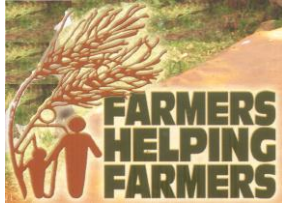


CHAPTER 21



FODDER SHRUBS: AN EXCELLENT PROTEIN SOURCE FOR COWS & CALVES

Prepared by Dr. Melissa Moggy and Dr. John VanLeeuwen

Milk production depends on a balance of energy and protein. Common feed stuffs such as tall Napier grass are lower in protein. Fodder shrubs are an excellent source of protein (20 - 30%) that can be fed in combination with high energy foods. Table 1 has the nutritional value of common Kenyan cattle fodder.

Benefits of Fodder Shrubs:

- Research shows average milk increases of 1 kg/cow/day or 10,000 ksh/year in Kenya
- Less likely to get rejected milk on lactometer test because milk is “thicker”, especially Friesians
- Cost to establish 500 Calliandra shrubs (labour included) is 700 to 1000 ksh (see photo)
- Decrease the need to purchase additional protein sources, especially during the dry season
- When fed to cattle, the manure produced is higher quality and can contribute nutrients to the soil.
- Take up little space and can be planted in areas cash crops are not planted such as, along farm boundaries, along paths, across slopes and in Napier grass plots. Can replace existing hedges.
- Roots extend deep into the soil (still grows when dry), and by planting across slopes, they can prevent soil erosion. Most fodder shrubs are “nitrogen fixers”, contributing nitrogen to the soil.
- Grown on farm, reducing the need to collect forage far from home, especially for zero-grazing farms. Also provide stakes & fuelwood.

How to Feed Fodder Shrubs:

- Can be fed freshly cut or it can be dried and stored for the dry season.
- 500 Calliandra make 6 kg/day of leaves - equal to 2 kg/day dairy meal
- Feed 3 parts Napier grass to 1 part fodder shrubs



How to Plant Fodder Shrubs:

- Selecting the appropriate types of fodder shrubs for your shamba can be difficult. It is important to plant a few varieties in case one variety fails. Table 2 can help you select the best fodder shrubs for your shamba.

For shrubs from seeds:

- Seeds should be planted in a nursery 2-4 months before the rainy season.
- If possible, set the nursery's length from north to south - this allows appropriate sunlight exposure to the nursery. The nursery should be located in a secure place (so animals cannot eat them) with a reliable water source.
- Prior to planting the seeds, the soil should be mixed with high quality manure, with 1 part manure to 4 parts soil.
- When first planted, the seeds can be covered with dry grass until the seeds germinate.
- The seeds should be watered twice a day, early in the morning and late in the evening. Once the seedlings have reached 15cm tall, watering can be decreased to once a day, late in the evening.
- Transplant the seedlings at the onset of the rainy season, when the seedlings are 25-50cm tall.

For shrubs from cuttings:

- Mulberry (photo on right) can be planted from seeds or cuttings.
- The cuttings should be 4 nodes long, planted on a 45 degree angle, with 2 nodes covered in soil
- Mulberry can compete with other crops as it has a shallow root system. It should not be planted nearby other food crops.

**Fodder Shrub Management:**

- Manure should be applied to the soil at the beginning of every rainy season.
- Shrubs can start to be harvested at 1 meter high, and continue to be harvested every 8-12 weeks.
- Use a sharp edge to harvest the fodder shrubs. Tearing the forage by hand can damage the shrub resulting in poor regrowth
- Every 6-7 years the shrubs can be cut back to promote new growth.
- To collect seeds, leave every 5th shrub uncut and allow it to grow up to 2 meters.

Where to get fodder shrubs:

- Agroforestry Research Center; they will send seeds upon request (small amount)
- Specialized nurseries can provide seeds and seedlings
- Your Dairy Group can help you find sources

Table 1: Nutritional Values of Fodder Crops Available in Kenya

Species	% Crude Protein	Potential Leaf Yield (tons/ha/year)	Limitations/Advantages
Grasses			
Napier Grass*	5 - 15	17 – 30	Low Protein
Maize Leaves	9 - 15	1 - 2.7	Low Protein
Herbaceous Legumes			
Desmodium	16 - 24	4 – 7	Does Poorly in Dry Season
Ground Lucerne	17 - 22	7 – 11	Low Tolerance to Acidic Soil & Drought
Fodder Shrubs			
Calliandra	22 - 28	6 - 16	No limitations (see photo above)
Trichandra	17 - 33	6 - 16	Cool climate. Some are psyllid resistant
Pallida	29 - 35	6 - 16	No limitations. Drought tolerant, highly psyllid resistant
Sesbania	15 – 20 (maybe 25)	Up to 20	Plants need replacing within 10 years Only one to tolerate water-logged soil
Tree Lucerne	20 - 30	Up to 10	No limitations. Drought tolerant. Act as a fire break.
Mulberry	15 - 25	5 - 11	Competes with crops; only non-N fixer. Highly palatable.
Others			
Sweet Potato Vines	11 - 18	15 - 18	High Water Content

* Tall Napier grass (2 metres high) has 5% protein. Short Napier grass (below 1 metre) is 15%.

Table 2: How to Select the Right Fodder Shrubs for your Shamba

Species	Rainfall (mm)	Altitude (m)	Max (m) Height	Frost Tolerant	Soil Drainage	Nitrogen fixers
<i>Calliandra calothyrsus</i>	>800	0-2200	4 - 6	No frost	Well drained	Yes
<i>Leucaena trichandra</i> ("Trichandra")	1100-1800	700-2000	5 - 18	No frost	Well drained	Yes
<i>Leucaena pallida</i> ("Pallida")	500-2000	1000-2000	4 - 6	Light frost	Well drained	Yes
<i>Sesbania sesban</i>	500-2000	100-2500	6 - 8	Light frost	Tolerates wet	Yes
<i>Chamaecytisus tagasaste</i> ("Tree Lucerne")	600-1600	1500-2500	5 - 6	Frost	Well drained	Yes
<i>Morus alba</i> (Mulberry)	1500-2500	1000-3000	25	Frost	Well drained	No

Acknowledgement: Thank you to World Agroforestry Center for providing information for this factsheet.

February 2013

This fact sheet is the property of Farmers Helping Farmers. It may be reprinted with acknowledgement.