

Dairy Goat Management



Best Management Practices

BEST MANAGEMENT PRACTICES FOR DAIRY GOAT FARMERS

Compiled and written by Clara Hedrich, with assistance from
Dr. Chris Duemler, DVM, and Dan Considine

This publication is made available through a grant from the



University of Wisconsin Emerging Agricultural Markets Team



with support from

The Wisconsin Dairy Goat Association



and the

**Wisconsin Department of Agriculture, Trade and Consumer
Protection**

April, 2008

BEST MANAGEMENT PRACTICES FOR DAIRY GOAT FARMERS

TABLE OF CONTENTS	PAGE
Chapter 1: Basics of Establishing a Goat Dairy in Wisconsin	1
Introduction	1
Finding a Market	2
Investing in Facilities and a Herd	5
Planning for Success	6
Time, Labor, and Management	7
Building Your Team	8
Inspection and Licensing	9
Record Keeping and DHI Testing	10
Other Sources of Income	11
Assessing Business Feasibility	12
Goat Dairy Start-Up Checklist	13
Chapter 2: Managing Milking Does	14
Dairy Goat Breeds	14
Milking Doe Facts	17
Basic Terms in Dairy Goat Husbandry	18
The Fresh Doe	19
Feeds and Feeding	20
Intake and Feeding Behavior of Goats	23
Eating and Intake Characteristics	24
Grazing Key Points	25
Feed Tests	26
Animal Comfort	27
Producing High Quality Milk	29
Proper Milking Procedures	30
Somatic Cell Count	32
DHI Records	34
Ultra Sounding the Doe	35

The Dry Doe	36
Cost of Production	38
Doe Management Checklist	41
Chapter 3: Breeding and Kidding	42
Breeding Protocol	42
Breeding Systems	43
Breeding Youngstock	46
The Doe's Heat Cycle	47
The Pregnant Doe	49
The Dry Doe	50
The Kidding Doe (Parturition)	51
Breeding and Kidding Checklist	53
Chapter 4: Raising Kids	54
Introduction	54
Pre-Parturition	55
Parturition	56
Birth to Weaning	60
Weaning to Breeding	65
Summary	66
Cost of Raising a Kid from Birth to Weaning	67
Kid Raising Costs based on 2008 prices	68
Checklist for Raising Kids from Birth to Weaning	69
Chapter 5: General Herd Health	71
Introduction	71
Disease Management	72
Preparations Prior to Breeding	73
Preparations Prior to Kidding	75
Kid Care at Parturition	76
Kid Care Till Weaning	77
Diseases Common to Goats	78

Metabolic and Nutritional Diseases	93
Diarrheal Diseases	104
Mastitis	106
Stomach Worms	110
Total Herd Health Plan	113
Chapter 6: Facilities and Equipment	115
Dairy Goat Housing	115
Grouping Animals	117
Working in the Barn	118
Electrical Needs	120
Ventilation	121
Storage	123
Equipment Needs	124
Milking Area	125
Investment Impact on Cost per CWT	126
Facilities and Equipment Checklist	127
Chapter 7: Milking Systems and Routines	128
Milk House Construction and Facilities	128
Basic Principles of Machine Milking Systems	133
Checks and Maintenance	139
Troubleshooting Milk Quality Issues	140
Resources for Milking Systems and Routines	147
Chapter 8: Identification and Genetics	148
Identification	148
Breeding Goals	151
Genetics	152
Making Sense of Genetics	157
Summary Steps	158
Sources	159

Identification and Genetics

IDENTIFICATION

There are several good reasons to permanently identify your goats. The permanent identification:

- Allows the farm manager to keep track of who the goat is and to keep accurate records as ancestry, health, reproduction, and lactation.
- Is required by ADGA (American Dairy Goat Association) in order to register your goat.
- In the event the animal is lost or stolen the animal can be readily identified.
- By being able to identify the animal it is much easier to make genetic



Supplies that are necessary for tattooing include the tattoo tongs with numbers and letters, tattoo ink, rubbing alcohol, towels and a toothbrush. A tattoo is a form of a permanent identification. Tattoos are placed in the ears of all of the breeds of goats except for the Lamancha breed. The tattoo is placed in the tail web of the Lamancha.

progress. Goats may be permanently identified by using a tattoo, tag or a microchip. Tattoos are permanent if well done but take time and effort to read and may fade with age.

Goats are curious by nature; thus using non-permanent identification may be a challenge. Ear tags may be chewed on, pulled out or worked out of the ear and eventually lost. Plastic number tags on a neck chain are readily chewed on and the number may be unreadable or the chain may break and the number will be lost. Ear tags with microchips in them are becoming more common. Neck chains with matching numbered tattoo or ear tags may be a good system. This provides a good visible ID in the neck tag and also provides a corresponding permanent ID.

Permanent Identification of Dairy Goats

The first step in correctly identifying a kid goat is to place a neckband on the kid upon birth. On the neckband write the animal's birth date and doe number. Record this information along with the sire in your reproduction record keeping system.

If tattoos are the primary ID, kids should be tattooed early at 1 to 4 weeks. Required tattoo supplies include a tattoo tongs with numbers and letters, tattoo ink (most prefer green ink) either paste or a

Identification and Genetics

roll on, a bottle of rubbing alcohol and a toothbrush.

The farm identification letters/numbers go in the right ear. To determine the right or left side of an animal, stand directly behind the animal facing the back end of the animal. Your right side will be the animal's right side; your left side will be the animal's left side.

The Unique Tattoo Sequence should be used in the right ear of all the goats. The sequence is assigned by ADGA when a membership is issued. A sequence preference can be requested on the membership application. If the requested sequence is already in use, another sequence will be assigned. A unique tattoo can be used by more than one membership if authorized in writing by the ADGA member that is assigned the sequence.

If the assigned unique tattoo is used and each goat has a different left ear tattoo, the goats are uniquely identified and meet the scrapie requirements for movement within or out of Wisconsin (if also registered). Scrapie tags are available from WDATCP and are required to sell goats over 6 months in Wisconsin if goats are not tattooed and registered.

The tattoo in the left ear is used to identify the specific animal. This tattoo

starts out with a letter, which represents the year. The ADGA tattoo letters by year are 2007 – X, 2008 – Y, 2009 – Z, 2010 – A and 2011 – B. The second tattoo is a number. The first animal born that year has the number 1, the 2nd is 2, etc. Thus the 52nd animal born that is being tattooed in the year 2008 would receive the tattoo Y52 in her left ear.



Goats may lose neck chains and identification tags. A system should be in place to permanently identify the animal so that if a tag is lost the animal can still be positively identified.

To actually tattoo an animal, place the correct letters and or numbers in the tattoo tongs. Punch a piece of paper to be sure the tattoo is correct. Next clean the inside of the ear with rubbing alcohol. Rub this surface with the green ink; put the flat rubber surface against the back of the ear. Do not tattoo over a major vein in the ear. Tattoo the ear using the tattoo tongs to puncture the ear firmly. Roll on more ink, and scrub this ink into the tattoo marks with the toothbrush. The

Identification and Genetics

ink needs to be rubbed in for at least twenty seconds to get a long lasting tattoo.

This tattoo will permanently identify the animal for the rest of its life. Since the ears of the Lamancha breed are so short they have their tattoos in their tail webs. To read tattoos in black or brown skinned ears, darken the area around the goat's head and ears and shine the beam of a flashlight through the back of the ear so it illuminates the skin around the tattoo. The tattoo is very easy to read if done properly.

When animals enter the milking herd neck chains with a tag are put on for easy identification. Recording the tag number for each tattoo is necessary as goats will lose neck chains and tags. Using neck tags matching tattoo or ear tags works well.

Small sheep and goat tags (like Premier) applied close to the head can be applied at a few hours or days old and will usually stay in for the lifetime of the animal. These are small tags and are hard to read unless the doe is caught and held.

In summary, permanent identification is necessary for accurate recording of reproduction, milk production, and health records for an animal. It is hard to maintain and make genetic improvements in your herd if no records are kept.

Microchip Identification

Microchips under the skin or embedded in ear tags are also used and can result in time savings during stock working. The chips can be lost with tags or migrate under the skin. Under skin microchips can be reported to ADGA for addition to the certificate of registered animals. They are more tamper proof than tags or tattoos and are gaining in popularity.

Identification and Genetics

BREEDING GOALS

The first step to advancing your herd genetically is to develop your breeding goals and then stay with them. In a dairy goat-milking herd you will obviously be looking at milk production, butterfat, and protein components.

But remember, type is important also.

The doe must have strong feet and legs with the correct set to the legs to allow her to move freely to and from the feed and water source as well as the milking area. She needs a strong mammary attachment that is high and wide. This will minimize udder trauma as she walks and as she lies down and gets up. A deep wide body will give her lungs, heart and rumen plenty of room for feed capacity to help oxygenate and circulate the blood. A strong topline will set up the body to work well together. A slightly sloping rump will allow the doe to have kids without getting lodged in the birth canal.

A key point to remember: **Milk puts the doe in the herd, but type will keep her in the herd.**

Identification and Genetics

GENETICS

The genetic potential of dairy goats to produce milk and desired components can be improved each generation if does and bucks with the best genotypes in the current generation are selected as parents for the next generation.



More genetic progress can be made in a herd if the concentration of the efforts is on the selection of the buck.

Selection Response

Again, the first step in the selection process is to define the goals of the program; e.g. which traits are desired in selection. The appropriate records need to be collected on the selection candidates and their relatives.

From these records, the breed values of the individuals are estimated and the goats ranked from best to worst. The breeder must now decide how many goats of each sex are needed. Selection is then simply keeping the top ranked animals. Fewer bucks are required to maintain the

population than females; therefore, the intensity of selection for males should be much greater. This points out that **more progress can be made by concentrating efforts on buck selection.**

Inheritance of Production and Type Traits

The inheritance of milk production and most body type traits is complex. Unlike some physical traits that are simply inherited (qualitative traits) and are controlled by a few genes (for example, coat color and the presence of horns), milk production and body type traits are under the control of many genes (quantitative traits), perhaps a thousand or more. Although the individual influence of each of these genes may be small, their collective influence can be great.



Coat color is a qualitative trait that is affected by only a few genes.

Production and type traits also are affected by environmental factors such as feeding, management, and health. In

Identification and Genetics

most cases their influence is greater than inheritance. However, this does not mean that genetic selection is not effective for improving many of these traits.

Environmental influences, however, can mask genetic differences when selecting between animals. The genetic constitution of an animal cannot be determined with certainty by physical observations or by test matings as is the case with some simply inherited qualitative traits. One cannot be sure if above or below average performance of an individual goat is due to genotype or environment.

Accordingly, parents may not “breed true” for production and type traits. More likely they will have wide variations in their offspring. Each kid receives only a sample half of each parent’s genes, which by chance can be above or below average. Furthermore, each kid can be subjected to different environmental conditions.

Environmental Corrections

Environmental influences can be controlled and corrected to permit more accurate identification of genetic difference between individual goats. Major environmental factors include level of herd management, year, age, season, parity of kidding, length of lactation, dry period, and previous lactation.

Genetic milk yield values are expressed as deviations from the herd average (including herd level adjustments) to remove the influence of herd management and to facilitate comparisons between does from different herds. Most differences between herds for average milk production are due to feeding, housing, diseases, etc. Probably 10 to 20% of the differences in production between herds is due to genetics. The remainder 80 – 90% is due to environment.

Season of kidding has a marked influence on milk production. Does kidding between December and March have, on the average, higher milk and fat yields than does kidding later in the year. The influence of season of kidding on percentage of fat is considerably less than on yields of fat and milk, but does kidding in April to July have slightly higher fat tests than does kidding earlier. If comparisons are made between does with records initiated during different seasons, they should be adjusted for season of kidding. Season adjustment factors in conjunction with correction for age of kidding have been published for each breed.

Age of kidding affects milk production strongly. Age and season of kidding jointly account for 30 to 40% of the total variation within a goat herd for milk and fat yields, which increase up to 5 years of

Identification and Genetics

age and then decline with advancing age. Effects of age on fat percentage are less pronounced. Lactation number, in addition to the effect of age, has a large influence on milk and fat yield in the dairy goat, which makes the dairy goat different from the dairy cow. The average difference in 305-day milk yields between first and second goat lactations is approximately 300 lbs.

Heritability

Heritability indicates the relative importance of heredity in the expression of a trait and measures the average percentage of variation between individuals that is due to heredity. For example, if a trait has a heritability of 30%, 30% of differences between individuals for a particular trait are attributable to genetics but the remaining 70% are due to environmental influences.

Heritability also gives an indication of the potential for phenotypic selection to improve a trait genetically. A high heritability suggests that individual selection will produce rapid genetic improvement, but a low heritability value indicates that progress from such selection will be slow and other means may need to be adopted to improve the trait.

The heritability of milk yield of goats is moderate at about 30%. Fat yield has a similar heritability. Heritability of fat

percentage is higher about 50%, and heritabilities of other milk constituents such as protein and solids-not-fat are similar to that of fat percentage.

Repeatability

Performance of goats, either good or poor, tends to be repeated although not perfectly. Repeatability represents the average correlation among records of the same animal and measures the tendency to be similar on successive records by the same animal. The repeatability of successive milk and fat yield records of the same doe is about 50%. Repeatability of fat percentage, and probably the other major milk components, is approximately 60%.

Improvement of Several Traits

Selection for one trait seldom leaves other traits of economic importance undisturbed. Many production and type traits are correlated genetically; i.e. they are influenced by some of the same genes.

The primary purpose of the dairy goat is to produce high quality milk efficiently. Accordingly, milk production must be a major selection goal. The more traits that are selected in a breeding program, the less the progress that can be made for any single trait. Therefore, the breeder must restrict his selection emphasis for traits other than milk yield to only those that have economic importance and large

Identification and Genetics

heritabilities to respond effectively to selection. Traits which have created shorter life span should be identified for emphasis in the herd breeding program.

Making Genetic Progress

In order to make progress in your herd there are a few key concepts to keep in mind and follow.

The first concept is to set goals for your herd. Where do you want to go with your herd and how do you plan to reach those goals?

Second, as you start your goat dairy, work hard at your management practices. Fine-tune them. Depending on what resource you read, how well an animal does in your herd is anywhere from 60 to 80% management and 40 to 20% genetics respectively. Management is a huge factor in how productive an animal is in your herd. The best genetics can not make up for poor management practices.

The third step is to identify the style of animal that does well in your herd. What does well in your herd under your management, in your facilities may not do well in another setting. Another type of animal that does extremely well in someone else's setting may not do well in yours. As you identify animal types that do not do well in your herd, consider

culling them.

Once you're comfortable with your management, you have your goals and you've identified the style of animal that works best for you, the fourth step will be to select a buck or a group of bucks for your herd. Get as much information on the bucks as you can before you make your decision. Ask to see milk records on their dams. Look at the relatives of a potential sire to find genetics to change your herd for the traits that you select to emphasize.

The ADGA Linear Appraisal program data and the ADGA genetics website are helpful to identify potential sire families. Spending \$50.00 on a young buck kid may get you what you paid for a meat kid and not a sire. Remember the buck puts in 1/2 of the genetics for your herd. If you have 100 does each doe will only contribute 1/100th of the genetics for the herd.

To make the most genetic progress select bucks from the top 15% on the USDA Sire Summaries. Select bucks only with positive scores for PTA's, PTI's and/or ETA's.

PTA (Predicted Transmitting Ability)—this comparison number is calculated from the animal, its progeny and its ancestry. A buck that is average for a trait will have a PTA at zero. A buck that has

Identification and Genetics

a plus for a trait indicates that this buck is better than the average for the breed. It is important to have a percentile ranking with this number as it gives a comparison of this buck compared to other bucks within the breed.

PTA's are generated for Milk Yield, Fat Yield, Fat Percentage, Protein Yield, Protein Percentage, and Dollar Value. These are expected differences from herdmates of average genetic merit per lactation. PTA for type is the expected difference from herdmates of average genetic merit in Final Score (ADGA LA system.)

PTI (Production Type Index) is a genetic index that combines production and type evaluations into one score. PTI's provide a comparison between bucks of a breed and are not expressed in pounds or points, as are PTA's. The Indexes are listed with a 2:1 production emphasis and a 2:1 type emphasis.

ETA (Estimated Transmitting Ability) – this comparison number is an estimated number for a young buck based on PTI numbers from his sire and dam. When a buck or doe has enough production and type data available, a PTI will be generated and the ETA will no longer be listed on ADGA pedigrees or performance reports for that animal. Twice each year new calculations are run by USDA and new PTA's and PTI's are generated. The latest

calculation will have most value, as the most data is included.



A Saanen crossed with any other breed will usually produce an animal with a white coat. A Nubian crossed with a breed that has erect ears will produce an animal with airplane ears. (Ears that are too long to be considered erect but are too short for a Nubian.) They are somewhere in the middle of these two ear types.

Identification and Genetics

MAKING SENSE OF GENETICS

Choosing genetics as you begin can be very challenging and confusing or can be quite rewarding. Start out by learning the definitions of a few of the basic terms and a few of the basic concepts. Then use the resources available to do your sire selections and matings.

Two resources that are extremely valuable to the dairyman are:

1. A handbook written by Jane Wierschem entitled “Beyond the Basics”. Topics covered include Bucks & Breeding, Genetics & Genetic Evaluations, Milk Production & DHI Testing, Type Evaluations and Linear Appraisal, The ADGA Sire Development Program, and more. You may order a copy by contacting Jane Wierschem PO Box 24, Minocqua, WI 54548.
2. The American Dairy Goat Association website also has valuable tools to help you select animals. Go to the website www.ADGA.org. On the menu to the left you can select ADGA Genetics, Superior Genetics, and Sire Development. Each area has many valuable tools to make selecting quality animals reliable.

For example, under ADGA Genetics by selecting Pedigree, a search may be made for an individual animal. Under Planning “Try Out” breeding can be done electronically before doing the

actual mating. Planned Pedigree, Estimated Transmitting Ability (ETA) and Coefficient of inbreeding are “calculated based on choice of sire and dam.” PTI /ETA – can search for top animal based on Production Type Index (PTI) and Estimated Transmitting Ability (ETA).

A search under Production gives Predicted Transmitting Ability (PTA) based on data modeled by the Animal Improvement Programs Laboratory (AIPL) of the USDA from years of DHI production tests.

Use the ADGA genetics data and website to select sire lines that will be likely to change the traits you have identified while also improving or maintaining milk yield.

The genetic evaluations calculated by the AIPL – USDA would show what an animal might or may not be able to pass along genetically. These genetic evaluations are the sire and dam PTAs (Predicted Transmitting Abilities), PTI (production- type indexes and ETAs (Estimated Transmitting Abilities).

Identification and Genetics

SUMMARY STEPS

- ___ 1. Permanent identification of animals.
- ___ 2. Goals set for the herd.
- ___ 3. Quality management practices.
- ___ 4. Identification of the style of animal that will do well in your herd.
- ___ 5. Protocol for selecting your buck.

Sources

- Ace, Donald L., Pennsylvania State University, University Park, PA.
- Appleman, R.D., University of Minnesota, St. Paul, MN: “Housing,” Goat Extension Handbook.
- Ayers Los Olivos, J.L.: “Diarrheal Diseases” Extension Goat Handbook.
- Ayers Los Olivos, J.L.: “Enterotoxemia” Extension Goat Handbook.
- Bliss, E.L., University of Florida, Gainesville; EA Oltenacu, Cornell University Ithaca, NY; and R.S. Ott, University of Illinois, Urbana: “Reproductive Management,” Extension Goat Handbook.
- Bradley, R. E., University of Florida, Gainesville: “Stomach Worms,” Extension Goat Handbook.
- Cannas, Antenello Dipartimento di Scienze Zootccniche – University of Sassari, Sardinia, Italy: “Balancing Diets for Lactating Goats.”
- Delaney, Carol, Small Ruminant Dairy Specialist Vermont: Small Ruminant Dairy Newsletter.
- Delaney, Carol Small Ruminant Dairy Specialist, University of Vermont: “Starting a Commercial Goat Dairy.”
- Duemler, Chris, DVM, Brodhead, WI.
- Gaskin, J.M., University of Florida, Gainesville: “Caseous Lymphadenitis and Pinkeye,” Extension Goat Handbook.
- Guss, S.B., Pennsylvania State University, University Park, PA: “Mastitis” Extension Goat Handbook
- Haenlein, George F.W., University of Delaware.
- Johne’s Information Center: <http://www.vetmed.wisc.edu/pbs/johnes> .
- Kennedy, B.W., Ontario Agricultural College, Guelph, Canada: “Genetics of Milk and Type,” Extension Goat Handbook.
- Le Roux, Jordan, Vermont Butter and Cheese Company.
- Mobini, Seyedmehdi, DVM, MS, Diplomat, ACT Professor/Research & Extension Veterinarian Georgia Small Ruminant Research Extension Center Fort Valley State University Fort Valley, GA: “Updates on Novel Approaches to Small Ruminant Parasite Control.”
- Nelson, D.R., University of Illinois, Urbana: “Metabolic and Nutritional Diseases,” Extension Goat Handbook.
- Ruegg, Pamela, DVM, MPVM UW – Madison: “Producing High Quality Goat Milk.”
- Smith, Mary, DVM: “Managing Kidding & Lambing”, 2005 Cornell Sheep and Goat Symposium.

Sources

Scruton, Daniel, Vermont Department of Agriculture.

Sherman, David M., University of Minnesota, St. Paul: "Johne's Disease" Extension Goat Handbook.

Smith, Mary C., Cornell University, Ithaca, NY: "Coccidiosis" Extension Goat Handbook.

Smith, Mary C. and Sherman, David M.: "Tetanus," Goat Medicine.

Sherman, David M., University of Minnesota, St. Paul: "CAE: Caprine Arthritis Encephalitis," Extension Goat Handbook.

Wierschem, Jane: "Proving your Buck."

Wiggans, G. R. ARS – USDA Beltsville, MD: "Adjustment Factors For Milk Records."

Williams, C.S.F., Michigan State U., East Lansing: "Disease Management" Extension Goat Handbook.

Yazman, J.A., Winrock International Livestock Residential Training Center, Morrilton, Arizona and Turillo, L., Cornell University, Ithaca, NY: "Management—Birth to Breeding," Extension Goat Handbook.

FURTHER INFORMATION

Wisconsin State statues ATCP 60 and 80 list most of the farm regulations and licensing requirements pertaining to dairies:

Dairy Farms: <http://www.legis.state.wi.us/rsb/code/atcp/atcp060.pdf>

Dairy Plants: <http://www.legis.state.wi.us/rsb/code/atcp/atcp080.pdf>

Goat Nutrient Requirement Calculator at the Langston University website:

www.luresext.edu/goats/research/nutritionmodule1.htm

The Small Ruminant Nutrition System is a new resource that is based on the animal state and the analysis of the feed. It can be downloaded free at:

<http://nutritionmodels.tamu.edu/srns/index.htm>

The National Research Council's (NRC) Nutrient Requirements of Small Ruminants, 2007.

The cost is \$130.00 and can be ordered at www.nap.edu or 1-888-624-8422.

For more information about Johne's, contact the Wisconsin Department of Agriculture, Trade and Consumer Protection's Division of Animal Health – Johne's Program at 608-269-0604 or 608-224-4872 or the website Johne's Information Center:

<http://www.vetmed.wisc.edu/pbs/johnes>