

Theme 1: Forage production and pasture management

# BRACHIARIA GRASS MANAGEMENT

## Level 3

Topic	Training & information Content
1.1	Planning of fodder/feed requirements for the dry season
1.2.1	Integrated soil fertility management I
1.2.2	Integrated soil fertility management II
1.3	Use of natural resources, compost making, farmyard manure, manure storage and use
1.4	Growing maize and sorghum for fodder and estimating time of harvest and yield
1.5	Brachiaria, Panicum, & Napier (cut and carry) grass management
1.6	Growing fodder trees and use of feed
1.7	Estimating of dry matter content, feeding value and yield of various fodder crops
1.8	Guidelines for Tropical pasture management and grazing management
1.9	Scaled mechanization of forage production and pasture management (harvesting practices)
1.10	Operating farm equipment and self-propelled tractors
1.11	Mechanization of feeding management
1.12	Economics of forage and pasture production



# Brachiaria grass Management (Level 3)

## Learning Activities - You will learn about:

- Varieties of Brachiaria grass
- Ecological requirements for growing Brachiaria grass
- How to establish and maintain Brachiaria grass field
- Harvesting, conservation and feeding of Brachiaria grass

# Brachiaria grass Management (Level 3)

## Background

- Improved Brachiaria is a new grass variety that complements the widely used and known Napier grass as a fodder for dairy cows
- The grass is the most extensively cultivated forage in South America, Australia and Asia
- It is a native grass in East African. However the use of improved Brachiaria as cultivated forage in Africa is extremely limited.



# Brachiaria grass Management (Level 3)



## Benefits

- Brachiaria grass yields a lot of nutritious biomass (i.e. above 12 tonnes of dry matter per acre per year) in a well managed field
- It is drought tolerant and adapted to soils of low fertility
- Brachiaria grass grows on a wide range of soil types and improves soil fertility, soil conservation and minimize greenhouse gas emissions.

# Brachiaria grass Management (Level 3)

## Varieties

### i. Improved Brachiaria

- **CAYMAN** - Has an erect growth habit with well-defined tussocks, which is ideal for cut and carry
- **COBRA** - A leafy, vigorous, perennial grass of medium height, growing to between 80–110 cm
- **MULATO II** - A very leafy plant with 5–8 leaves (length 40–60cm, width 0.6–0.7 cm) per stem.

### ii. Brachiaria cultivars

- BASILISK
- MG4
- PIETÀ
- XARAES (TOLEDO)

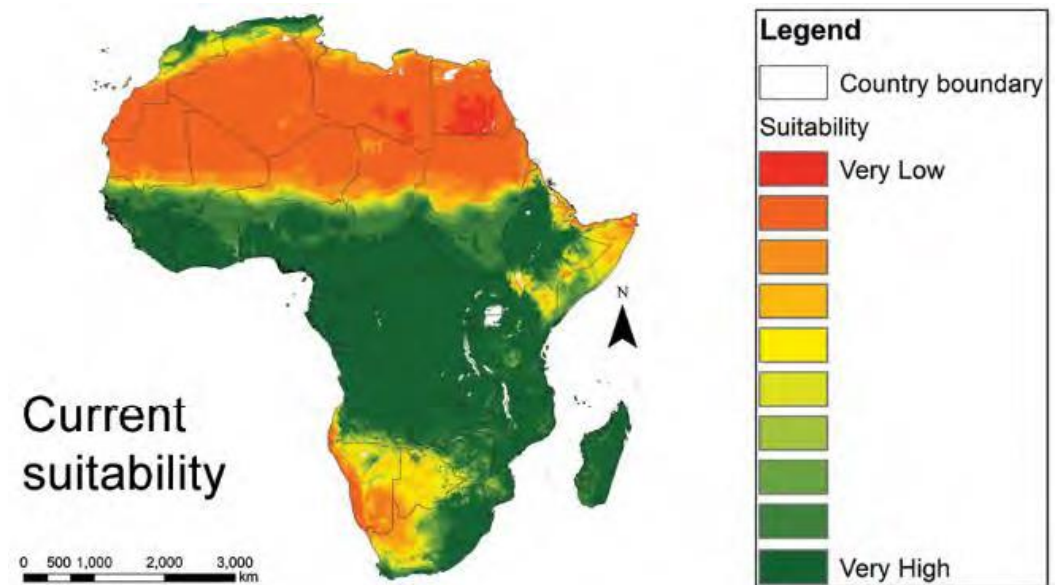


Photo: Felix Opinya

# Brachiaria grass Management (Level 3)

## Ecological requirements

- Brachiaria grass performs well in sub humid and humid areas with annual rainfall of at least 700mm and temperatures of between 17°C - 30°C
- The optimum altitude is above 1800m above sea level
- The grass therefore is adapted to different ecological zones of Tropical Africa
- Furthermore, the grass responds well under irrigation in arid and semi arid areas which receive longer dry seasons of over 5 months.



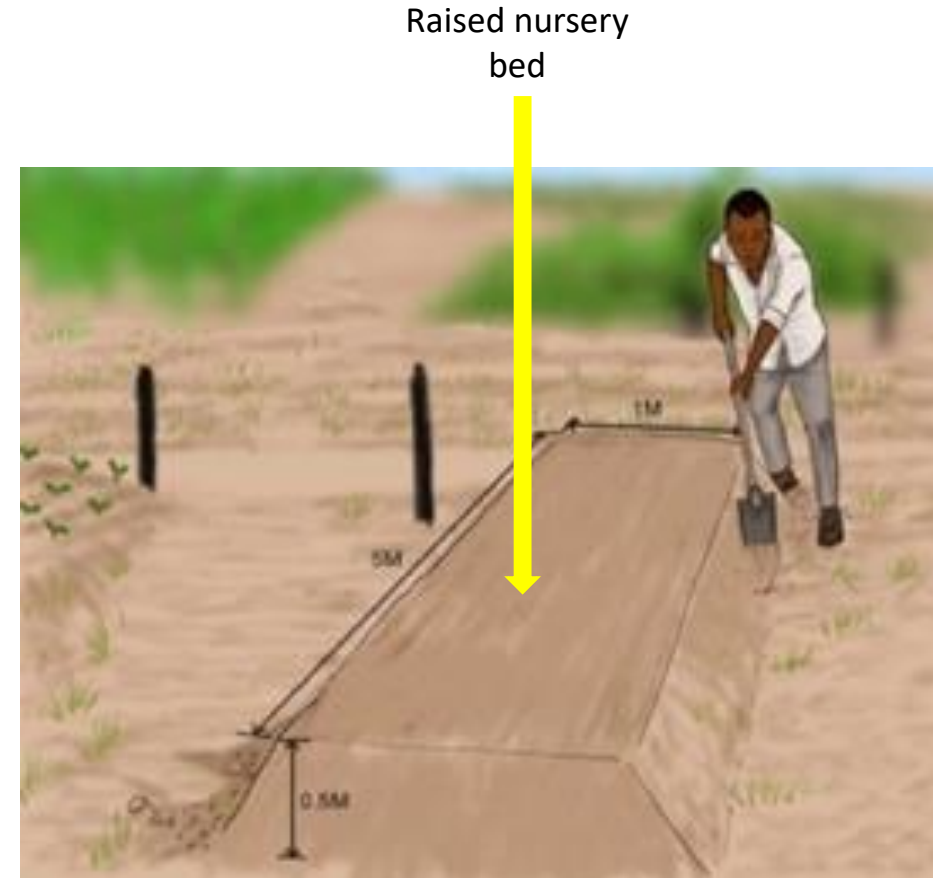
*Suitable areas for growing Brachiaria grass*

# Brachiaria grass Management (Level 3)

## How to establish Brachiaria Grass: Nursery establishment

### How to prepare a raised nursery bed

- Measure the nursery area, and make sure it is 1 x 5m
- Double dig the nursery to a fine bed
- Raise the nursery bed by 0.5m. This is to prevent water logging in the seedbed and allow strong roots to develop easily
- **Note:** Brachiaria Basilik and Cobra varieties can do well even without need of a nursery bed, especially in South west Uganda



**Important:** The nursery bed should be protected from domestic animals like dogs and poultry

# Brachiaria grass Management (Level 3)

## Propagating Brachairia grass

Brachiaria grass can be propagated by **seeds** or **vegetative methods (root splits)**.

### Seeds: Sowing the seeds

- Use a string to make straight furrows 5cm between the rows
- Dig the furrows along the row no more than 2 cm deep
- This should give you 18–20 furrows.



Distance of  
furrows  
between the  
rows



# Brachiaria grass Management (Level 3)

## Drill the seeds into the furrows

- Drill 0.5 kg of seeds, evenly placed in the furrows
- Cover them lightly with soil. Ensure all the seeds are covered by the soil.
- Water the nursery bed immediately after drilling.

*Important: 2.5kgs – 3kgs of seeds are enough for One (1) acre piece of land*



# Brachiaria grass Management (Level 3)

## Mulching

- When the drilling is complete, cover the nursery bed with dry grass, straw, dry banana leaves or any such kind of material. This is known as **mulching**.
- Mulching helps preserve the moisture in the nursery
- Using local materials, construct a simple shade over the nursery. This will protect germinating seedlings as young seedlings can be delicate and die if exposed to direct sunshine. It also prevent birds from eating the seeds.



# Brachiaria grass Management (Level 3)

## Watering

- On dry days, water the nursery bed twice daily (morning and evening) using a watering can with a nozzle
- Be careful not to water the nursery bed excessively; as it can cause water logging that could stress the seedlings
- Monitor the nursery bed to ensure it is not destroyed by scavenging birds, pests or diseases. Protect the bed from being damaged if need be.



# Brachiaria grass Management (Level 3)

**Important:** Remove the mulch immediately after germination

- After 5 – 7 days, or as soon as you observe that germination has started, remove the grass mulch to allow the seedlings to grow.



# Brachiaria grass Management (Level 3)

*Important: Remove the shade gradually*

- From the third week, gradually remove the shade that is covering the seedlings to allow in more light. This will make the seedling stronger and ready for transplanting.



# Brachiaria grass Management (Level 3)

## Transplanting

### Preparation for Transplanting

- Seedlings will be ready for transplanting within 4–6 weeks
- Before transplanting, **select a suitable field** or planting Brachiaria grass.

#### Field selection

- For ease of carrying the grass to the cows, select fields close to the feeding/zero grazing unit
- Fields for grazing can be further away from the homestead



# Brachiaria grass Management (Level 3)



*Important: It is recommended that planting takes place during the rainy season*

- Plant 1 - 1½ acre per cow. If well maintained high quality Brachiaria grass is enough to feed one cow, a heifer and a calf.

## Root splits

- One can also use root splits to (trans)plant Brachiaria grass.
- Before transplanting (either nursery seedlings or root splits), prepare the selected field appropriately

# Brachiaria grass Management (Level 3)

Site preparation: Preparing the selected field for transplanting seedlings

- Select an area at least 2 x 6 m
  - Area close to the homestead is desirable to easily monitor/keep an eye on it
  - Have ease of access to water sources for ease of watering
- Clear the selected area from all weeds and grasses
- Plough the land and mix the soil thoroughly with manure

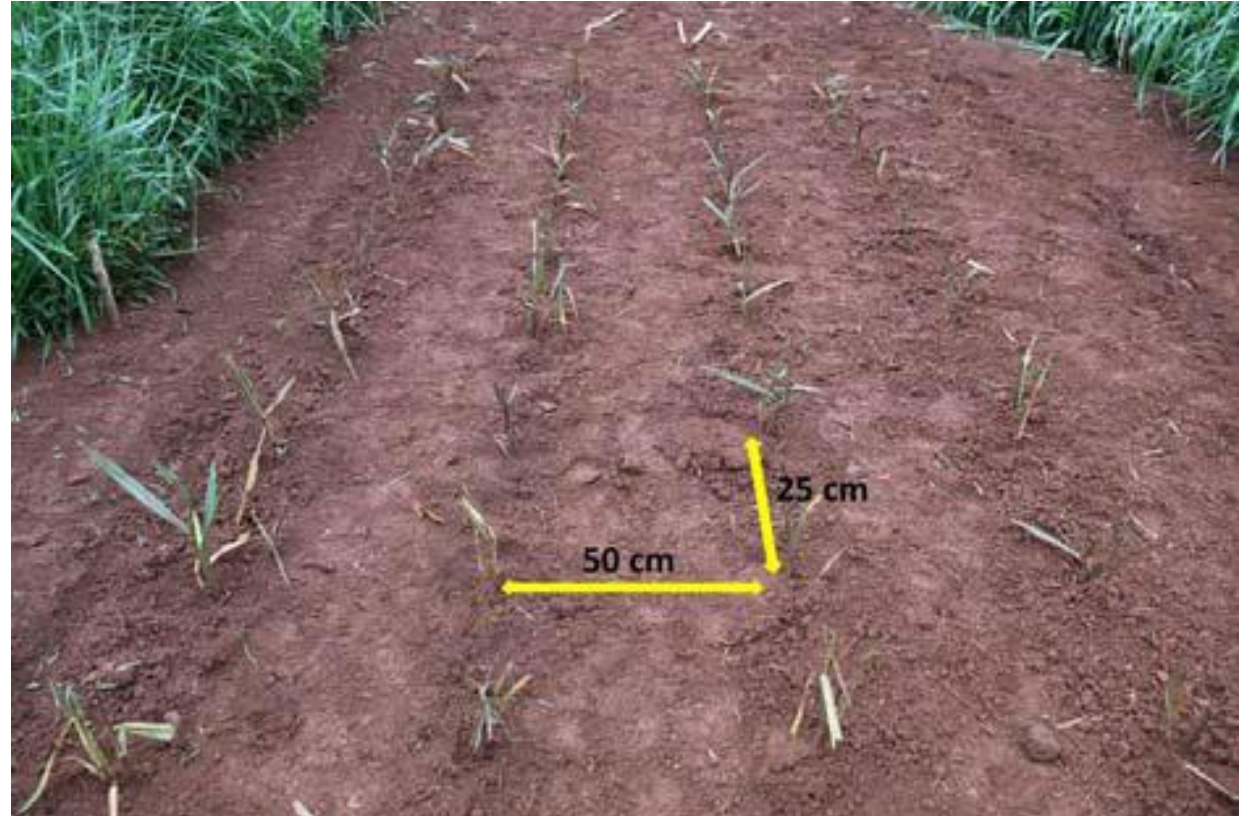
*Important: Preparation of the seedbed/site should take about 6-8 weeks before onset of rains*





# Brachiaria grass Management (Level 3)

- Dig holes for plants 25 cm apart along lines 50 cm apart from each other. This will make weed control easier.



# Brachiaria grass Management (Level 3)

Transplanting seedlings: Time to plant the seedlings onto the field/seedbed

- Water the nursery in the morning to soften the ground to allow easy of uprooting the seedlings
- Remove each seedling with soil attached to the roots. Seedlings should be carefully arranged on trays or gunny bags and transported for planting



*A seedling with soil (lump) attached to the root*

# Brachiaria grass Management (Level 3)

- Plant the Brachiaria grass seedlings with well-dried farmyard manure. Apply one handful of per hole.
- DAP can be used as an alternative at the rate of one soda bottle top per hole.



# Brachiaria grass Management (Level 3)



*Planting one rooted tiller per hole*

- The seedlings should be transplanted during the cool hours of the day i.e. preferably early in the morning (from 6–10 am) or late in the evening (from 4–6pm) when temperatures are lower. This is to avoid exposing the seedlings to excess heat
- Prun/trim long roots on the seedlings to avoid fungal infections
- Plant one rooted tiller per hole. Planting more than this creates competition between plants and reduces the plantable area.
- Keep some seedlings in the nursery to replace seedlings that die after they are transplanted (i.e. to do **gapping**).

# Brachiaria grass Management (Level 3)

## Maintenance of Brachiaria grass

- Keeping plants healthy and areas around the crop free of weeds is the best way to begin preventing pests and diseases
- Growing in shadows, in a very dry or very wet environment can be stressful to Brachiaria grass
- Make sure the plants have enough water and nutrients (manure or fertilizer) to keep the plants healthy



# Brachiaria grass Management (Level 3)

## Weeding

- Keep the growing Brachiaria grass free of weeds. Weeding before sprouting will reduce the weed burden very much. Weeding during the dry season will control vigorous weeds.
- Weeding can be done manually by pulling out the germinating weeds.



*Field of Brachiaria  
grass being kept  
free of weeds*

Photo courtesy: Innocent

# Brachiaria grass Management (Level 3)

- Weeding can also be done after the grass and weeds have germinated, using a herbicide targeting broadleaved weeds only.

***Important:** For herbicides, use an appropriate herbicide in the recommended concentration, apply correctly and under the right conditions*

- Weeding should be repeated after every cut (harvesting)



# Brachiaria grass Management (Level 3)

## Preparation for Fertilizer/Manure Application

- To make use of fertilizers/manures effectively, it is important to understand:
  - i. Factors influencing fertilizer application
  - ii. Good practices for fertilization of pastures
  - iii. Nutrient components in fertilizers/manures

### i. Factors influencing fertilizer application

- **Soil fertility:** some soils are naturally more fertile than others and have a lower fertilizer requirement





# Brachiaria grass Management (Level 3)

- **Rainfall:** the more water a crop has at its disposal, the higher the yield and the more nutrients will be needed
- **Pasture crop** – the species and cultivar(s) in the pasture play an important role as every species has its own unique characteristics and requirements
- **The type of animal** – it is inefficient to use high quality pastures for animals such as dry cows that can be kept in the required condition with much cheaper rations. Animals such as milk cows, young growing cattle, that are being fattened mostly have a need for better quality grazing and are usually able to use these pastures.



**Note:** Poorly fertilized pastures cannot meet the requirements of these high producing animals, hence the fertilizer application rates will partly be determined by the type of animal and the system in which the pasture will be used.

# Brachiaria grass Management (Level 3)



## ii. Good practices for fertilization of pastures

- Before using fertilizers on pastures, take note of the following:
  - Take soil samples before fertilization. This will inform nutrients deficient in the soil and enable you use correct fertilizers
  - Fertilize adequately
  - Use the correct Nitrogen (N) source

**Note:** *Brachiaria grass will also grow on low fertile soils but with lower levels of production. Higher and more frequent fertilizer applications are necessary on low fertile acid soils*

# Brachiaria grass Management (Level 3)



## iii. Nutrients in fertilizers/manures

- Some examples of fertilizers that can be used and their nutrient components are listed below:
  - DAP is Di-Ammonium Phosphate which contains 18% N and 48% P
  - CAN is Calcium Ammonium Nitrate which contains 26% or 27% N
  - SSP is Single Super Phosphate which contains 7-9% P and 18-21% Ca and 11-12% S
  - Lime is Calcium Carbonate which contains  $\text{CaCO}_3$
  - Rock phosphate contains 30% P and 38% CaO



Cow manure contains 12.7% Dry matter (as % of Dry matter) 3.9% N and 0.7% P and 2.6% K

*N=Nitrogen; P=Phosphorus; K=Potassium; Ca=Calcium; S=Sulphur*

# Brachiaria grass Management (Level 3)

## Actual application of Fertilizer/Manure

### i. During planting

- During planting/initial fertilizer application, use a phosphorus (P) dominated fertilizer such as DAP to support root development
  - Make furrows along the Brachiaria grass lines
  - Apply fresh manure and cover the furrow with soil **OR**;
  - Apply DAP fertilizer in the furrows
  - Cover the furrow with soil

**Note:** One bag (50 kg)  
DAP is enough for 1  
acre

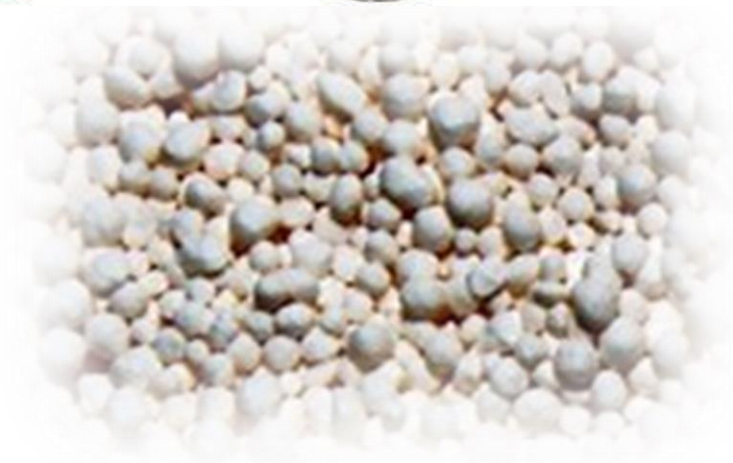
Fertilizer applied into  
a furrow along the  
growing grass/crop



# Brachiaria grass Management (Level 3)

## ii. Subsequent fertilizer application

- Subsequent applications (as top dress) should be done annually with Nitrogen (N)-based fertilizer like CAN. Apply CAN at the rate of 100 kg/ha.
- All fertilizer applications should be done after rains when the soil is wet enough to dissolve the fertilizer; alternatively, use irrigation.
- Fertilizer application after harvesting/cut should also be done when the soil is wet, for quicker regrowth. Application should be done after every harvesting/cut.



# Brachiaria grass Management (Level 3)

## General rule of thumb for fertilizer application

Based on the three main nutrients for crops (NPK)

- **Nitrogen (N)** application is: 0.2-0.25 kg N fertilizer for every 1 mm rainfall, in other words 100 kg N per hectare for a 500 mm rainfall zone
- **Phosphorus (P):** Phosphate removal from the soil can range from 1 kg/ ton DM produced (poor grazing) to 3 kg / ton DM produced (intensive used pasture). If plant material is cut and removed, P should be replaced.
- **Potassium (K)** removal ranges from 15 kg/ton (poor grazing) to 25 kg/ ton DM produced (intensively used pasture). Where plant material is removed, it would be necessary to replace the removed K.



Picture source: <https://5.imimg.com/data5/ML/PF/BW/SELLER-45489165/npk-fertilizer-1kg-500x500.jpg>

**Note:** More general to maximize Dry Matter yield per acre, annual fertilizer applications of between 250-300 kg/ha of NPK fertilizer are recommended.

# Brachiaria grass Management (Level 3)

## Pests and Diseases

- During the growing period, inspect the grass crop for pests and diseases. Carry out inspections at least 2 times every week.
- Keep the Brachiaria grass free of pests and diseases. The following pests are common:
  - i. Red spider mites
  - ii. Army worm
  - iii. Stem and stalk borer



Red spider mite



Stem/stalk borer

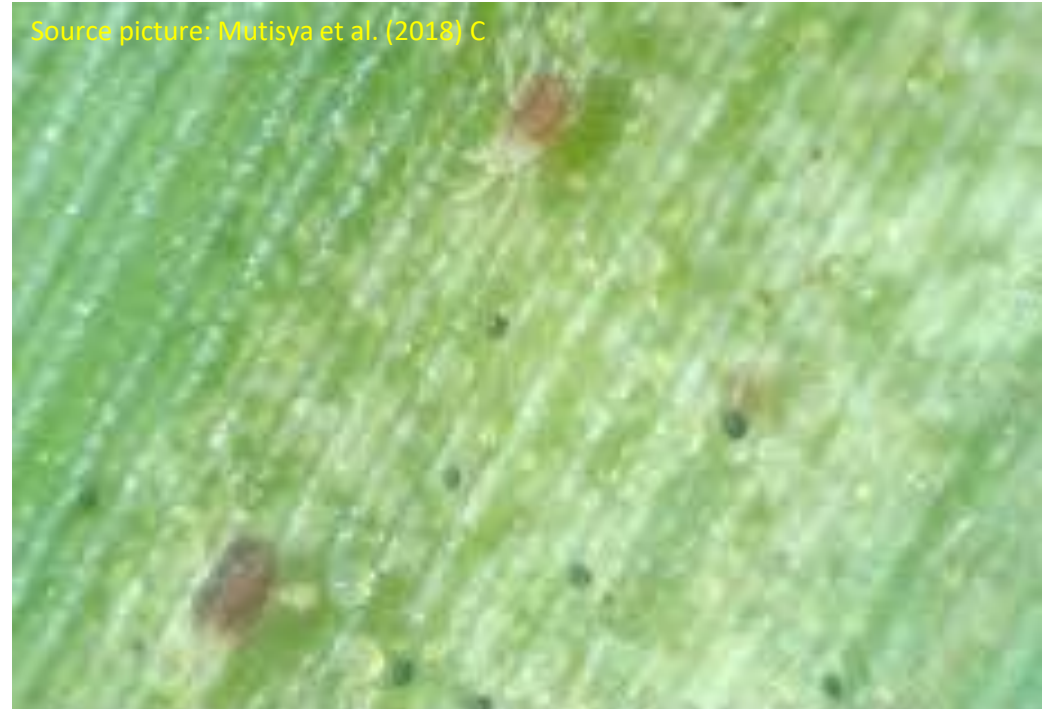


Army worm

# Brachiaria grass Management (Level 3)

## i. Red spider mites

- Red spider mites can attack Brachiaria grass frequently. Once the grass is attacked, red spider mites spread all over the plants.
- Control/take care of infestations before the plants become permanently damaged.
- Symptoms: A plant infested by red spider mites will start to look unhealthy and appear dusty on the underside of its leaves.
- Control: The best way to eliminate red spider mites is to avoid getting them. **How?**



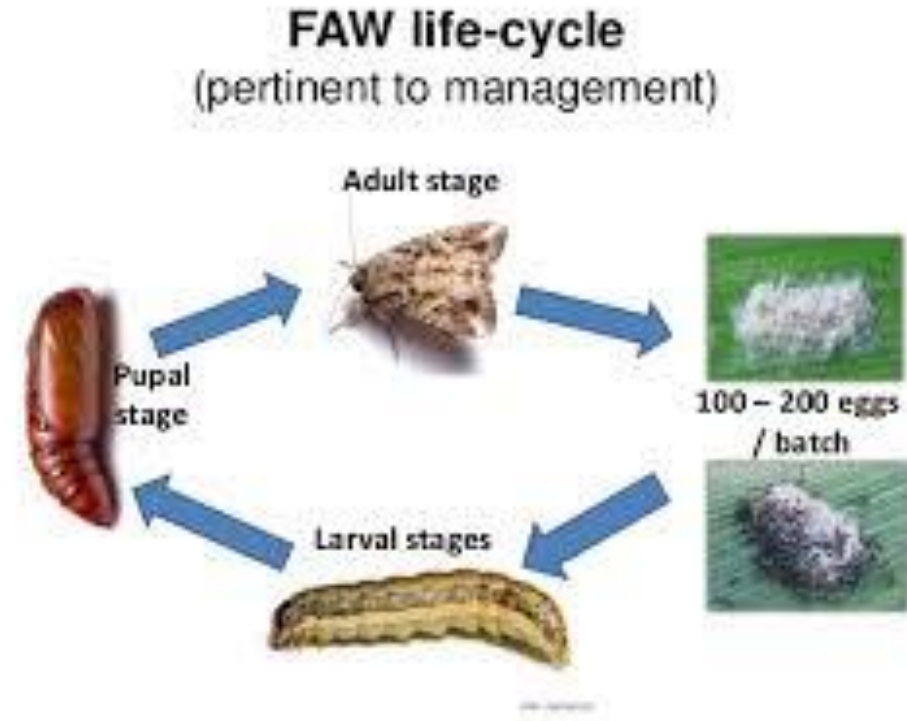
*Red spider mite colony (Mag.x40) on Brachiaria grass*



# Brachiaria grass Management (Level 3)

## ii. Fall Army worms (FAW)

- Fall Army Worms attack, feeding on grass shoots. Insecticides can be applied successfully at the early stages of an attack.
- Treatments should be applied in the evening before they begin feeding. Note that adult worms can become resistant to chemical applications.















*Source picture: J. van den Berg et al. (2018)*

## iii. Stem borers and stalk borers

Keep the Brachiaria grass free of weeds to avoid pest and diseases.

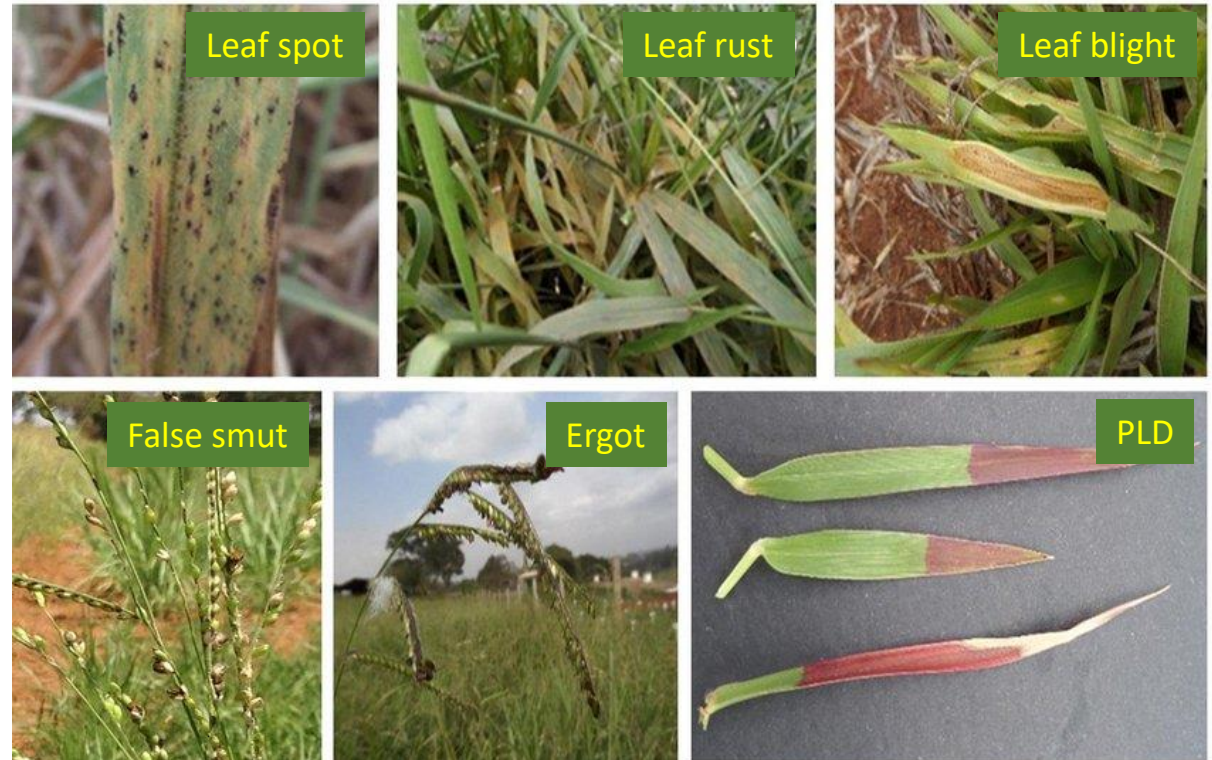
- If need be, use an appropriate pesticide in the recommended concentration
- Apply the pesticides correctly and under the right conditions

*Note: Predators like wild animals can be scared away using dogs*

	Fall armyworm	Asian stem borer	Spotted stalk borer
Scientific names	( <i>Spodoptera frugiperda</i> )	( <i>Ostrinia furnacalis</i> )	( <i>Chilo partellus</i> )
Appearance Eggs			
Appearance Larvae			
Appearance Pupae			
Appearance Mots			
Main food sources	Maize, rice, sorghum, sugarcane, vegetable crops, cotton	Maize, bell pepper, cotton, millet, sugarcane, sorghum, ginger	
Natural enemies	Ants, earwigs, bugs	Tachinid flies, braconid, and ichneumon wasps, earwigs	wasps
Intercropping	Cassava, napier grass, brachiaria grass, beans, peas	Beans, eggplant and lemon grass	Sorghum, Cassava, napier grass, desmodium
Biocontrol	Litovir, spodoxir		Extra Nitrogen fertilizer

# Brachiaria grass Management (Level 3)

- Some of the common diseases of improved Brachiaria cultivars include:
  - Leaf spot
  - Leaf rust
  - Leaf blight
  - False smut
  - Ergot
  - Physiological leaf disorder (PLD)



Source picture: Njarui, D.M. et al. (2016)

# Brachiaria grass Management (Level 3)

- Common viral diseases include Guineagrass Mosaic Virus that significantly reduce yields
- Infected plants show rhomboid or eye-shaped lesions on infected leaves
- When the disease is noticed earlier (low infections), burn infected plants.



# Brachiaria grass Management (Level 3)

## Harvesting/When to cut

- Brachiaria grass takes 80-150 days till the first harvesting/cut. During this period, the grass will be about 1 meter high.
- Harvesting/cuts can be made on rotational basis as follows:
  - **Rainy season:** Every 25–45 days
  - **Dry season:** Every 60–70 days

*Smallholder dairy farmers in East Africa who prefer to feed their dairy cows in stalls can use Brachiaria grass as cut-and-carry fodder. Cut to about 5 cm above the ground level*



Harvested Brachiaria grass

# Brachiaria grass Management (Level 3)

## Conservation of Brachiaria grass

- Brachiaria grass can be conserved either as hay or silage using different types of silos.



# Brachiaria grass Management (Level 3)

## Feeding Brachiaria grass

### *Cutting/Chopping*

- After harvesting/cutting and carrying the grass to the feeding unit chop the grass in small pieces of 1-2 cm length
- Young grass can be chopped with a machete, chaff cutter or mechanical chopper. Chopping increases voluntary cattle's feeding/intake and digestion of the grass.



# Brachiaria grass Management (Level 3)



## Feeding

- Feed at the following rates:

	Rainy season (good quality Brachiaria)	Dry season (good quality Brachiaria, but drier material)
Large size cows (Friesian, Fleckvieh, Ayrshire)	90-110 kg per day	70-80 kg per day
Small size cows (Jersey, Guernsey)	65-85 kg per day	55-65 kg per day

**Note:** An empty 50kg  
fertilizer bag, filled with  
chopped grass is equal to  
25kg of feed

- END -