

FEEDING MILKING COWS

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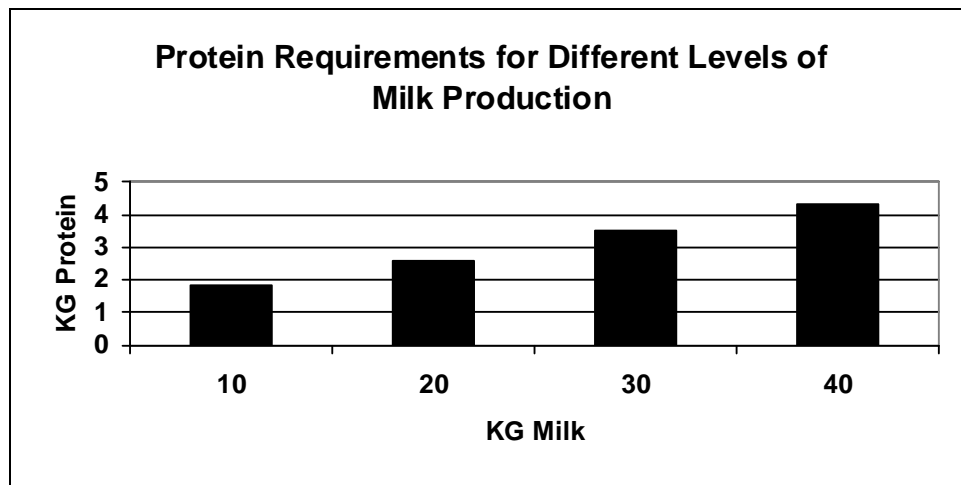
Well fed dairy cattle will produce more milk. When cows give more milk then more profit can be made. To achieve high milk production, many strategies must be used to ensure cattle are well fed during the dry period and while milking.

By working with members of the Wakulima Dairy, we have demonstrated how to improve milk production of cattle. This fact sheet summarizes some of the discussion notes from these talks.

In general, dairy cattle must be healthy and kept in dry, comfortable housing. Cattle need high quantities of fresh forage and grain containing protein, energy, vitamins and minerals to produce milk. These nutrients must be fed in a balanced ration so that the cow gets the right amount of each nutrient. We are going to discuss protein and energy and how best to feed them.

PROTEIN AND ENERGY IN FEED

The two most important nutrients for dairy cattle are protein and energy. As milk yield increases after calving, cattle should be fed more protein and energy in the first 3 weeks after calving. Forages such as Napier grass, Desmodium and Lucerne provide high amounts of protein and energy if they are cut early. Early cut forages will give higher milk with less dairy ration required.



Proteins are the building blocks which the cow uses to grow and to make milk. There must be enough protein to allow the cow to make milk. If a cow has the breeding and is big enough to make 20 kg of milk and she is only given 2 kg of protein (from forage and dairy meal), she will not produce more than 10 kg of milk.

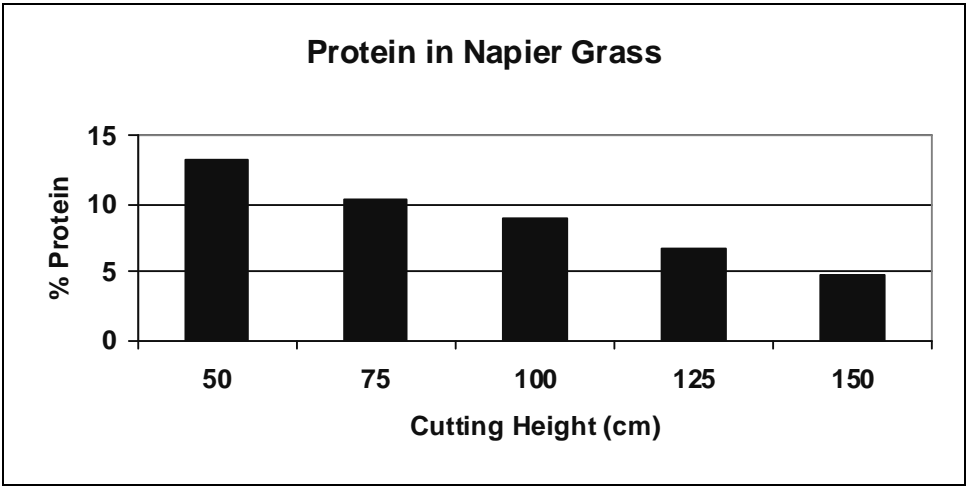
As another example, a large Holstein (600 kg) that is able to produce 30 kg of milk daily needs 3.5 kg of protein in her diet. Good quality Napier grass, when fed free choice, can provide half of her requirement for protein. The other half must come from dairy meal or other high protein forages such as Desmodium.

FEED ENOUGH PROTEIN FOR THE COW TO MILK UP TO HER POTENTIAL

The more milk the cow can give, the more energy she must also be fed. There is a very close link between energy and protein in the cow. Giving enough protein without enough energy will only lead to increased milk in the short-term. However, giving enough energy without enough protein will not increase milk production in the short-term or long-term. Also, a cow's body can store energy (into fat), minerals (in bones) and vitamins (in fat) to be used later, if needed. However, extra protein cannot be stored and used later, but rather is broken down to be used for energy. So making sure protein levels in the diet are adequate every day is most important.

CUT NAPIER GRASS AT 1.0 to 1.5 METERS TO GET THE BEST YIELD, PROTEIN AND ENERGY

The most important source of feed is the feed that you grow on your own farm. Here, the most important and lowest cost source of feed is Napier grass. It grows well in this climate and uses the manure from cows very well.



The protein and energy of Napier grass is the best when the grass is short. The protein and energy percentage goes down, as the grass gets taller. Cutting Napier grass when it is 1.0 to 1.5 m tall will give the best protein and energy yield for feeding dairy cows. Taller grass will have a lower percentage of protein and energy, meaning your cattle will produce less milk. The amount of Napier grass that dairy cows eat depends on the maturity (height of the grass) and the size of

the cow. Tall Napier grass has more fibre (the plant is woody) which reduces the amount that can be eaten by cattle.

A large Holstein cow (600 kg) can eat 60 kg of Napier grass cut at ½ metre height, but only around 40 kg when it is cut at a 2 metre height. Again, this is because of the woody high fibre content of Napier grass. The protein content of Napier grass is higher when cut at ½ metre height compared to 2 metre height meaning cows will get more protein from the Napier grass when it is fed at a shorter height.

NAPIER GRASS CONSUMPTION BY CATTLE AT DIFFERENT HEIGHTS

Type of cow	Napier grass consumption (kg)	
	½ metre height	2 metre height
Large Holstein (600 kg)	60	42
Small Holstein (500 kg)	50	36
Jersey milking cow (400 kg)	40	29

Napier grass should be chopped with a chaff cutter or panga to encourage the cow to eat more. The cow should be fed all the Napier grass she will eat. Clean up the feed box every day to prevent stale feed.

**THE TALLER THE NAPIER GRASS HAS GROWN,
THE LOWER THE PERCENTAGE OF PROTEIN AND ENERGY.**

Desmodium is a good crop to grow because it is a legume and contains a higher level of protein than grasses. Desmodium can be slow to establish but it can provide a large amount of the protein required by milking cows. Growing Desmodium will reduce the amount of feeds that must be purchased to produce milk.

FEEDING VALUE OF COMMON FORAGES (DRY BASIS)

FEED	CRUDE PROTEIN	NET ENERGY MCAL/KG
Early cut grass hay (fertilized)	18	1.4
Mature cut grass hay	10	1.0
Sweet potato vines	14	1.3
Desmodium	17	1.3
Fodder trees	30	1.0
Maize silage (whole plant)	8	1.5
Maize stover	5	1.1
Maize leaves (green)	15	1.3
Rice hay	5	1.0

Dairy meal is a combination of several grains and minerals, sold in low or high protein concentrations, which is usually printed on the bag label. Usually low protein dairy meal is lower in cost. However, the energy content of dairy meals may vary from very low to high- which is not stated on the bag label because it is not necessary by law. Usually a high priced dairy meal has higher energy and maybe an additive such as yeast, which may help cattle digest their diets better.

Fish meal is a very high quality source of protein but it should be fed to milking cows in small amounts and after milking so that it does not give the milk a fishy odor. Also, the oils within the fish meal may cause the cows to have a low butter fat content.

Wheat bran has a crude protein of 16 % but the protein is poorly digested. Wheat bran's feeding value is roughly ½ forage and ½ grain, because of its high fibre and low energy content.

Cotton seed cake and sunflower meal have a high content of protein, but a low energy value and should not be used as the only source of protein in a homemade dairy meal.

FEEDING VALUE OF COMMON GRAINS AND BYPRODUCTS (DRY BASIS)

FEED	CRUDE PROTEIN	NET ENERGY MCAL/KG
Dairy meal	16 to 20	1.6 to 1.9
Fish meal	60	1.9
Soybean meal	54	2.2
Cotton seed cake	43	1.7
Sunflower meal	31	1.5
Maize germ meal	24	2.0
Coconut meal	21	1.7
Pollard (Wheat middlings)	18	1.8
Wheat bran	17	1.7
Rice bran	15	2.0
Molasses	6	1.8

DETERMINING HOW MUCH DAIRY RATION TO FEED

A formula is helpful to know how much to feed a dairy cow. A commonly used formula is to subtract 5 from the kg of milk the cow is producing, and then divide by 2. This tells you the kilograms of dairy ration to feed daily.

For example, if a cow is giving 10 kg of milk then:

$$(10 \text{ kg} - 5 \text{ kg}) \div 2 = 2.5 \text{ kg of dairy ration}$$

AMOUNT OF DAIRY RATION TO FEED

KG of Milk Yield	KG of Dairy Ration to Feed Daily
Less than 10	2.0
15	5.0
20	7.5
25	10.0
30	12.5

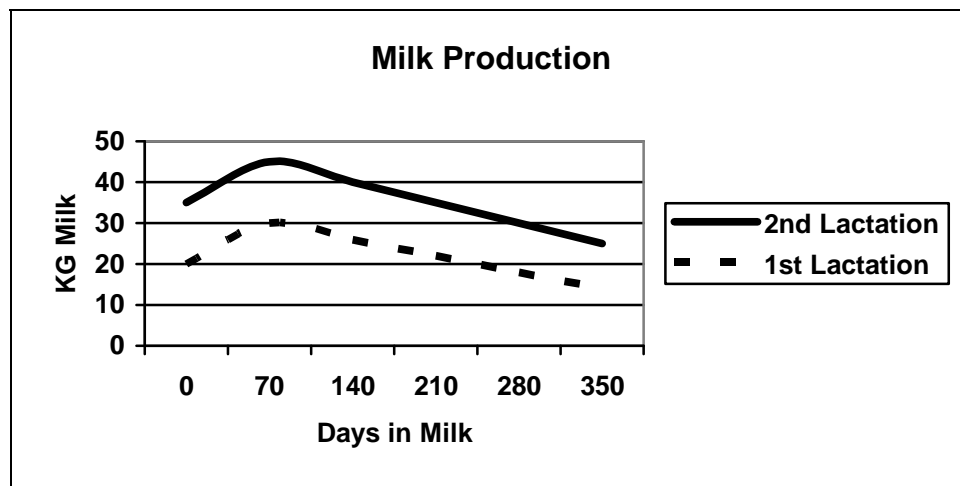
Dairy ration should not be fed in amounts higher than 12.5 kg daily, as this will cause a disease called acidosis, which leads to lameness and low butter fat content. No more than 4 kg of dairy ration should be fed at one time and ideally split into four equal feedings per day. For example, if a cow receives 10 kg of dairy ration daily, consider feeding 2.5 kg every 4 hours through the day.

SCALE

USE A SCALE TO WEIGH THE CONTAINER OF DAIRY MEAL FED TO THE COW. A 2 KG FAT CONTAINER DOES NOT HOLD 2 KG OF DAIRY MEAL (MAYBE ONLY 1 ½ KG IF THERE IS A HIGH CONTENT OF WHEAT BRAN)

HIGHER PEAK MILK PRODUCTION GIVES MORE TOTAL MILK IN THE LACTATION.

We have seen how much protein and energy a milking cow needs. Now it is important to know when to use the formula to feed your cow. The graph below shows how milk production normally goes up after calving for 3 months but then goes down by 8 to 10% per month. Poor feeding can lead to even larger drops, especially if production was high.



It is ideal to feed the dairy cow very well during all stages of her dry period and lactation, but especially the month before calving and the first three months after calving. Why? During the month before calving the cow's udder grows in size, and the bigger it gets, the more milk it can produce. Feeding the cow very well during this time will make sure that the milk producing part of her udder achieves its maximum potential. More protein and energy soon after calving will push milk production up for a long time afterward (up to 300 days). As the graph shows, a first calf heifer could give 30 kilograms of milk if fed properly, and a very good second lactation cow could give nearly 45 kilograms of milk by 70 days after calving. Increasing the dairy ration amount after 90 days in milk will not improve milk production.

THE DRY PERIOD AND 'CLOSE UP' FEEDING

Cows should be dried off two months before calving. A two month dry period allows the cow's body to rest and prepare for a productive lactation. When you end the cow's lactation, begin feeding medium quality Napier grass (10% CP) along with 150 grams of dairy cattle mineral daily.

It is important to change the feeding of the cow before she calves to help her give more milk after calving. A cow which gives more milk at calving can be pushed to higher levels of milk production after calving. Also, she will give more colostrum to feed the calf. This enhanced feeding before calving is called 'steaming up'. Start three weeks before calving and give her 1 kg per day of dairy ration and then increase the amount by 1 kg weekly until reaching 3 kg.

SCHEDULE FOR "STEAMING UP"

Days Before Calving	KG of Dairy Ration
21 to 15	1
14 to 8	2
7 to calving	3

If the forage is to be changed between the dry period and lactation, the change should be made more than two weeks before calving (not in the last two weeks before calving).

Remember, there are many factors affecting milk production other than nutrition, but none is as important as feeding. Other factors include:

- 1) Cow health (diseases such as mastitis, uterus and lung infections, lameness, retained afterbirth)
- 2) Cow comfort (bedding area, shade, temperature, hygiene)
- 3) Parasite exposure and treatment (worms and ticks)

For more information contact the following WSHDG animal health personnel:

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