Theme 2: Forage conservation

ESTIMATING IDEAL TIME OF HARVESTING (Level 1)

Topic	Training & information Content
2.1	Fodder conservation and storage
2.2	Estimating ideal time of harvesting
2.3	Guideline for silage making
2.4	Fermentation process
2.5	Treatment of straw with Urea
2.6	Making of urea/molasses/mineral lick
2.7	Management of silage pit (feed out)
2.8	Estimating fodder supplies for dry season feeding & planning of feeding management

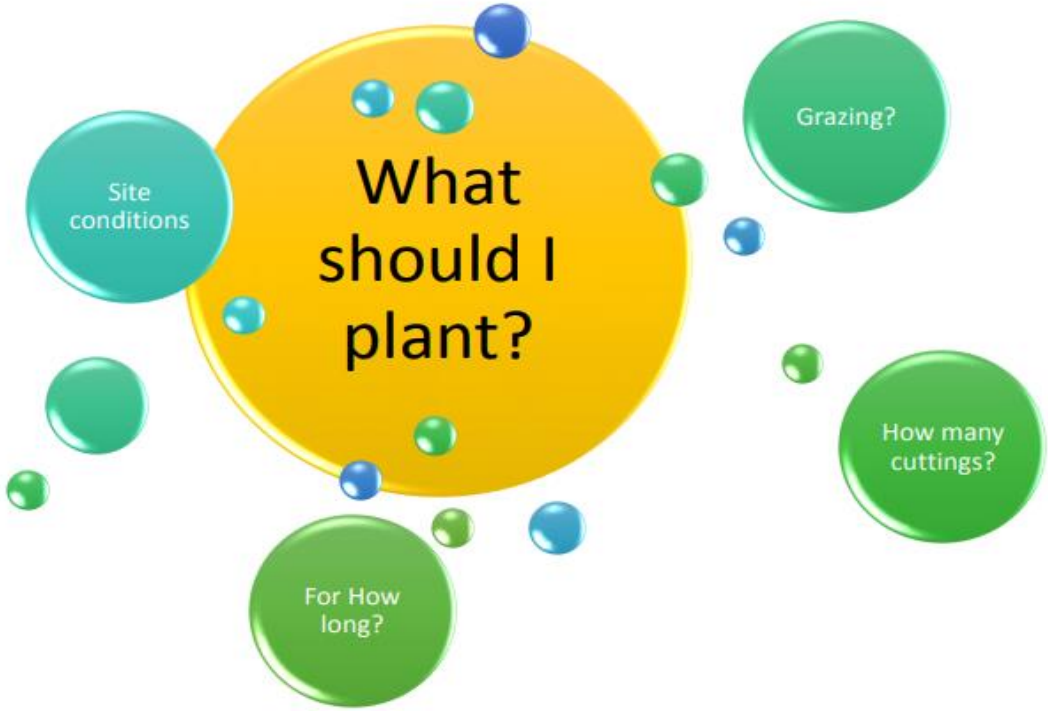
1. You will learn about (learning objectives):

- ❑ The trainee knows the best stage at which to harvest grasses, maize and legumes used as forage
  - Forage quality
  - Selection of crops and stage of harvest
  - Good vs bad silage
  - Hay making
  - Machinery for harvesting and chopping maize and kernel crashers

2. Introduction

- Every forage crop has an optimum stage of harvesting - balance between maximum yield and the best quality

- The optimum stage depends on how the forage material will be utilized i.e. either fresh feed or conserved feed (hay or silage)



3. Forage quality: Grasses, Alfalfa and Maize

- Stage of harvesting (harvesting time) and condition of forage material vary based on:
  - maturity
  - moisture content
  - type of forage crop
  - conservation method to be used

4. Grasses: Best stage for harvesting grasses

- At cutting the grass should;
    - Be highly palatable
    - Have high intake
    - Highly digestible
    - Have high nutrient content
    - Have limited anti-quality (nutritional) factors
    - Improve animal performance

5. Selection of crop and stage of harvest

- The primary methods of preserving forage crops include silage making and hay making. The crops can also be harvested as green chops or grazed

- Each of these methods of forage harvest and/or preservation has benefits and limitations

- Farmers, based on the scale of their farm and level of intensification, must review each management practice and evaluate their own production situation to determine which method to use to gain maximum economic returns

6. Factors affecting the choice of harvesting stage

- Grass variety
- Protein content
- Fibre content (NDF)
- Stage of maturity
- Balance between yield and nutritive value

Drop in grass quality over time

7. Young grass is a source of nutrients

- Grass is a very good source of protein when harvested before flowering

- To optimize the nutrients available in the plant, feed the grass when fresh. If there is more than the cows can finish, make silage

8. Napier grass – stage of harvesting

- Cut the grass at the vegetative stage
- Napier silage should be made when the grass is between 60-90 cm. Alternative way is to cut the grass every 4-6 weeks

11. Grass for hay production

- Hay made when grass is overgrown is of poor quality

12. Harvesting stage for maize silage

- Factors that affect harvesting stage of maize for silage include:

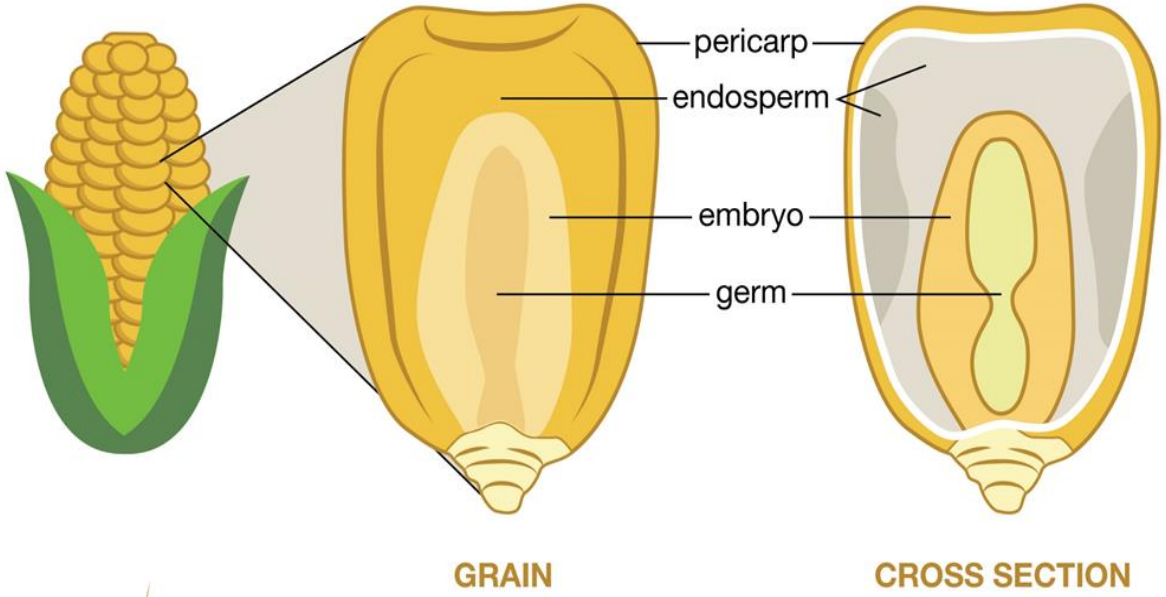
  - Dry matter
  - Maize variety (uniform ripening cob/stem)
  - Starch content
  - Forage choppers used




13. Access the crop on dry matter (DM) yield

- Identify the % dry matter; should be between 30-35% DM. The cob and kernel maturity correlate directly to dry matter;

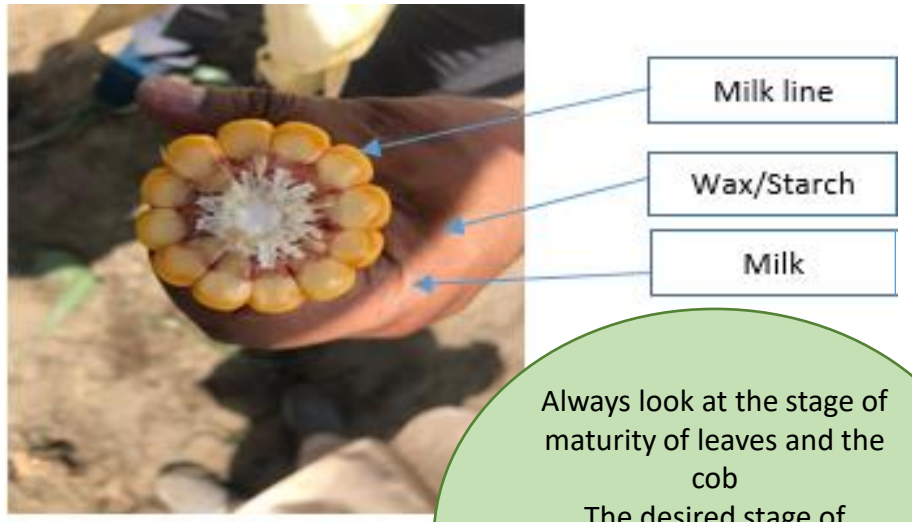
    - Firstly, collect at least five representative cobs and pull back the outer leaves
    - Secondly, break the cobs in half to examine kernels
    - Thirdly collect at least five stalks (stalk/leave maturity), crack and twist
    - Fourthly, decide on the intended cutting height



Maize kernel (grain)

14. The maize kernel at 30-35% dry matter

- Milk ripe:
  - kernel is filled with milky substance
- Soft dough ripe:
  - kernel is filled with dough like substance
- Dough ripe:
  - pressing your fingernail into the kernels should result in a soft cheese texture at top of the cob
- Hard dough ripe:
  - top kernel is hard



Always look at the stage of maturity of leaves and the cob
The desired stage of harvesting maize is when the milk line is at ¾ of grain. This is when starch content is at optimum

16. Determining dry matter in maize crop

- When you twist the stem of the maize crop, the number of drops indicate the level of Dry matter

  4 drops ≤ 18 % DM 100 % green
  3 drops ≈ 21 % DM 75 % green
  2 drops ≈ 24 % DM 50 % green
  1 drop ≈ 27 % DM 25 % green
  0 drops ≥30 % DM 0 % green

17. Stubble height

- Cut at a higher height (leaving 30 to 40 cm of the stalk) -> better quality maize silage

- The stubble height can be a tool to manage
  - dry matter content
  - harvest timing of maize silage
- The lower part of the stem (stubble) contains more of the water

18. Machinery used for harvesting maize

- Always make sure the knives are sharpened regularly (4-8 hours) to ensure the correct chopping size (0.8- 1.5 cm)
- If a forage harvester or chopper has no kernel crusher, many grains will pass unbroken (not damaged). These kernels can not be digested in the rumen and can be found in the manure
- The energy in the kernels is lost for the cow
- In this case it is better to harvest the maize earlier at the dough stage

19. Machinery used for chopping maize

- If a machine has no kernel crusher, many kernels (grains) will pass unbroken, this will force early (sub optimal) harvest i.e. at milky stage

21. Legumes

- Legumes are best fed fresh or harvested as hay
- Making silage using legumes is not easy because of the high protein content

Lablab

Sunn hemp (Clotolaria)

Alfalfa (Lucerne)

22. Making hay from Alfalfa

1. Start with a good, full stand of healthy plants

- Maintain your field well by ensuring proper fertilization and weed control

2. Cut at proper maturity under ideal drying conditions

- If weather permits, the ideal maturity to cut alfalfa is in the bud to 10 % flowering
- This maturity is the perfect blend of yield/ha and high nutritive value
- Alfalfa should be cut in the morning – leaving 1 to 2 inches of stubble, and it should be conditioned when cut to disrupt the waxy cuticle on the stem

22.1 Making hay from Alfalfa Cont'd…

3. Drying

- To promote rapid drying, alfalfa should be laid out in wide swaths that are at least 70% or greater the width of the cut row
- Wide swaths increase overall hay quality due to two main factors – the hay dries faster and hay cured in wide swaths has a lower ash content

4. Bale the alfalfa quickly at optimum moisture levels

- Alfalfa is ready for baling only when you twist the forage crop in your hand there is no moisture

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