic effect on forage quality. Rain leaches nutrients and can shatter leaves. Reraking of rained hay can cause additional leaf losses. Table 7 shows the effect of 1 inch of rain applied to nearly dry hay which had been cut at two maturities. Rain decreased forage CP and digestible energy content and increased fiber content. The reduction in crude protein content was greater for the hay cut at late bloom.

For proper storage of hay, a maximum moisture concentration of 20% is recommended. Above this level, molding and heating increases. Severe molding and heating can ultimately result in spontaneous combustion, but more often molding of forages and heating to temperatures below ignition results in serious losses of forage quality. These losses are associated with a reduction in energy and availability of crude protein. Molded hay will be dusty and discolored, and palatibility may be reduced.

Table 6 . Forage quality and maturity of alfalfa and perennial weeds harvested in early June.

Plant Species	NDF[a]	CP	Dig.	Palat.
Alfalfa (bud)	42	20	68	3
Smooth bromegrass (head)	63	14	67	5
Quackgrass (boot)	54	18	69	4
Dandelion (seed)	33	13	77	8
White cockle (bud)	46	15	75	4
Curly dock (veg.)	33	17	65	10
Hoary alyssum (bloom)	42	14	76	10
Canada thistle (veg.)	32	19	78	10
S. smartweed (veg.)	35	22	58	8

[a]NDF = neutral detergent fiber; CP = crude protein; Dig. = digestibility; Palat. = palatability on scale 1 = no rejection, 10 = complete rejection determined by grazing animals.

Source: Marten et al., 1987.

Table 7. Effect of one inch of rain on forage quality of early bud and late bloom alfalfa.[+]

Rainfall	Maturity	CP[a]	ADF	NDF	IVDDM
		%			
none	early bud	26.2	32.0	41.0	67.6
	late bloom	18.1	38.1	48.8	60.1
1 inch	early bud	24.6	34.5	42.1	65.2
	late bloom	13.9	39.6	49.0	58.8

[a]CP = crude protein; ADF = acid detergent fiber; NDF = neutral detergent fiber; IVDDM = digestibility.

Source: Collins, 1983.

Summary

Forage nutritive value and quality can be appraised by sensory and chemical methods. The results of chemical evaluations can be utilized in deciding relative quality ranking of forages or in ration balancing.

Forage of many plant species is suitable for dairy goat feeding. Legumes such as alfalfa are often preferred because of their high protein concentration and high intake potential.

The quality of any forage crop is dramatically influenced by maturity at harvest. Forage nutritive value is greatest for immature forage and declines with maturity.

References

Collins, M. 1983. Wetting and maturity effects on the yield and quality of legume hay. Agron. J. 75:523-527.

Linn, J., and N. Martin. 1985. Using forage test results in dairy rations. Minnesota Agric. Ext. Service. AG-FO-2637.

Linn, J.G., and N.P. Martin. 1987. Relative feed value as a measure of forage quality. Minnesota Forage Update. Vol. XII (4):2-4.

Marten, G.C. 1985. Factors influencing feeding value and effective utilization of forages for animal production. pp. 89-97. In Proc. Int. Grassl. Congr. Kyoto, Japan. 24-32 August. Iroha Insatsu Kogei Co., and Yamanoto Kogyo Cl., Nagoya, Japan.

Marten, G.C., C.C. Sheaffer, and D.L. Wyse. 1987. Forage nutritive value and palatability of perennial weeds. Agron. J. 79:980-985.

Martin, N.P., and R. Ellingboe. 1986. Quality tested hay auctions start soon. Minnesota Forage Update. Vol. XI. (4):3-6.

McGraw, R.L., and G.C. Marten. 1986. Analysis of primary spring growth of four pasture legume species. Agron. J. 78:704-710.

Sheaffer, C.C., and G.C. Marten. 1987. Alfalfa harvest management strategies for the 1990's. Crops and Soils 39(8):6-8.

BEGINNERS BASIC MANAGEMENT
OF DAIRY GOATS

Maxine Sheldon
Maple Island Alpines

Housing, feeding, health management, milk handling and your breeding program are the areas which I will be discussing. All of these areas are important for a successful management program.

HOUSING

In our climate, we must provide duel purpose housing that will keep the goats warm in the winter and cool in the summer. A building that is double-walled and insulated is ideal. This could be either a new structure or an adapted farm building already in existence. If an older barn, hog house or chicken coop is to be used, diligent cleaning and sanitizing should be completed before the goats are housed in them. If you are building a new building, the University has building plans for calf barns that work very well for dairy goats. Each goat should have a minimum of fifteen square feet of space. Plan generously. Goat herds have a tendency to grow quickly!

Ventilation is a major concern. Not only will you need windows that are functional and provide good cross-ventilation, you will need a ventilation fan. Excessive humidity, not temperature control, is the biggest problem. Goats can tolerate cold temperature, but not high humidity.

Along with dry air, the goats need a dry floor that is well-bedded and warm. Gravel flooring in loose housing pens works very well. Cement floors may require more bedding to absorb excess moisture and to provide protection from the cold. With the use of adequate bedding it will be necessary to completely clean the barn about four times per year.

Insect control, mainly flies, is also important. The windows should be screened and the barn kept clean. You will still need help from fly strips and dairy sprays. Mosquitoes also like the taste of goats, and must be controlled.

Keeping goats confined does not have to be a hassle. A majority of our fencing is electric. We also use some hog panels. For our bucks we use woven wire with one strand of elecric on the inside. The one strand of electric keeps the bucks from rubbing on the fence and stretching the fence out of shape. We have found that keeping our goats well fed with adequate exercise area prevents them from wanting to get out. We also do not teach our kids how to jump or come over the fence. We always walk them through a gate instead of lifting them over the fence. Another thing to keep in mind when fencing is not only keeping your goats in, but keeping out unwanted preditors. Strange dogs in goat pens are deadly.

FEEDING

Most important is getting on a good feeding program and being consistent. Talking to your extension agent will help you determine what dairy farmers in your area are feeding their cows, and where they are getting their feed. A good 16% protein dairy ration should be adequate. Most feed mills have a dairy ration available. There are also some commercial diary goat rations on the market. If you use a cow feed, be sure it does not contain urea or estrogen. Goats do not tolerate these additives. We use a 14% or 20% protein pelleted dairy ration marketed by the Doboy feed company. The protein varies depending on the quality of the forage we are feeding. This has worked the best for us and is the most econimiacl way for us to feed grain. We feed about four pounds of grain per goat per day for eight pounds of milk. We increase that according to the individual goats' production. One pound of grain for two pounds of milk. A doe milking ten pounds per day would receive five pounds of grain. During the dry period we feed less than four pounds if the doe is getting too heavy.

Along with our pelleted grain our goats have alfalfa hay available to them at all times. A good qualtiy dairy hay is best. Grass hay with many weeds and coarse stems is not as palatible for the goats and strong weeds make strong tasting milk. Loose salt and minerals should also be available at all times. Your feed person would be the best person to advise you on what minerals to use with your particular hay and grain.

Grain and hay sould be fed in feeders off the floor, with both being non-accessible for playing or sleeping. Manure droppings should also be kept out. Clean water should be available at all times, and if possible it should be warm, summer and winter.

HEALTH MAINTENANCE

Prevention is much easier and cheaper than curing. To accomplish this there are some routine management procedures that should always be done.

Hoof trimming is one of them. This should be done as needed, which turns out to be about every two months. Some goats' hooves grow faster than others and will need to be done more frequently.

All kids should be disbudded at four to five days of age if they are horned. If you have adults with horns, they can de dehorned when there are no flies, but you should have some help from your veterinarian when doing this.

Routine worming should be done at least twice yearly. This should be done before breeding season in the fall, and after kidding in the spring. It is better to rotate worming medication, not using the same wormer twice in a row. Thiebenzole and Panacur are very effective. If you have coccidia in your herd, a wormer for that specifically must

be used. Keeping hay, grain and water feces free, and keeping your barn clean is also important for controlling parasites.

You should also check for external parasites and treat as necessary. If your animals are rubbing and scratching excessively, loosing their hair or have dull coats, they may have lice, fleas or mange. If these goats are in milk, make sure you use a treatment that is for dairy animals. Clipping your goats in the spring will help you to evaluate their skin condition more accurately.

Vaccinations should be discussed with your veterinarian and given as he suggests. He will be aware of the health problems you are having and the health problems in your geographic location. We vaccinate yearly for enterotoxemia and tetanus. Tetanus is especially important if you have horses, or if there has ever been horses on your farm.

Another thing that should be done annually is testing for tuberculosis and brucellosis (bangs), particularly if you drink your milk unpasteurized.

When you are planning your housing, you should include an area where you can isolate an animal if it is sick or injured. It is also a good idea to isolate any new animal that is coming into your herd for a minimum of thirty days.

An important part of health care is finding a good veterinarian before you have a sick animal. Get to know him and give him a chance to get to know your animals before you have to call him in an emergency.

MILK HANDLING

Milk is one of the rewards for the hard work with your goats. Taking care of the milk properly is of utmost importance to insure a quality product for human consumption.

A separate, clean room for milking is needed. A cement floor is preferred, with an elevated milking stand, and a shelf for milking utensils during milking. The doe should have a dairy clip including her flanks, tail, udder and underneath her belly. The entire animal should be brushed to remove loose hair and dirt from her coat. Just prior to milking, all equipment that touches the milk should be sanitized in a water/chlorox solution and allowed to drain and air dry.

The doe's udder and teats should be washed with warm water containing an udder wash solution like chlorahexidine. Next dry the doe with a paper towel. Leave the paper towel under the doe and use it for a blotter for milk splashes. After the doe is dried with the paper towel, strip two squirts of milk from each teat into the strip cup to check for blood spots or milk clogs. This also removes the milk with the most bacteria from the teat. Proceed to milk the doe into a stainless steel pail. If a stainless steel goat milking pail is not available, any stanless steel mixing bowl or pan will suffice. When you have emptied the udder, massage it for a few seconds to work down

any milk that was high up in the udder. After the massage, milk the udder empty again. Next dip both teats in teat dip to seal the teat orifaces. The milk should then be strained into a glass jar and cooled immediately. Submerging the jar in ice water cools the milk faster than just setting it in the refrigerator. When you have finished milking, the equipment should be rinsed in tepid water, then washed in a dairy detergent and again sanitized in the water/chlorox solution and allowed to air dry. A brush works best for washing the utensils. The milk stand should be wiped off and the floor swept after milking.

BREEDING PROGRAM

A successful bareeding program is vitally important because it determines the type of animals that will be in your herd in the future. Each mating should have a purpose other than getting the doe bred to bring her into milk. A successful breeding is one in which the offspring is an improvement over the dam.

If you are planning to purchase buck service from another breeder, make the arrangements prior to the day you would like your doe serviced. Be prepared to meet the requirements of the breeder such as health certificates and time of day that is best for them. Discuss the cost of the service and be prepared to pay cash at the time of servicing. After the servicing is completed be sure to get a signed Sire Service Memo from the breeder for use in registering your kids when they are born.

There is nothing more difficult in the breeding process than determining for sure that the doe is in standing heat. The signs are red, swollen vulva, clear vaginal discharge, "flagging" with the tail, more talkative with a change in disposition. Milkers may have a reduction in production when they are in heat. Heat cycles last from twelve to twenty-four hours to two or three days. Every doe is an individual. The cycles should occur about every twenty-one days. If you are having difficulty in detecting heat, a buck rag may be helpful. The best time for catching does in heat is usally October or November, but some will breed as early as August or as late as January.

Doe kids may be bred when they are seven months old and weigh a minimum of eighty-five pounds. Does in milk should be bred to freshen about the same time every year. They should have a two month rest from milking after their ten month lactation, before freshening again. You will need to start drying them up at least eight weeks before they are due to kid.

When your does are bred, they will need adequate exercise and should be protected from over-crowding and stressful situations. When the due date arrives, be sure to be on hand for the kidding. If you are unable to be there, at least arrange to have the doe checked two or three time a day. Does usually kid within five days before or after their due date. After the doe has freshened, she should not be milked empty for the first twenty-four hours. Just keep the udder milked

enough to keep the pressure off and the doe comfortable. After the first day, the doe should be milked twice a day at regular twelve hour intervals.

Kids should remain on milk along with grain, hay and water until they are three months old. Bottle feeding or pail feedings will need to be done three times per day for the first month, then a twice a day schedule may be implemented. Separate housing is most desirable for the kids until they are large enough to compete with mature animals. Buck and doe kids should be separated by three months of age or breedings may occur.

Last but not least, take time out to enjoy your goats. Goats are devoted and loving animals that will give you many years of service for the price of some common sense and lots of TLC.

PROMOTION OF DAIRY GOAT PRODUCTS BY THE MINNESOTA DAIRY GOAT ASSOCIATION UPDATE

KARYL DRONEN

The Minnesota Dairy Goat Association has always promoted the goat as the motto on our buttons proclaim. Each member has worked singly or collectively to promote dairy goats and their products-spreading the message akin to the way old-time traveling ministers spread the gospel. Dairy goat people have made inroads into the minds of people who never thought about goats. Promotion, however, was done quietly over coffee with a neighbor or at the county fair by sponsoring a 4H dairy goat project.

But, there is a change in the air - as sure as the changing leaves of fall. The MDGA promotion committee was born out of and because of that change. MDGA is a forward looking organization, that in the fall of 1986 decided to take an aggressive approach to the problem of product promotion.

So what was the big change in America that prompted the MDGA to write letters to their American Dairy Goat Association directors demanding national promotion? The change that set aside $1.00 of each MDGA membership for product promotion? The change lies in the tastes of the American consumer. American tastes are becoming more sophisticated and now includes European specialty cheeses. European-style goat milk cheeses are fast becoming the brie of the eighties states Charlotte Balcomb. No longer do Americans think cheese means Kraft American singles. Goat milk cheeses are appearing on cheese shelves across the country and on many restaurant menus. Goat milk cheese consumption is growing at an average annual rate of 20% according to Dr. Chateau. Most of this market is supplied by France and Norway with limited domestic cheese production.

Our efficient dairy goats produce many products milk, meat and leather to name a few. But, the promotion committee decided to concentrate on dairy products. Fluid goat milk has always had a limited market, but the goat milk cheese market is expanding rapidly, so the committee turned its attention to what the American consumer wants----CHEVE!! Why should the goat milk cheese market be dominated by imports when domestic products are available and the dairy goat industry could expand to meet the needs.

But, does promotion increase the demand for a product and therefore increase the marketability of that product? The answer is YES. "Since the National Dairy Promotion Board was formed in 1983 the commercial usage of dairy cow products has increased by 8.6 billion pounds of additional milk and dairy products. This translates into a 7% total increase in the first two years of the boards existence wrote Ralph Hofstad, President of Land O'Lakes, Inc. He also states that an increased awareness by consumers, as a result of product promotion, ultimately increase the amount of product sold. Product promotion is something most agricultural organizations believe in. That's why the dairy farmers put 15 cents per cut toward a national promotion program, the beef producers set aside $1.00 per head and the pork producers checkoff one quarter of 1% of the animals value for promotion. National promotion is not something that can be done by individuals, it simply costs too much. However, a group working toward a common goal can benefit.

Why did MDGA decide to focus on the food service industry? Because of the volume of business done by these organizations. The restaurant business has grown consistently since the 1950's. More people eat out more often and spend more money than ever before. A recent survey conducted by Restaurant and Institutions magazine found that 40% of those surveyed ate out more than 7

meals per week. 88.9% answered yes when asked if they had eaten out during the week prior to the survey. Also, what is spent eating out is increasing from $28.68 to $31.87 in 1987. Clearly, the business is there and the money is also.

So where are we now and how did we get there? One summer evening in July, committee members met at the home of a semi-professional photographer and spent the evening setting up cheese displays for photos. The pictures turned out beautifully. We had some of the photos enlarged and framed. These photos have been used in the MDGA booth at the State Fair and the ADGA National Convention.

One of the photos was used in our national promotional ad for goat milk cheeses. Restaurant and Institutions magazine was selected as the one to advertise in because it is one of the leading food industry magazines and because it has over a 200,000 distribution. Four cheese producers were contacted to help defray expenses. The ad appeared in the fall premier issue of Marketplace magazine. To date we have received 122 inquiries and have forwarded these to the cheese producers. It is too early to tell how much business will be generated by this ad, but time will tell - there is an interest.

What does this mean for the dairy goat industry? The hope is that as consumers become aware of domestic products the market will shift away from the European imports, that the dairy goat will become a profitable business and that quality livestock will be worth breeding and selling. But, most of all, that the dairy goat industry will take it's rightful place as part of the American agricultural economy.

Vic and Mary Tymoshuk

ADVERTISING BASICS

I.) KNOW YOUR PRODUCT
- A.) BE HONEST & OBJECTIVE IN APPRAISING YOUR STOCK
- B.) BE REALISTIC IN PRICING & CULLING YOUR STOCK
- C.) KEEP GOOD WRITTEN RECORDS
- D.) KEEP IN A LEARNING MODE
- E.) SLOW GROWTH IS MORE SECURE
  - 1.) HERD GROWTH SHOULD COINCIDE WITH MARKET DEMANDS
- F.) KEEP UP A SENSE OF HUMOR

II.) AGGRESSIVELY CULTIVATE YOUR MARKET
- A.) QUALITY + CREATIVE PROMOTION + PERSISTENCE EQUALS...

S-U-C-C-E-S-S

1.) SHOWS-PRESENT YOUR QUALITY REPRESENTATION PUBLIC
2.) D.H.I.A. - A PERMANENT WRITTEN ACCOUNT OF YOUR HERDS WORK
3.) DAIRY GOAT CLUBS - COMRADESHIP SPARKS INTEREST
4.) LOCAL NEWSPAPERS - ALWAYS INTERESTED IN NEW STORIES
   a.) WRITE A CATCHY ARTICLE OF YOUR OWN
   b.) CALL THEM UP FOR AN INTERVIEW
5.) OPEN YOUR FARM TO FIELD TRIPS
   a.) AREA SCHOOL CHILDREN
   b.) 4-H CLUBS
6.) WORD OF MOUTH, SHARE ABOUT YOUR FAVORITE PRODUCT
   a.) HEALTH FOOD FAIRS & STORES
   b.) LEAVE PROMOTIONAL ARTICLES AT YOUR VET'S OFFICE
   c.) LIBRARIES
   d.) COUNTY & STATE FAIRS
   e.) EXTENSION OFFICES
7.) SALES LIST
   a.) HAVE YOUR ANIMALS LISTED WITH EXTENDED PEDIGREES
   b.) ACCOMPLISHMENTS NOT EMBELLISHMENTS
   c.) BRED TO WHOM
   d.) PICTURES ARE WORTH A THOUSAND ADJECTIVES
8.) WRITTEN ADVERTISEMENTS
   a.) BLOCK ADS
   b.) CLASSIFIED
   c.) BREED LISTINGS IN THE DIFFERENT MAGAZINES

III.) WRITTEN ADVERTISEMENTS-WHERE WHEN & CURRENT COSTS
1.) STATE NEWSLETTERS - THE LEAST COSTLY
   a.) OUR MN GOPHER GOAT GOSSIP - ADS MUST BE IN BY THE 6TH OF THE MONTH PRECEDING PUBLICATION. COSTS & ADDRESS OF EDITOR:

(PAGE TWO-COST'S OF ADVERTISING IN G.G.G. & ADDRESS OF EDITOR:)

****
BARTER BOARD Classified Ads cost $2 per 50 words (1-50 is $2; 51-100 is $4; etc.)
WANT ADS are free.
ONLY PUREBRED OR AMERICAN BUCKS MAY BE ADVERTISED.
****

BLOCK ADS: Send prepared ad copy to Mark Boorsma

Size of ad	One month	3 months	6 months	12 months
1/16 page (2 5/8 x 2")	$1.50	$3.00	$5.00	$8.00
1/8 p. (2 5/8 x 4 1/8")	$3.00	$7.50	$11.50	$18.00
1/4 p. (5 3/8 x 4 1/8")	$5.00	$11.50	$18.00	$32.00
1/2 p. (5 3/8 x 8 1/8") or (10 1/2 x 4 1/8")	$8.50	$21.00	$36.00	$65.00
FULL PAGE (10 1/2 x 8")	$15.00	$35.00	$60.00	$100.00

****

ADDRESSES OF OFFICERS:

Mark Boorsma
185 Arboretum Blvd.
Chaska, MN 55318
612-443-2068

2.) NEXT LEAST EXPENSIVE IS YOUR BREED CLUBS MAGAZINES
(PRICES VARY - CHECK WITH YOUR BREED CLUB EDITOR)

A.) NAT. SAANEN BREEDERS ASSOC.
MARY JOAN
68551 MULBERRY RD.
LAKEVILLE, IN 46536

B.) ALPINE INTERNATIONAL
LINDA LEWIS
RT. 1, BOX 121
LIBERTY, TN 37095

C.) AM LA MANCHA CLUB
WENDY DOHERTY
13641 14TH AVE.
HANFORD, CA 93230

D.) INTERNAT. NUBIAN BREEDERS ASSOC.
90669 GEORGETOWN RD.
JUNCTION CITY, OR 97448

E.) OBERHASLI BREEDERS OF AMERICA
MARY SLABACH
RT. 1, BOX 215
WAWAKA, IN 46794

F.) NAT'L TOGGENBURG CLUB
TERRY DUNN
RT. 2, BOX 44
WHIGHAM, GO 31797

3.) UNITED CAPRINE NEWS - NEWSPAPER FORMAT, 12 ISSUES A YEAR
P.O. DRAWER A, ROTAN TEXAS 79546
DUE DATE FOR ADS: 15TH OF MONTH BEFORE PUBLICATION
$7.00 PER COLUMN INCH FOR BLOCK ADS, CLASSIFIED ADS: $.20 PER WORD, $4.00 FEE MINIMUM

4.) DAIRY GOAT JOURNAL - 12 ISSUES A YEAR. MOST EXPENSIVE BUT CLAIMS TO HAVE THE LARGEST CIRCULATION
401 N. BROAD ST. SUITE 226, PHILADELPHIA, PA 19108
DUE DATE FOR ADS: FIRST OF MONTH PRECEDING PUBLICATION FOR CLASSIFIEDS. 2 MONTHS PRECEDING PUBLICATION FOR BLOCK ADS.
CLASSIFIEDS: $.40 PER WORD, $7.00 MINIMUM. BLOCK ADS RATES:

BLACK & WHITE RATES:

SIZE		1X	6x	12X
Full Page...		325	320	310
2/3 page	2 col. x 10".....	220	215	210
1/2 page	3 col. x 5".....	180	165	160
1/3 page	1 col. x 10".....	120	118	115
	2 col. x 5".....			
1/4 page	1 col. x 8".....	105	100	95
	2 col. x 4"			
	1 col. x 6".....	80	78	76
1/6 page	1 col. x 5".....	75	73	70
1/8 page	1 col. x 4".....	65	63	60
	2 col. x 2. 30			
1/10 page	1 col. x 3".....	54	52	50
1/15 page	1 col. x 2".....	43	42	40
1/30 page	1 col. x 1".....	23	22	20

COVER:

Front cover one photo only
Black and White.....195
4 Color Photo.....395

IV.) THE HOW'S OF SIMPLE WRITTEN AD'S

1.) LAYOUT - MAGAZINES THAT COMMAND A LARGE INCOME DO THIS AS A SERVICE (REFLECTED IN THE PRICE OF THE AD). IN THE CASE OF NEWSLETTERS ON A SMALLER BUDGET, SUCH AS OUR STATE G.G.G., ONE MUST SEND IN A PREPARED AD, OR "COPY READY". THIS MEANS IT HAS TO BE THE EXACT SIZE THAT YOU WANT IT TO APPEAR IN THE PUBLISHED PRODUCT.

2.) KEEP INFORMATION CONCISE & CLEAR

3.) PHOTO'S ARE HELPFUL
   1.) FOR BEST RESULTS US A CONTRASTY BLACK & WHITE
   2.) 35MM CAMERA
   3.) TO REPRINT PHOTO'S, A SCREENING PROCESS IS NEEDED
      a.) USUALLY EXTRA FEE IS INVOLVED FOR THIS
      b.) IN THE CASE OF G.G.G., SCREENING IS UNAVAILABLE

4.) DESIGN & STICK WITH THE SAME LOGO IN EACH OF YOUR ADS

5.) BE CONSECUTIVE IN YOUR ADS

6.) BUDGETING - IN THE NATIONAL CONVENTION OF 1986, KIM PEASE, PUBLISHER OF THE UNITED CAPRINE NEWS SAID THAT YOU WANT TO DEVOTE APPROXIMATELY 15% OF YOUR EXPECTED INCOME TO ADVERTISING.

GOURMET USES FOR GOAT CHEESE

Marge Kitchen
Grandy, Minnesota

We are in the 1980's, the era of gourmet food products along with all other prestige items. Many dairy goat breeders are unaware of the fact that they own and possess the producers of one of the many expensive desirable food products used by the country's top chefs. California markets have been producing and using chevre since the 1970's. Chevre is becoming more and more popular in the Midwest and will probably become more so with the availability of the product. We are able to purchase chevre and other dairy goat cheeses in our better food markets and food co-ops.

Many dairy good breeders are not aware of the many fine products that our dairy goats produce for us. Many feel it is difficult to make these fine products, but do love to sample and test the products that their peers have made. I hope that you will take the time to possibly try your hand at making some gourmet items for your family, relatives and friends to hear the oh's and ah's....

If you feel it is difficult to make cheese, throw away that thought and get yourself a recipe, a few necessary cooking utencils and make your first cheese. You will be amazed. Attached is a very simple Queso Blanco cheese recipe that you can use in several recipes. This is an excellent recipe for 4-H project meetings.

There are several dairy goat cheese books available, but one that I found very beneficial is the Minnesota Extension Bulletin #395-1975, entitled, Making Cheese at Home, which you may obtain at your local Extension office.

Some recipes that I have tried and enjoyed are:

ZIPPY CHEESE BALL

4 oz Goat Cheese (Monterey Jack), grated
8 oz. bleu cheese
8 oz. cream cheese (chevre)
1/4 c. chopped onion
1 tbs. Worchestershire sauce
1 tbs. lemon juice
1/4 c. chopped pecans
1/2 c. chopped parsley

Combine cheese, onion, Worchestershire sauce and lemon juice in a bowl; mix well. Shape into ball. Coat with mixture of pecans and parsley. Chill until serving time. Garnish with whole parsley - serve with crackers.

STRAWBERRY DESSERT

This is an easy and elegant dessert to prepare.

Fresh or whole frozen strawberries.
Cooled prepared strawberry glaze. Glaze can be purchased or prepared.

Slice 1 inch slices of jelly roll, decorating with 1 heaping tablespoon of cream goat cheese (chevre), fresh strawberries, pour glaze over top as desired.

Ready to serve. Garnish with green leaf.

SPINCH SALAD

Wash and dry spinach leaves (approx. 1/2 pound)

Heat in skillet:
1 tablespoon olive oil.

Cube 8 oz. Quesco Blanco cheese rolled in bread crumbs. Brown in skillet.

Mix:

Spinach leaves, browned cheese cubes,
add:
1/4 pound fresh sliced mushrooms,
1 sliced red onion or fresh green onions chopped.

May add: whole cherry tomatoes.

Toss with Italian dressing or vinegar and oil dressing of your choice.

SOME MORE IDEAS

Use goat cheese (chevre) in all recipes that call for cream cheese.

Add cheese to scrambled eggs just before they are set.

Melt chevre on top of hamburgers and steaks.

Use goat cheese in lasagne.

Make your own chip dip with cream cheese.

Warm walnut bread and goat cheese makes an excellent combination.