Sample rations for lactating does

- these rations were volunteered by 6 goat farms to help prepare for the 2001 Goat Field day at Cornell University. Farms included commercial goat dairies and meat goat operations as well as hobbyists. For the purpose of this exercise, I am assuming that the BF% of the milk is 3.5. The first table in each example is based on the 1981 NRC publication on Nutrient Requirements for Goats. The second table in each example is based on a table of daily nutritional requirements for dairy goats that Dan Brown published in 1980 based on his doctoral research here at Cornell. Studies at both of the International Goat Centers in the US have bore out that the protein and energy levels outlined by the NRC were adequate to sustain the specified production levels. ***Several actual ration mixes are shown at the end of this article.***

88 lb yearling doe milking 3 kg (~3 quarts) daily

	TDN (g)	CP (g)	NE(Mcal)	Ca (g)	P(g)
Maintenance plus low activity	560	77	1.14	3	2.1
Lactation -3 kg of milk(3.5% fat)	1026	204	2.07	6	4.2
Total	1586	281	3.21	9	6.3

		CP (g)	NE(Mcal)	Ca	P
Maintenance		93	1.3	3.4	2.5
Lactation -3 kg of milk(3.5% fat)		222	2.37	7.8	5.7
Total		315	3.67	11.2	8.2

132 lb multiparous doe milking 4 kg (~4 quarts) daily

	TDN (g)	CP (g)	NE(Mcal)	Ca	P
Maintenance plus low activity	760	105	1.54	4	2.8
Lactation -4 kg of milk(3.5% fat)	1368	272	2.76	8	5.6
Total	2128	377	4.3	12	8.4

		CP (g)	NE(Mcal)	Ca	P
Maintenance		120	1.7	4.3	3.4
Lactation -4 kg of milk(3.5% fat)		296	3.16	10.4	7.6
Total		416	4.86	14.7	11

154 lb multiparous doe milking 5 kg (~5 quarts) daily

	TDN (g)	CP (g)	NE(Mcal)	Ca	P
Maintenance plus low activity	560	77	1.14	3	2.1
Lactation -5 kg of milk(3.5% fat)	1710	340	3.45	10	7
Total	2562	458	5.18	15	10.5

		CP (g)	NE(Mcal)	Ca	P
Maintenance		134	1.9	6.8	3.9
Lactation -5 kg of milk(3.5% fat)		370	3.95	13	9.5
Total		504	5.85	19.8	13.4

Here are some sample rations from actual producers to compare to the above tables – In most cases these producers were feeding goats that varied in body weight. The owners for the most part feel like everyone was eating the amount of grain listed here but that the hay consumption varied with smaller goats eating below average and bigger goats above average. I have reported the averages here. In some cases the amount of hay reported is what was offered to the goats and was not what was actually consumed because goats were allowed to select and reject. However, in other cases almost no selection was allowed (for example, in the first farm listed) or hay reported is actually a relatively good estimate of the actual amount consumed. I think in most cases if dry matter intake is more than 6%, we can safely assume that hay consumption is probably less than reported.

1) Farm #1

Does in early lactation weighing on average 140 lbs and averaging 10 lbs milk each. Farm complained that does lost weight rapidly on this ration this year in early lactation and were not as persistent as in the past. In the past, herd had been offered more hay and similar amounts of grain. In past, this commercial dairy maintained a rolling herd average of 2200 to 2400 lbs milk.

Feed	lbs fed	g fed	TDN	CP (g)	NE(Mcal)	Ca (g)	P (g)
Corn	3	1362	1062	118	2.49	.27	3.68
Pro-rite 20 pellets	1	454	327	96	.77	6.58	2.86
Alfalfa hay	4	1816	1017	296	2.28	18.16	6.17
Total	8	3632	2406	510	5.54	25.01	12.71

Please note – I plugged in the feed analyses for a very good alfalfa hay I was feeding myself here. Even with a very good quality alfalfa, this ration is a little low on TDN if for does weighing 154 lbs and milking about 5 qts each daily. If you plug in a poorer quality alfalfa like the one listed in the next example, the deficiency in TDN would be even more pronounced. Farm said that while they try to feed their best alfalfa in early lactation this is not always possible depending on how the barn has had to be stacked. For example, they might end up feeding a lower quality alfalfa hay like the one they were feeding in the following example. This would radically change the plane of nutrition for their goats and might be a good comparison to show i.e. plug in the following for the 4 lbs of alfalfa:

Feed	lbs fed	g fed	TDN	CP (g)	NE(Mcal)	Ca (g)	P (g)
Alfalfa hay	4	1816	962	229	2.12	17.25	3.63

Does in midlactation weighing approximately 140 lb and averaging 6.6 lbs of milk. Hay on the day I sampled was a pretty low quality 1st cutting alfalfa but better hay was given as soon as second cutting came along. I have used the lower quality hay for

this illustration. This ration is being used in an attempt bring back up the production of does that have dropped more sharply than in previous years especially after the heat wave weather we experienced this summer.

Feed	lbs fed	g fed	TDN	CP (g)	NE(Mcal)	Ca (g)	P (g)
Corn	2	908	708	79	1.66	.18	2.45
Pro-rite 20 pellets	1.5	681	490	143	1.16	9.87	4.29
Alfalfa hay	4	1816	962	229	2.12	17.25	3.63
Total	7.5	3405	2160	451	4.94	27.3	10.37

The needs of these goats according to requirements given earlier would be about
NRC-

	TDN (g)	CP (g)	NE(Mcal)	Ca	P
Total	1586	281	3.14	9	6.3

Dan Brown-

		CP (g)	NE(Mcal)	Ca	P
Total		356	4.27	14.6	9.6

So essentially the does in the herd that are truly milking 6.6 lbs or less are really coasting on this ration. Unfortunately, we all know it is pretty hard to bring up production once the lactation curve has started to drop. Individula does that are milking more would also not be supported well on this ration.

Farm #2 –

Example of 160 lb does milking 9.6 lb of milk daily. Owner says “does appear to be wasting a lot of hay, particularly they seem to leave a lot of hay #2”. If we assume a 6% dry matter intake for goats it is pretty obvious why much of this hay is not eaten. Even at an 8% intake which has been recorded for some does in early lactation, this feed would still be too much for a 160 lb doe to consume. However, this show herd did stay quite productive throughout our heat waves although the owner complained that her butterfat scores were down at 3.5% and are normally higher. Milk protein was ~ 2.9 %.

Feed	lbs fed	g fed	TDN	CP (g)	NE(Mcal)	Ca (g)	P (g)
Roundhouse calf starter	5	2270	1634	451	3.9	15.89	12.94
grass hay #1	6	2724	1307	319	2.5	18.52	7.9
grass hay #2	3	1362	695	93	1.3	7.08	2.45
Total (assumes hay #2 not eaten)	14 (11)	6356 (4994)	3636 (2941)	863 (770)	7.7 (6.4)	41.49 (34.41)	23.29 (20.84)

Even assuming that the does are not eating any of the lower protein hay (#2), these animals are eating way over the normal requirements for even 11 lbs of milk.

Now for some lactating meat goat rations –

Farm #4 –

Mature does averaging around 150 lbs nursing twins that are hopefully gaining ½ lb per day at minimum. Owner is of the impression that herd is urinating more on this ration.

Feed	lbs fed	g fed	TDN	CP (g)	NE(Mcal)	Ca (g)	P (g)
18%lactation pellet	2	908	627	145	1.48	7.26	4.54
alfalfa baleage (66.2 %DM)	12	5448	2125	556	4.8	68.1	13.08
Total	14 (really about 9.8lb DM)	6356 (~4413g DM)	2752	701	6.28	75.36	17.62

Please note, this farm was feeding baleage. Although they had good luck with the baleage in 2001, results were disastrous the following year. In 2002, the baleage did not achieve an acid enough pH and the herd contracted listeria from consuming it. Numerous newborn kids died as well as several adult animals. The newborns contracted listeria through the openings provided by the eruption of their baby teeth. Many other herds that have fed baleage have also had substantial losses from listeria.

The baleage listed here was second cut alfalfa. If the farm had used the first cutting alfalfa baleage they also produce, nutrients for the baleage would have been:

Feed	lbs fed	g fed	TDN	CP (g)	NE(Mcal)	Ca (g)	P (g)
alfalfa baleage (61.7 %DM)	12	5448	1852	370	3.6	31.1	11.99

This same farm separates out does that are nursing triplets or quads and instead feeds them 3 lbs of the 18% lactation pellet listed here and a high quality alfalfa hay at about 6 lb per doe (hay would be similar quality to the hay mentioned in the first LR example).

Farm #5 –

Does averaging 100 lbs that are nursing twins that need to gain 1/3 lb each minimum. Does include smaller meat goat breeds and also several yearlings.

Feed	lbs fed	g fed	TDN	CP (g)	NE(Mcal)	Ca (g)	P (g)
16% pellet	.75	341	246	55	.58	1.63	1.36
grass hay (amt. likely consumed)	7.5 (5.25)	3405 (2384)	1634 (1144)	398 (279)	3.15 (2.2)	23.15 (16.21)	9.87 (6.91)
Total (assuming 6%DM	8.25 (6)	3746 (2725)	1880 (1390)	453 (334)	3.73 (2.78)	24.78 (17.84)	11.23 (8.27)

consumption)							

NRC requirements for 88 lb does milking 3 kg of milk

	TDN (g)	CP (g)	NE(Mcal)	Ca	P
Total	1586	281	3.21	9	6.3

Dan Brown requirements for similar does

		CP (g)	NE(Mcal)	Ca	P
Total		315	3.67	11.2	8.2

We can see that while the ration appears to work if the goats eat all the hay offered, that it is probably deficient in TDN and NE when we plug in realistic figures for what is actually consumed. If the hay has a lot of variation then the goats may well be selecting the most nutritious parts of it to eat and meeting their requirements. The owner was talking about wanting to revamp the hay mangers to allow for less waste (i.e. selection) by goats. Before he or she does that, they really need to get a handle on what the quality of their grass hay is. Unless it is better than the 11.9%CP and 48% TDN hay I plugged in here, they may well find their does being unable to meet their needs if they have to eat this hay without practicing selection. Also, while we may see lactating does eating 6% of their body weight when the ration has a lot of grain in it, I am not sure if we would see as high dry matter intake on a minimal grain ration like this. Hay quality will be paramount for this herd.

Farm #6 –

Does 2 to 4 yrs of age averaging 130 lb nursing twins that are hopefully gaining ½ lb/day.

Year 2000

Feed	lbs fed	g fed	TDN	CP (g)	NE(Mcal)	Ca (g)	P (g)
whole corn	1.6	726	567	63	1.33	.15	1.96
whole raw soybeans	.4	182	160	67	.41	.36	1.07
alfalfa hay #1	3	1362	763	222	1.71	13.62	4.63
alfalfa hay #2	3	1362	708	212	1.53	18.52	3.41
Total	8	3632	2198	564	4.98	32.65	11.07

This would be sufficient for does that are 132 lb. to milk 4 kg each.
NRC requirements

	TDN (g)	CP (g)	NE(Mcal)	Ca	P
Total	2128	377	4.3	12	8.4

Dan Brown requirements

		CP (g)	NE(Mcal)	Ca	P
Total		416	4.86	14.7	11

NRC requirements if 132 lb does milking 5 kg each.

	TDN (g)	CP (g)	NE(Mcal)	Ca	P
Maintenance plus low activity	760	105	1.54	4	2.8
Lactation -5 kg of	1710	340	3.45	10	7

milk(3.5% fat)					
Total	2470	445	4.99	14	9.8

Dan Brown's requirements for 130 lb doe milking 5 kg.

		CP (g)	NE(Mcal)	Ca	P
Maintenance		120	1.7	4.3	3.4
Lactation -5 kg of milk(3.5% fat)		370	3.95	13	9.5
Total		490	5.65	17.3	12.9

It looks like the ration for the year 2000, would not suffice if the aim was to have does milk 5 kg on average. Since this farm does have some litters of triplets and quads, it might be that does with larger litters should have the ration adjusted somehow

Does were fed this same grain ration when they went onto pasture in peak lactation. Does seemed to have trouble maintaining weight as time progressed on pasture. Pasture went from having samples that were about 64%TDN,14.4%CP, 1.3%Ca,.24%P (8 weeks after kidding) to later samples (14 weeks into lactation) were more like 60%TDN, 7.9%CP, .58%Ca, and .24%P as a percentage of dry matter.

Year 2001 – in reality, the sample used for the analyses of the second hay was probably not very representative. However hay quality was definitely less than for previous year and goats had no trouble cleaning up the ½ lb of extra grain with no hesitation.

Feed	lbs fed	g fed	TDN	CP (g)	NE(Mcal)	Ca (g)	P (g)
whole corn	2	908	708	79	1.66	.18	2.45
whole raw soybeans	.5	227	200	84	.51	.45	1.34
alfalfa hay #3	3	1362	708	170	1.5	14.16	3.13
alfalfa hay #4	3	1362	722	113	1.44	6.40	2.59
Total	8.5	3859	2338	446	5.11	21.19	9.51

Note – yearling does in the same herd average ~88 lbs each and are assumed to eat same grain ration but 4 lbs of alfalfa hay.

18% lactation pellet fed at Farm #3-

Ingredients	Pounds As Fed	% As Fed
Soy Hulls	510	25.5
Wheat Middlings	655	32.8
Corn Meal	365	18.3
Soy 48%	160	8.0
Distillers Grains	100	5
Gluten Feed	100	5
Molasses	48	2.4
Salt	20	1
Limestone	30	1.5
Bovatec9000	9	.45
Selenium .06%	0	.025
R-H Mini Fortified Vitamins	1	.05
Vitamin E-20	1	.05
	2000	

Here is a sample of a 16 to 17% CP grain that some farms use on growing kids and lactating does. I assume the Ca is feed quality limestone and am not sure what sure of mixes or dilutions the ”Se” for selenium or the Vit ADE are.

Ingredient	lbs
Oats	100
Distillers	145
Roasted Soy	225
Corn	1304
SBM	75
Molasses	100
Salt	20
Ca	13
ADE	6
Bovatec 9000	7
Se	5