

## Forages for Goats

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The general practice of goat producers in the region is for the goats to freely graze on any vacant land that has any green vegetations or goats are individually tethered around the residential and farm premises. Some raisers do “cut and carry” method to supplement the daily ration of their goats. These pasture areas have weeds and bushes growing that barely satisfy the nutritional requirements for growth and reproduction for the goats. The goats manifest these situations in their appearance with poor to fair nutritional and health conditions.

Several plant materials from pasture areas from the villages of Dededo, Mangilao, and Inarajan were sampled and analyzed to establish their nutrient contents. Samples were tested for crude protein (c.p.), ash, fiber, fat, and nitrogen-free extract (NFE) values. The results are shown below.

	C.P.	Fiber	Ash	Fat	NFE
<b>Pasture 1</b>	11.6	22.5	7.2	3.4	47.5
<b>Pasture 2</b>	10.7	27.7	9.6	2.7	41.0
<b>Pasture 3</b>	13.4	13.4	10.6	2.7	50.1

Goats grazing on Pastures 1 and 2 had rough haircoat. The nutritional contents are low. Goats grazing on Pastures 1 and 2 had rough haircoat, skinny, and unhealthy looking. One possible reason for this condition is due to poor or lack of nutrition these goats are getting from the pasture area.

Goats grazing in Pasture 3 had shinier haircoats, better developed musculature, and healthy looking. The pasture area had improved grass variety.



Fig. 1. Pasture 3 and a well-nourished buck.

A satisfactory feeding program is very much necessary for a better growth performance and higher production of goats in the region.

A Professional + Producer Research and Education grant to study the different existing local forages to feed goats was made possible through the Western Sustainable Agriculture and Research Education (WSARE). The project ran from January 2011- August 2012. This was conducted to demonstrate the easy to grow high-protein forages for a higher level plane of nutrition to improve goat production.

The major activities conducted for this project were: (1) Nutrient analysis of newly introduced varieties and local forages; (2) Feeding trials of these forages; and (3) Observations on the propagation and growth of these forages.

The results of this nutrient analysis is shown in this table below:

Feedstuff	C.P.	Fiber	Ash	Fat	NFE
<i>Lucaena sp.</i>	24.7	13.7	7.8	5.6	42.6
Mulberry	16.9	10.7	8.2	4.2	49.1
Sweet potato	12.9	15.7	8.2	4.2	48.2
<i>Glyricidia sp.</i>	18.6	11.9	7.0	3.2	51.2
<i>Moringa sp.</i>	18.8	16.0	13.0	6.4	49.1
Pigeon pea	18.7	6.6	25.3	8.5	35.3
Sunn hemp	18.6	3.2	27.1	9.8	32.4
Banana leaves	14.0	4.8	20.8	8.8	42.7
Grass A	9.2	1.8	25.4	7.8	50.4
Grass B	5.6	2.0	30.9	6.5	50.9

**Production of Forages**

Most of these forages thrive on limestone soil, however they grow well on deep soil.

**1. Pigeon pea.**

First harvest should commence when plants have developed a strong stem base and leafy shoots begin to branch out. Trim at around 2-3 feet high from the ground. Regrowth of new shoots normally occurs every 6-8 weeks for next harvest.



Fig. 2. A hedgerow of pigeon pea.

**2. Mulberry.**

For new plants, limit growth to 4 feet high for easier cutting of small branches. For older trees, cut main trunk to 4 feet above ground and harvest new shoots every 5-6 weeks.



Fig. 3. A row of trimmed mulberry plants for easy cutting of branches.



Fig. 4. Goats feeding on Mulberry.

**3. *Moringa sp.***

This plant is far more popular as a nutritious vegetable than as forage for goats. In the feeding trial, leaves and small branches of this forage plant were readily consumed by the goats. This plant is not a popular forage in the region but it is widely used in the South American cattle ranches. Forage is high in protein, fat, and minerals.

**4. *Leucaena sp.* (tangan-tangan).**

Goats did not show any untoward signs when given tangan-tangan on a daily basis. This forage is abundant in the island. If your farm area has no close source of tangan-tangan, this forage is fairly easy to grow on almost any type of soil on Guam.

Cut trees to 3-4 feet above the ground for easier trimming and cutting of growing branches.



Fig. 5. A row of tangan-tangan with new shoots and branches.



Fig. 6. *Indigofera* sp.

### Feeding Trials

Several batches of goats from donor producers were given a variety of forages for as long as a month to 5 months at the Department of Agriculture Breeding Station in Dededo. Observations were focused on growth and preference of goats to the forages (palatability), growth performance, and signs of digestive disorders of the goats. Four kinds of forages at approximately 10 lbs. (fresh weight) were provided daily to the goats. Feeders were installed and each forage were placed separately in each feeder. Goats have the “free-choice” of forages to consume.

Feeding trials were also conducted on-site at producers’ ranches.

The following forages were interchangeably provided to the goats: tangan-tangan, mulberry, pigeon pea, sweet potato vines, zacate, madre de cacao, and *Moringa*.

### Observations

The goat’s preference on the forages was in this order: (1) mulberry, (2) pigeon pea, (3) *Leucaena* sp. (improved and local tangan-tangan), (4) local zacate, (5) sweet potato vines, and (6) madre de cacao.

The goats were skinny, had rough haircoat, and had poor appetite at the beginning of each feeding trial. The goats started to look better (shiny haircoat) and healthier as they were given the forages. There was a great difference in their body conditions after each conclusion of a feeding trial. There were no signs of any digestive disorders such as diarrhea and bloat.



Fig. 7. A variety of high protein forages

### Recommendations

The quality and quantity of protein in the forage greatly affects growth and performance of growing and breeder goats. Here are some goat husbandry tips to sustain a high protein diet for goats in the region:

1. The forages utilized in the project can grow on any type of soil on Guam but most grow best in loamy soil.
2. Plant as many forage in terms of quantity and variety in your farm. It can be alongside the fence or close enough where the goats are housed for easier “cut and carry” method. Do not allow the goats to graze on forage plants as goats have tendencies to eat the barks and stems and will destroy and kill the plants.

3. Forages can be used as sole feed or supplement to existing ration of goats. Two or more varieties of forages can be mixed together in one feeder or one variety of forage per feeder. Allow enough feeding spaces for the goats. There were no problems encountered with rabbits eating the forages.
4. Goats only consume “clean” forages. Provide feeding bunks or troughs for the forages. This prevents the goats from stepping on and urinating on the forages when directly placed on the ground. Elevated feed bunks for grain and forage can also minimize parasite infection.
5. The nutrient values of imported alfalfa hay came out lower compared to the other forages. It is very costly to feed imported hay to feed our high inbred status of existing goat population on island.
6. Palatability can be a problem for some forages. Introduce these forages to newly-weaned goats or mix both palatable and less palatable forages.
7. Goat manure can be utilized to fertilize forage plants.
8. More varieties of forages are still available for goat feed in the tropics. *Indigofera sp.* and *Sesbania sp.* were also grown for this project.



Fig. 8. A goat feed bunk made of used pallets. Goats easily get the forage between the wood slots.



Fig. 9. Goat feed bunk can also be made of wire attached to the fence wall. Goats eating pigeon pea.

### Terms used in the table of analysis and their definitions

- A. Crude protein – is an estimate of the level of protein in the feed based on the amount of nitrogen present.
- B. Ash – is a measure of the total mineral content of the feed, but it does not tell us how much of each mineral is present.
- C. Fiber – is the poorly digested component of the feed.
- D. Fat – is the amount of fat and fat-soluble components of a feed.
- E. Nitrogen Free-Extract (NFE) – made up primarily of readily available carbohydrates, such as sugars and starches.

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