L23
Fodder - Trees

Importance of tree fodder

- Provides nutritious feed and pods rich in proteins and minerals to livestock's
- Variety of products - fuel, timber, fibre & medicine
- Source of organic matter, increases soil N & soil structure
- Serves as fence/ hedge
- Serves as wind break
    - to prevent soil erosion and conserve soil moisture
- Provides shade for shade living plants
- Increase the yield and improve the quality of grasses
    - Acacia spp (velvel, karuvel), Agathi, Sithagathi, Subabul

Botanical name	**Common name**
Acacia catechu	Karungali
A. nilotica	Karuvel, Black babul
A. leucophloea	Velvel, White babul
Albizzia lebbek	Vagai
Bauhina variegata	Orchid, Bauhina
Dalbergia sisoo	Sissoo
Erythrina indica	Mulmurungai
Glyciridia maculata	Glyricidia
Hardwickia binata	Acha
Leucaena leucocephala	Soundal, Subabul, Ipil ipil
Pitheclobium dulci	Kodukapuli
Pongamia glabra	Pungam
Prosophis juliflora	Semaikaruvel
Azadirachta indica	Neem
Melia azadirachta	Malaivembu
Entelobium saman	Rain tree
Madhca indica	Illuppai, Mahua
Sesbania grandiflora	Agathi
Delonix regia	Goldmohar
Ailanthes excelsia	Match wood tree

Fodder Preservation

Hay & Silage making

Hay making

"Hay -refers to cereals, grasses or legumes that are harvested at appropriate stage, dried and stored"

- High quality hay is light grey color
- Leafy, pliable & free from mustiness
- Easy method of storing seasonal excess
    - Only way for farm by-products
- Principle is to reduce water content
- Legume, non-legume & mixed gay are the major three types

Field method

- In field there are two methods
    - Windrows – occupies 1/3rd land area
    - Swath – Entire field
- Drying in 'Windrows' faster than swath
- For this, harvest few hrs after dew drying
- Allowed to cure in the field itself
    - Turned after every 4-5 hrs
    - By the evening moisture reduced (75% to 40%)
    - Next day requires 1 or 2 turnings
    - Moisture content in the 2nd day comes to 25%
    - Now ready for storage as bales or in tripod stand
    - End of curing moisture to be reduced to 20%
    - Normally 70-75 sunshine hrs require
- Not suitable for rainy season

Mechanical method

- Fence method – wire fencing with angle iron posts are used
    - More suitable for berseem, Lucerne, groundnut haulms and legume fodders
    - Protein loss is minimized (2-3%)
- Forced air batch – developed at IGFRI
    - Capacity 1 t /day
    - Cost Rs.60/t

Chemical changes in hay making

- Conversion of soluble sugars to CO2 & H2O
- Loss of digestibility
- Increase in cellulose and lignin content
- Reduce in nutritive and keeping quality

Loss in fodder value

- Nutrient loss in late cutting
- Shattering of leaves & finer parts (in legumes)
- Fermentation loss leads to dry mass loss by 6%
- Oxidation by sun bleaching leads to
    - Loss of chlorophyll and carotene

        - Carotene decreases from 150-200 to 5-10ppm
        - Carotene is to give aroma
            - Animals are color blind
- Leaching leads to loss of
    - Protein, nitrogen free extract (NFE), minerals, and vitamins
    - Consequently crude fibre increases & digestibility deceases
    - In Berseem crude protein loss is from 22% to 16-18%

Ensilage / Silage making

'Silage' may be defined as the green succulent roughage preserved under controlled anaerobic fermentation in the absence of oxygen by compacting green chops in air and watertight receptacles

- Silage leads to fermentation of water soluble carbohydrates to organic acids which increases acidity of the materials (pH – 4)
- Such anaerobic acid (lactic acid) arrests the
    - growth of bacteria
    - Moulds
    - Inactivates putrefying organisms (act as preservative)
    - Consequently reduces nutrient losses and
    - Change in nutritive value
- Best method than hay

Crops suitable for silage

- Crops suitable are based
    - Dry matter of 30-45%
    - Soluble sugar 8-10%
    - Ratio between water soluble CHOs and buffer capacity
    - Ratio of sugars to crude protein
        - All these decide production of lactic acid
    - Crops suitable for cut at 50% flowering and at milking
        - Crops like sorghum, maize

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Points for consideration while ensiling

- Dry matter content for the materials should be 30-45%
- More succulent materials may be taken after field drying only
- Polythene layering on all sides improves the quality
- Filling should be done on a clear day as quickly as possible

- Filling should be in layers of 20-30cm at a time and uniformly
- Compaction must be perfect
- Trampling is useful to remove air pockets
- Top must be convex / dome
- Silage pit size
    - 20 x 20 x 20 c. ft for 50-55 t
    - 5 x 5 x 6 c. ft for 22.5 t
    - 10 x 5 x 6 c. ft for 45.0 t

Characteristics of good silage

- No mould growth
- Golden / greenish yellow
- Pleasant fruity odour or acceptable aroma
- Free flowering and non-sticky texture
- 3-4% increased palatability
- Increased nutritive value
- pH around 4.0 – 4.5
- Lactic acid proportionally more than other acids
- Decrease in nitrate-N and increase in ammoniacal-N
- Ammoniacal N should not exceed more than 15% of the total N

Haylage

- It is low moisture silage (40-45%)
- Made from grass / legume that is wilted to reduce moisture content
- But for moisture it is almost silage

<u>Fortification of Fodder</u>

'Fortification or enriching is the direct addition of feed supplements to the poor quality roughage to improve its fodder value'

- Mixing green legume with fodder
- Mixing liquid ammonia (2.5 to 3.0%)
- Mixing Urea molasses
    - 2-3% for concentrates
    - 1% of dry matter
- After mixing similar to silage

Fortifying materials and usage

- Molasses for rice, wheat
- Mineral mixture and salt for low grade grass hay
- Urea for sorghum & maize green fodder
- Tapioca powder/ maize powder for leguminous fodder
- Bacteria and / fungi for dried ground nut haulms

Advantages of Fortification

- Improves palatability
- Reduces wastage
- Improves rumen environment
- Increases crude protein

- Cleavage of cell wall for increased digestibility
- Neutralize or reduce the concentration of toxic principles
- Increases digestibility
- Milk protein and fat increase