



RESEARCH
PROGRAM ON
Livestock



FORAGE FACTSHEETS

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MULATO II

Scientific name: *Urochloa ruziziensis* × *U. decumbens* × *U. brizantha* cv. Mulato II



1. Establishment and management

- a) Land preparation and planting: Pulverize the soil to a fine tilth, remove all weeds; make rows about 5 cm deep, 20 cm wide, with intervals of about 40-50 cm. Apply basal fertilizer and cover with a thin layer of soil before sowing. Mix seeds with dry soil or fine sand before sowing, 1 kg of seeds with 30-50 kg of soil. Cover seeds with a layer of soil ensuring not to bury the seeds more than 2 cm depth.
- b) Sowing rate: For seeds, plant about 10-15 kg/ha. Can also be planted vegetatively from rooted slips or stolon cuttings (3.5-4 tons/ha), to be planted in pits 25 cm x 40 cm apart, 2-3 cuttings per pit. Note: lower density for more fertile soil; when planting with cuttings, the tops should be trimmed.
- c) Planting season: Sow seeds at the beginning of the rainy season, from April to July in Northwestern provinces; plant cuttings from May to September. Late propagation is not recommended as it would affect the growth in winter.
- d) Fertilizer application: Apply 10-15 tons/ha of manure or 200-250 kg/ha of NPK 5:10:3 and 60-80 kg of urea fertilizer after the first harvest. Apply all the manure and NPK 5:10:3 at seed sowing. Apply additional NPK fertilizer 20-30 days after sowing and after each harvest. Pay attention to the safe withholding period before feeding the grass to animals, at least 14 days from the last fertilizer application until harvest; no application immediately after harvesting; best to apply 10-15 days after harvesting.
- e) Weed control: 25-30 days after planting, and after each harvest. Weeding should be done by digging out the weeds or uprooting; do not use herbicides.

2. Harvesting

- a) Mulato II is ideal for cut-and-carry.
- b) First harvest is recommended at 60 days after planting. Cut at about 10-15 cm from the base, which will help tillers to regrow well. For subsequent harvests, cut grass after 40-45 days in the rainy season and 50-55 days in the dry season.

3. Utilization

- a) Cut grass can be chopped and used for stall feeding.
- b) During summer and autumn when there is high biomass yield, Mulato II can be harvested, hayed or ensilaged, and stored for use in winter.
- c) Combining with other types of feed (legumes, concentrates, rice straw, etc.) is recommended.



4. Advantages

- a) Cold and drought tolerant
- b) High biomass yield and forage quality
- c) High production potential. Can last for 5-7 years

5. Limitations

- a) Slower growth compared to Guinea grass
- b) Animals might not like it in the early stages due to hairy leaves
- c) High soil fertility requirements



MOMBASA GUINEA

Scientific name: *Megathyrus maximus* cv. Mombasa



1. Establishment and management

- a) Land preparation and planting: Pulverize the soil to a fine tilth, remove all weeds; make rows about 5 cm deep, 20 cm wide, with intervals of about 40-50 cm. Apply basal fertilizer and cover with a thin layer of soil before sowing. Mix seeds with dry soil or fine sand before sowing, 1kg of seeds with 30-50 kg of soil. Cover seeds with a layer of soil ensuring not to bury the seeds more than 2 cm depth.
- b) Sowing rate: For seeds, plant about 8-10 kg/ha. Can also be planted vegetatively from rooted slips or stolon cuttings (3.5-4 tons/ha), to be planted in pits 25 cm x 40 cm apart, 2-3 cuttings per pit. Note: lower density for more fertile soil; when planting with cuttings, the tops should be trimmed.
- c) Planting season: Sow seeds at the beginning of the rainy season, from April to July; plant cuttings from May to September. Late propagation is not recommended as it would affect the growth in winter.
- d) Fertilizer application: Apply 10-15 tons/ha of manure or 200-250 kg NPK 5:10:3 for basal dressing and 200-300 kg urea. Apply all organic fertilizers or NPK to the rows at planting and the after every forge cut (5-7 harvests/year). Pay attention to the safe withholding period before feeding the grass to animals, at least 14 days from the last fertilizer application until harvest; no application immediately after harvesting; best to apply 10-15 days after harvesting.
- e) Weed control: Weeding should be done 25-30 days after planting and after each harvest; do not spray herbicides.

2. Harvesting

- a) Ideal for cut-and-carry.
- b) First cut is recommended at 60 days after planting. Cut at about 10-15 cm from the base, which will help tillers at the base to regrow well and prevent the base from being crushed or decomposing. For subsequent harvests, cut grass after 40-45 days in the rainy season and 50-55 days in the dry season. Best to harvest before the sheath develops.



3. Utilization

- a) Cut grass can be chopped and used for stall feeding.
- b) During summer and autumn when there is high biomass yield, Mulato II can be harvested, hayed or ensilaged, and stored for use in winter.
- c) Combining with other types of feed (legumes, concentrates, rice straw, etc.) is recommended.

4. Advantages

- a) High biomass yield
- b) High quality feed
- c) High production potential.
- d) Resistance to drought and cold temperature

5. Limitations

- a) Requires fertile soils
- b) High water content in the leaves and stem in the rainy season
- c) Can become stemmy if not cut regularly
- d) Intolerant to waterlogging

GREEN NAPIER GRASS

Scientific name: *Cenchrus purpureus*



1. Establishment and management

- Land preparation and planting: Pulverize the soil to a fine tilth, remove all weeds; make rows about 10-15 cm deep, 20 cm wide, with intervals of about 60-70 cm. Apply basal fertilizer, prepare cuttings 20-35 cm long with about 2-3 nodes per cutting, plant in alternate rows that 10 cm apart, cover with a thin layer of soil of about 2-3 cm.
- Sowing rate: About 3.5 tons of cuttings/ha
- Planting season: Ideal planting time is April-September.
- Fertilizer application: Apply about 10-15 tons of manure or 500 kg NPK 5:10:3 and 200-300 kg urea, to be equally divided and applied after every forage cut (5-7 harvests/year, apply 60-80 kg/1ha/harvest). After each harvest, apply urea 10-15 cm at the base of the plant and cover with a light layer of soil. Pay attention to the safe withholding period before feeding the grass to animals, at least 14 days from the last fertilizer application until harvest; no application immediately after harvesting; best to apply 10-15 days after harvesting.
- Weed control: Weeding should be done when the grass reaches > 25 cm. Do not apply any herbicides.

2. Harvesting

- Napier grass is ideal for cut-and-carry.
- First cut is recommended 60 days after planting, when the height reaches about 180 - 210 cm. Cut at about 15-20 cm from the base, which will help tillers at the base to grow well and prevent the base from being crushed or decomposed. For subsequent harvests, cut every 40-45 days in the rainy season and every 50-55 days in the dry season.



- c) Grass collected to prepare cuttings for propagation should be at least 60 days old.

3. Utilization

- a) Cut grass can be chopped and used for stall feeding.
- b) During summer and autumn when there is high biomass yield, Mulato II can be harvested, hayed or ensilaged, and stored for use in winter.
- c) Combining with other types of feed (legumes, concentrates, rice straw, etc.) is recommended.

4. Advantages

- a) High dry matter yield
- b) Drought tolerant
- c) Very palatable, high-quality forage
- d) Can last for 4-6 years
- e) High tolerance to intensive cropping

5. Limitations

- a) High water content, which may cause digestive issues for animals (diarrhea) if the grass is harvested too young
- b) Low resistance to cold, frost susceptible
- c) Needs high fertile soil or lots of fertilizer
- d) Matures rapidly and becomes stemmy



UBON PASPALUM

Scientific name: *Paspalum atratum* cv. Ubon



1. Establishment and management

- a) Land preparation and planting: Pulverize the soil to a fine tilth, remove all weeds; make rows about 5 cm deep, 20 cm wide, with intervals of about 40-50 cm. Apply basal fertilizer and cover with a thin layer of soil before sowing. Mix seeds with dry soil or fine sand before sowing, 1kg of seeds with 30-50 kg of soil. Cover seeds with a layer of soil ensuring not to bury the seeds more than 2 cm depth.
- b) Sowing rate: For seeds, plant about 8-10 kg/ha. Can also be planted vegetatively from rooted slips or stolon cuttings (4-5 tons/ha), to be planted in pits 25 cm x 40 cm apart, 2-3 cuttings per pit. Note: lower density for more fertile soil; when planting with cuttings, the tops should be trimmed.
- c) Planting season: Sow seeds at the beginning of the rainy season, from April to July; plant cuttings from May to September.
- d) Fertilizer application: Apply 10-12 tons/ha of manure or 450 kg/ha phosphate or 230-250 kg/ha potassium sulphate or 300-500 kg/ha NPK 5:10:3 and 400 kg urea/ha/year. Apply all organic fertilizers, 100% phosphate, 50% potassium or 100% NPK 5:10:3 at planting. Top-dress with the remaining potassium and urea 20 days after sowing and after every forage cut. Pay attention to the safe withholding period before feeding the grass to animals, at least 14 days from the last fertilizer application until harvest; no application immediately after harvesting; best to apply 10-15 days after harvesting.
- e) Weed control: Weeding should be done 25-30 days after planting and after each harvest; do not spray herbicides.

2. Harvesting

- a) Ubon paspalum is ideal for cut-and-carry.
- b) First cut is recommended at 60 days after planting, when the grass with stem held upright is about 100-140cm from the base. Cut at about 10-15cm from the base, which will help tillers at the base to grow well and prevent the base from being crushed or rotten. For following harvests, cut every 40-45 days in the rainy season and every 50-55 days in the dry season.
- c) Ubon paspalum should be cut frequently as it becomes very unpalatable when too mature and old because of low nitrogen levels and high stem content.



3. Utilization

- a) Cut grass can be chopped and used for stall feeding.
- b) During summer and autumn when there is high biomass yield, Mulato II can be harvested, hayed or ensilaged, and stored for use in winter.
- c) Combining with other types of feed (legumes, concentrates, rice straw, etc.) is recommended.

4. Advantages

- a) High biomass yield
- b) Soft, hairless, large leave blades
- c) Can grow in low fertile, acidic soils
- d) Resistance to waterlogging and drought.
- e) Can last for 3-4 years

5. Limitations

- a) Moderate nutritive value
- b) High water content, which may cause digestive issues for animals (diarrhea) if the grass is harvested too young
- c) Unpalatable when mature

UBON STYLO

Scientific name: *Stylosanthes guianensis* var. *guianensis* cv. Ubon stylo

1. Establishment and management

- Land preparation and planting: Pulverize the soil to a fine tilth, remove all weeds; make rows about 5 cm deep, 20 cm wide, with intervals of about 40-50 cm. Apply basal fertilizer and cover it with a thin layer of soil before sowing. Mix seeds with dry soil or fine sand at a rate of 1 kg of seeds with 30-50 kg of soil. Cover seeds with a layer of soil ensuring not to bury the seeds more than 2 cm depth.
- Sowing rate: For seeds, plant about 10 kg/ha. In addition, Ubon stylo can be propagated using mature cuttings, each 30 cm long. Transplant after roots develop. However, the germination rate is not as high as from seeds.
- Planting season: Sow seeds in April-July.
- Fertilizer application: Apply 10 -15 tons/ha manure, or 80-100 kg NPK 5:10:3.
- Weed control: Weeding should be done 25-30 days after planting. Do not apply any herbicides.



2. Harvesting

- Ubon stylo is suitable for cut-and-carry and pasture for grazing due to its tolerance to trampling.
- First cut is recommended at 60 days after planting, when the stem is about 50-80 cm from the base. Cut at about 15 cm from the base to help tillers regrow well and prevent the base from being crushed or rotten. For subsequent harvests, cut every 40-45 days in the rainy season and every 50-55 days in the dry season.
- The grazing period is after about 60 days.



3. Utilization

- Fresh Ubon stylo can be stall fed to animals in combination with grasses. Can also be hayed or ensilaged with grasses and stored for use in rainy days or shortage season.
- Ubon stylo leaves can be dried, ground into powder and mixed with concentrates as a source of protein supplement for cattle.
- Can be fed to pigs directly or cooked.

4. Advantages

- High protein content
- Grows well in acid infertile soils

- c) Drought tolerant
- d) Suitable for both ruminants and monogastrics

5. Limitations

- a) Susceptible to cold temperatures
- b) Not tolerant to waterlogging or salty soils
- c) Not persistent under continuous grazing



RICE BEAN

Scientific name: *Vigna umbellata*



1. Propagation and management

- a) Land preparation and planting: Pulverize the soil to a fine tilth, remove all weeds; plant in pits, each 5cm deep, 3 seeds/pit, pit distance of 1 x 1m for single cropping. 1 x 2m for intercropping with maize.
- b) Planting time: Sow at the beginning of the rainy season, from April to July.
- c) Requires 80-100 kg NPK 3:10:5 for lining when planting.
- d) Weed control: Weeding should be done 25-30 days after planting; do not apply any herbicides

2. Harvesting

- a) Rice bean can be used for multiple purposes – beans can be used as food for humans, stem and leaves for animal feed, improving soil fertility.
- b) Suitable for cut-and-carry. Fresh stems and leaves can be cut 60 days after planting. Cut at about 20-30 cm from the base. Only harvest 1-2 times per year.

3. Utilization

- a) Leaves can be fed directly or ensilaged with grasses.
- b) Dried beans used as food.

4. Advantages

- a) High protein content
- b) Improve soil, increase nitrogen content in soil

5. Limitations

- a) Requires replanting every year
- b) Susceptible to pests and diseases and pests
- c) Low biomass yield

PINTO PEANUT

Scientific name: *Arachis pintoi*

1. Establishment and management

- a) Land preparation and planting: Pulverize the soil to a fine tilth, remove all weeds, make rows 15 cm deep, 25-30 cm apart. For intercropping with fruit trees, plant 100-150 cm from the tree.
- b) Sowing rate: Requires 1.5-2 tons of seedlings/ha. For seeds, sow 10-14 kg/ha. Seed density rate should be 25 x 40 cm, 1-2 seeds/pit.
- f) Planting time: Ideally at the beginning of the rainy season, from April to June. Plant cuttings from May-September.
- c) Fertilizer application: Apply 10-15 tons/ha of manure or 80-100 kg NPK 5:10:3 basal.
- d) Weed control: 25-30 days after planting, no herbicides should be applied.



2. Harvesting

- a) Best suited for grazing though can also be used in cut-and-carry system for taller varieties
- b) Harvest about 60 days after foliage forms. After first cut, cut every 50-60 days in the rainy season. May leave 10 cm from the soil level when cutting, the sprout nodes will grow back. In the dry season, pinto peanut does not grow well without irrigation.
- c) It can also be used as ornamental ground cover or cover crops in perennial crops such as fruit trees, coffee

3. Utilization

- a) Cattle can graze at the pinto peanut field. Can also be fed to poultry
- b) Cut and ensile with grasses, feed together with grasses or farm residues.
- c) Dried pinto peanut can be ground into powder and mixed with concentrates as a protein supplement for animals.

4. Advantages

- a) High quality feed with high protein content
- b) Good ground cover
- c) Improves soil fertility
- d) Tolerant to heavy grazing
- e) Tolerant to acidic, low fertile soils
- f) Highly tolerant to shade

5. Limitations

- a) Not best suited for cut-and-carry systems
- b) Low biomass yield
- c) Rodents (rats and mice) are attracted to the nuts
- d) Needs a lot of moisture to grow well

GENERAL GUIDE ON HOW TO USE GRASSES (MULATO II, MOMBASA GUINEA, NAPIER, ETC.) AND LEGUMES FOR CATTLE

1. Grasses

- Cut grasses can be chopped and fed directly to cattle. Cattle can eat fresh grass up to 10-12% of their body weight. For example, a 200 kg cow can eat 20-24 kg fresh grass.
- However, it is recommended to feed in combination with other types of feed (legumes, concentrates, hay, urea-treated hay, etc.) to increase the effectiveness (Table 1).
- Cut young grass or right after it rains, quick drying is necessary to allow water in the grass to evaporate to prevent bloating, flatulence, and diarrhea in cattle. For example, cut grass in the morning for afternoon feeding, or cut in the afternoon for next day feeding. Fresh grass can be fed together with hay at a rate of 6-8% body weight of fresh grass and 0.8-1.2% hay. For example, a cow with body weight of 200 kg should be fed with 12-16 kg fresh grass and 1.6-2.4 kg hay.
- In the summer-autumn season when biomass yield is high, grass can be cut and ensilaged for winter use. It can be ensilaged with legumes such as stylo, rice bean, soybean, etc. at a ratio of 20-35% legumes to 65-80% grasses. Remember to dry grasses and legumes before silage, and do not ensile on rainy days; grasses and legumes for silage should not be harvested young.
- Note: for new grasses unfamiliar to cattle, it is necessary to introduce gradually in at least 1 week from small to larger amounts. During the introduction phase, feed the new grasses first before other feeds, or grasses can be chopped and mixed.



2. Legumes

- Harvested legumes can be fed directly, hayed, or ensiled with grasses for winter use.
- If fed directly, they should be chopped, and the amount fed to animals should be about 2-4% of cattle body weight.
- If hayed or silage is fed, you can refer to table1 for recommended amounts.
- Farmers can also grind dry legumes and mix with concentrates in a 1:2 ration.

Table 1. Feed rations for cattle
(Feed amount is calculated for 200 kg body weight of cattle)

No.	Material	Ration 1		Ration 2		Ration 3		Ration 4	
		Ration per BW (%)	Amount (kg)	Ration per BW (%)	Amount (kg)	Ration per BW (%)	Amount (kg)	Ration per BW (%)	Amount (kg)
1	Fresh grasses	10-12	20-24	8,0-9,6	16,0-19,2	3,0-3,6	6,0-7,2	2,5-3,1	5,0-6,2
2	Hayed legumes			0,5-0,6	1,0-1,2			0,4	0,8
3	Urea-treated straw					1,6-2,0	3,2-4,0	1,6-2,0	3,2-4,0
4	Concentrates	1,0	2,0	1,0	2,0	1,0	2,0	0,8	1,6
5	Silage					3,0-3,6	6,0-7,2	3,0-3,6	6,0-7,2

BW: body weight.

Depending on the availability of feed types in a season, farmers can choose 1 of the 4 rations above to feed cattle. Farmers can also adjust feed rations based on the above 4 to suit the specific circumstances.



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