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dairy guidelines

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A FEEDING GUIDE FOR MILKING GOATS

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Alfalfa and other legumes, harvested at the proper stage of maturity, are excellent feeds for milking goats. However, these high quality forages do not provide adequate energy for high levels of milk production during early lactation. Economical milk production, sound reproduction and herd health require that attention be given to the different nutrient requirements at different times during the lactation cycle.

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The dairy goat is a ruminant. Ruminants have four stomachs which are involved in the digestion of feeds. The first two stomachs or compartments, the rumen and reticulum, are connected. These compartments act as a fermentation vat whereby many millions of bacteria and other microorganisms, residing in the rumen, break down the nutrients in plants. Other bacteria use these end-products to grow and reproduce. The goat, in turn, digests these bacteria as well as using the end products of fermentation and nutrients which have not been digested by microorganisms.

Goats produce milk by using amino acids, fatty acids, sugars, etc., that are formed by digestion. These are absorbed across the stomach and intestinal wall, and transported to the udder. Many factors influence the availability and amounts of these substances that can be used for milk production.

The lactation cycle can be divided into approximately four time intervals: the dry period, after kidding and through early lactation when energy consumption does not equal energy requirements for maintenance and milk production, peak production through mid lactation, late lactation and the dry period. After kidding, it is important to stimulate maximum feed intake and provide a nutritionally balanced ration so that does may reach maximum milk production. Late lactation and the dry period are important if does are to attain maximal milk production during the next lactation without causing health problems at kidding.

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Nutrient Requirements for Milk Production

National Research Council guidelines for feeding dairy goats have not been compiled. Recently, Brown (1980) published standards for dairy goats based upon his research findings. His suggested requirements for maintenance, milk production, gain, and late pregnancy are shown in Table 1.

Table 1. Daily nutrient requirements for dairy goats (Brown, Cornell University, 1980)

Requirement	Net energy (Kcal)	Crude protein (lb)	Calcium (lb)	Phosphorus (lb)	Dry matter intake (lb)
Maintenance (lb body weight)					
100	1400	.22	.008	.005	3.0
120	1600	.25	.009	.007	3.2
140	1800	.28	.010	.008	3.3
Milk production (multiply nutrients by lb milk produced per day)					
3.0% Fat	330	.070	.0025	.0018	
3.5	360	.074	.0026	.0019	
4.0	380	.078	.0027	.0020	
4.5	410	.082	.0028	.0021	
5.0	440	.086	.0028	.0022	
5.5	470	.090	.0029	.0023	
Gain (per lb gain per mo)					
	100	.020	.0022	.0011	
Pregnancy (to be added to maintenance for last 2 mo pregnancy)					
	900	.07	.0111	.0070	-.3

Level of milk production (lb/d)	2	4	6	8	10	12
Estimated dry matter intake (add to lb dry matter for maintenance) (lb/d)	+0	+1	+2	+3	+4	+1

As an example, let's calculate the daily nutrient requirements for a herd averaging 8 lb milk per day at 3.8% fat. The average body weight is 120 lb and average gain per month is .5 lb.

Requirements:	Dry matter intake (lb)	Net energy (Kcal)	Crude protein (lb)	Calcium (lb)	Phosphorus (lb)
Maintenance	3.2	1600	.25	.009	.007
Milk	3.0	2976	.61	.021	.016
Gain	-	50	.01	.001	.001
Total	6.2	4626	.87	.031	.024

For the maintenance requirement, enter the nutrients listed for the 120 lb weight. For milk production, determine the requirement for 3.8% fat. Multiply the nutrient requirement times daily lb milk (e.g., 372 Kcal NE x 8 = 2976 Kcal NE). Add the estimated dry matter intake for the level of milk to the maintenance dry matter intake. Now add in any requirements for body gain. The total represents daily nutrient requirements.

Supplementing Forage with Grain

Usually the most economical feeding program is one that makes maximum use of home-grown forages which are harvested at the proper stage of maturity and with little nutrient loss. These conditions will stimulate maximum forage intake. Although lactating goats will consume 4-7 lb dry matter per 100 lb body weight, they will not consume much more than 3 lb dry matter from alfalfa hay and 2 lb dry matter from average hay. Legumes such as alfalfa usually are more nutritious than grasses and fescue. However, late cut alfalfa contains lower amounts of net energy than high quality orchardgrass (Table 2).

Table 2. Nutritive value of alfalfa and orchardgrass cut at several maturities

	Net energy (Kcal/lb)	Crude protein (%)	Calcium (%)	Phosphorus (%)
Alfalfa				
late veg.	640	20	2.0	.30
early bloom	590	17	1.2	.23
full bloom	544	15	1.0	.20
Orchardgrass				
early bloom	635	10	.4	.30
late bloom	500	8	.25	.25

To maintain high levels of milk production, forage must be supplemented with needed amounts of energy, protein, and minerals. Suggested amounts of corn and 44% protein supplement for average quality alfalfa hay, orchardgrass hay, and clover-grass pasture are shown in Table 3.

Table 3. Recommended grain feeding guide for milking goats fed different forages[1]

	With Alfalfa			With Orchardgrass			With Clover-Grass		
Daily milk (lb)	Corn (lb)	44% Prot. Suppl. (lb)	Crude protein (%)	Corn (lb)	44% Prot. Suppl. (lb)	Crude protein (%)	Corn (lb)	44% Prot. Suppl. (lb)	Crude protein (%)
12	4.8	.85	14	4.4	1.3	17	4.4	.9	15
10	4.25	.4	12	4.1	1.0	15	3.5	.5	13
8	3.4	.2	11	3.5	.8	15	2.8	.3	12
6	3.0	.1	11	3.0	.6	15	2.2	.1	11
4	2.4	0	10	3.33	.4	15	1.75	.1	10
2	1.8	0	10	1.9	.3	14	1.4	-	10

[1]Mix the 44% protein supplement with the corn and feed the total of these amounts. If only one concentrate is to be purchased, buy the protein level suggested under "% crude protein" and feed the total suggested for corn and 44% protein supplement. Commercial concentrates or supplements should contain adequate minerals.

From this feeding guide, the 120 lb goat producing 8 lb milk should be fed 3.4 lb corn and .2 lb 44% protein supplement or 3.6 lb of 11% protein grain mix. This goat could be expected to eat 3.6 lb alfalfa hay. Her total nutrient intake would be 4647 Kcal NE, and .91 lb crude protein.

	Feed (lb)	Dry matter (lb)	Net energy (Kcal)	Crude protein (lb)
Required	---	6.2	4626	.87
Corn	3.4	3.0	2633	.30
Soybean meal	.2	.18	151	.09
Alfalfa hay	3.6	3.03	1863	.52
Consumed		6.2	4647	.91

The Dry Period

Pregnant, dry does should receive good quality pasture or hay. At drying-off, body condition should be similar to that desired at kidding. They should be maintained in this condition throughout the dry period. During this time they may need 1-2 lb corn or 10-12% protein concentrate to maintain and hold desired body condition. In addition, they should receive a mineral mix with 2:1 calcium - phosphorus ratio (.06 lb of 10% phosphorus supplement). Don't allow does to get too fat during the dry period. Excessive over-conditioning causes health problems at kidding and reduces milk production during the next lactation.

At Kidding and In Milk

During the last week before expected kidding, reduce the amount of grain mix to .5 lb per day. Continue to feed .5 lb concentrate for the first week after kidding. After 1 week gradually increase the amount of concentrate until she leaves a small amount. After she reaches peak daily milk production, a doe should be fed concentrate according to milk production (Table 3) and body condition. Under all conditions, goats should receive at least 30% of their dry feed as hay or forage.