**PASTURES**

**TERMS USED**

1. **Pasture** - This is a fenced area demarcated forage plant usually improved and on which animals are grazed.

2. **Fodde**r – This is a grass or legume that is cut and carried to the stalk for indoor feeding.

3. **Forage** – This is a plant grown primarily for feeding livestock.

4. **Hay** – This is feed produced by hydrating green forage to a moisture content of 15% or less.

5. **Silage** – This is forage preserved in a succulent condition by partial formation.

6. **Palatability** – This is the relative attractiveness of feed to an animal.

7. **Herbage** – This refers to leaves, stems and other succulent part of forage plant that animals can feed on.

8. **Stocking rate** – This is the number of animal grazing in unit area of pasture land irrespective of reliable or available herbage.

9. **Carrying capacity** – This is the number of animals a given pasture is able to support for a given period of time.

**TYPES OF PASTURES**

There are two main types of pasture i.e.

* Natural
* Ley

1. **Natural pasture**

* This is open area with a dense cover of native grasses and other plant species.

**Advantages:**

* Forage plants found in natural pasture are well adapted to natural condition hence can survive even under poor management,
* Natural pasture contains a variety of forage plant needed in the animal diet.
* They are found in areas that are difficult to cultivate hence help in the utilization of such idle places.
* They can support a large population of local livestock species like goats, sheep, and cattle.
* They are cheap to maintain since they do not require a lot of care.
* They require fewer inputs during improvement.

**Disadvantages:**

* They are less productive in terms of herbage yields and nutritive value.
* The grasses mature very fast becoming stemy and coarse hence reducing palatability and nutritive value.
* They are usually grazed communally hence high chances of more livestock using it leading to overgrazing.
* Due to poor management of natural pasture livestock diseases spread very fast from herd to herd.

1. **Ley pasture**

* These consist of improved grasses and legumes that provide high quality forage. Ley pastures are used for intensive farming and particularly for dairy cattle.

**Limitations**

* High cost of establishment i.e. money is needed to prepare the land, buy seeds and fertilizers.
* Lack of viable seeds – seeds are not readily available on a commercial basis for Ley pastures.
* Poor quality animals – Most farmers rear poor quality animals which cannot give profitable returns to cover the cost of leys.
* Poor managerial skills – Most farmers lack basic knowledge and skills of managing Ley so that they can be productive for a long period of time.
* Poor soil – Most farmers are not willing to surrender their fertile soil for Ley pasture production.
* Unreliable rainfall – Ley pasture production requires rainfall which is not less 800mm annually and must be well distributed.

**IMPORTANCE OF PASTURES**

* They provide organic matter to the soil after rotting.
* They provide a wide range of nutrients to grazing animals.
* They help in utilizing idle land.
* Deep rooted pasture plants recycle plant nutrients from deeper layer to soil surface for rooters to use.
* They can break life cycle of pest when planted in a rotation with crops.
* They can reduce water evaporation from the so acting as a cover.
* Pastures are the cheapest source of feeds for animals
* The root of pasture plant will bind soil particles together hence reducing soil erosion.
* Pasture plant, particularly legumes improves the soil fertility by fixing nitrogen into the soil.

**IMPROVEMENT OF NATURAL PASTURES**

* Fencing - The area should be fenced to exclude wild animals and intruders.
* Remove bushes and dense tree canopy so that the pasture grasses can receive enough light.
* Weeds control – Poisonous and notorious weeds should be removed.
* Provision of water to animals – Watering points should be well distributed to avoid over grazing and trampling on pastures in some places.
* Erosion control – Stolonferous grass spp should be planted on bear surface or in over grazed area to reduce soil erosion.
* Over sow – this is the introduction of improved forage spp more especially legumes in natural pasture to improve nutrient content.
* Control grazing / rotational grazing / strip grazing – This encourages efficient forage utilized and reduces over grazing.
* Establishing fodder bank that can be fed to animals when fresh herbage is scarce.
* Distribute salt licks evenly in a pasture to stop animals from creating small path in a pasture as they move to the point with the licks.
* Practice control burning so that all pasture with parasites are got rid of to give way for the young and nutritious forage.
* Draining water logged area so as to encourage proper forage growth and control parasites

**FACTORS TO CONSIDER BEFORE ESTABLISHING A PASTURE**

* Type of soil – A farmer should consider a good soil with a good ability to retain moisture
* Topography – pasture land should have a gentle slope which allows easy use of machines during seed bed preparation and planting.
* Climate – The area should have adequate rainfall with about 800mm during dry periods.
* Planting materials – There should be good quality planting materials that ensure good pasture establishment.
* Cost of production – The farmer should make sure that the expense involved in pasture establishment can be met from the income of the animals.
* Availability of pasture seeds – The pasture under consideration should have readily available seeds within the environment

**CHARACTERISTICS OF A GOOD PASTUER SPECIES.**

* It should be easy to establish hence reducing cost involved in replacing the seeds that failed to establish.
* It should be able to provide herbage even in times of scarcity
* It should be drought resistant. In order to meet this deep rooted species are always preferred.
* It should be easy to manage i.e. easy to plant, weed and harvest
* It should be highly palatable so that the animals can take it.
* Should match with the nutrient requirement of animal.
* It should show a high resistance to grazing i.e. the species should be able to regenerate after grazing and persist for at least three years.
* It should be highly resistant to pest and diseases that can attack the pasture.
* Should be able to produce a large quantity of dry matter in a year for the animals to graze on.
* It should have a suitable height from the ground to allow easy grazing by the animal.
* It must be a pasture that can be easily mixed with other pasture species without having any effect on them or being affected.
* It should have readily available seeds that can be used for propagation

**TYPES OF PASTURES**

***Pasture is divided into two broad groups. i.e.***

* Pasture grasses
* Pasture legumes

***Examples of pasture grasses***

* Guinea grass - ***Panicum maximum***
* Rhode grass - **Chloris *gayana***
* Congo Signal grass - ***Brachiaria ruziziensis***
* Elephant grass - ***Pennisetum purpureum***
* Kikuyu grass - ***Pennisetum clandestinum***
* Nandi grass - ***Setaria anceps***
* Thatch grass - ***Hyparrhenia rufa***
* Star grass - ***Cynodon dactylon***

***Examples of common pasture legumes***

* Green leaf Desmodium - ***Desmodium* intortum**
* Silver leaf Desmodium - ***Desmodium uncinatum***
* Stylo - ***Stylosanthes gracilis***
* Glycine - ***Glycine wightii***
* Centro *-* ***Centrosema pubescens***
* Lucerne **- *Medicago sativa***
* Clovers **- *Trifolium spp***

**ADVANTAGES OF INCLUDING LEGUMES IN A PASTURE**

* They fix nitrogen into the soil hence improving soil fertility for other plant species.
* They show a high resistance to drought hence can be relied on during the dry season.
* They increase the palatability of the pasture since they are highly palatable.
* Since they are deep rooted, they help in recycling plant nutrients for use by other plant species.
* They reduce cases of bloat in animals since they are not very succulent.
* A good number of them have broad leaves hence have the ability to control soil erosion.
* The legumes supply protein to the animals which supplement the grass.
* They give longer grazing period since they mature at different times.
* They produce better quality and quantity of foliage for the animals

**ADAPATATION OF FORAGE PLANTS TO THE ENVIRONMENT**

* They produce very many seeds which increases their chances of survival
* Their seeds are light hence can be easily dispersed by wind.
* They can withstand defoliation and regenerate quickly
* They have short life cycle hence able to utilize the shortest period of good conditions
* some have thorns and hair which discourage animals from eating them
* Some species produce chemicals which keep off animals
* Some have underground stem (rhizomes) which will sprout when the leaves and stems are destroyed.
* Some grass seeds posses’ hard seed coat that cannot be destroyed by the animal digestive system.

**CONSERVATION OF HERBAGE.**

Herbage can be conserved into two major ways i.e.

* Hay
* Silage

**HAY;** this is partially dry grass, legume or fodder fed to animals during the periods when pastures are scarce.

**CHARACTERISTICS OF A GOOD HAY**

* Good hay should be leafy since leaves are richer in food value compared to other parts of the plant.
* Should be prepared out of herbage cut at the stage near flowering when the plant is highly nutritious.
* It should be green in colour since the green colour signifies the presence of Vit .A
* It should be free from dust and moulds which reduce palatability
* It should be soft and pliable for easy consumption by the animals
* It should be free from weeds and poisonous plants.
* It should have a smell which is a characteristic of the plant from which it is made.
* The moisture content of hay should not exceed 15% since high moisture may cause rotting.

**FACTORS AFFECTING THE QUALITY OF HAY**

* The species of grass – some grass species produce high quality hay since they can be easily turned and have nutrient content.
* Storage – Proper storage of hay by protecting it from rain and sunlight preserve the quality.
* Stage of cutting the grass – Grass cut before flowering produces high quality hay than that cut after flowering.
* Level of drying – Poorly dried hay becomes moldy and over dried hay lacks Vit. A

**PROCEDURE OF MAKING HAY**

* Select a suitable plant species with high nutrient to be used in the making of hay.
* Cultivate the plant species on a good soil where it can obtain the required nutrients.
* Harvest the plant species just before flowering when it contains a lot of nutrients.
* Dry the hay to a moisture content of about 15%
* Tie the hay in bales and prepare it for storage
* The hay should be stored in a place well protected from rain and sunlight to preserve the quality.

**SILAGE**

This is the herbage cut before flowering and converted into succulent feed through the process of fermentation. It can be made from any succulent green material such as sweet potatoes vines, young maize, sunflower sorghum, young Guatemala grass and elephant grass.

N.B. High protein foliages mixed with starchy foliages in ratio 3:1 give well balanced silage

**THE PROCESS OF ENSILING (MAKING SILAGE)**

* Cut the grass when it is about to flower and incase of legumes when they have formed pods.
* Chop the grass into small pieces of about 4cm long that can be easily packed.
* Park the material in the air tight chamber (silo) and compress it to exclude air.
* Add fermentable water soluble carbohydrates like **molasses** which provide energy to the microbe during fermentation process.
* Add **urea** at a rate of 5Kg per ton so as to increase nitrogen content of the silage.
* When the silage chamber is full, seal it off from the atmosphere to exclude air and water.
* Allow the materials to ferment for At least three weeks
* Monitor the temperatures in the silo to ensure proper fermentation. When temperatures drop, molasses should be added to provide energy to the microbes carrying out fermentation.

**FERMANTATION PROCESS**

* The material is under fermentation through the action of lactobacillus bacteria.
* Organic acids are produced and the major one being lactic acid
* Lactic acid gives silage a good flavour, kills off the harmful microbes and acts as the preservative for silage.
* The PH has to be low between 3.8 -4.3 and the temperature must rise to about 37.80C to encourage fermentation by lactobacillus.
* If the temperatures are low, add more **molasses** into the silage.
* Add water to lower temperature in case they are high.

**N.B.** Low temperature can be avoided by:

1. Partial drying of the material before ensiling to reduce moisture in the silage.

2. Filling the silage chamber rapidly but compressing the material lightly.

3. Sealing the silo immediately after the final packing to exclude air as much as possible.

**N.B.** Forage crops contain other species of bacteria such as *clostridium ssp* which convert sugars and lactic acid to butyric acid.

Butyric acid gives silage a foul smell and makes it less palatable.

**FACTORS AFFECTING THE QUALITY OF SILAGE.**

* The type of grass and legume species ensiled
* The stage of growth of the species ensiled
* The speed of ensiling
* The type and amount of additive used.
* Consolidation to exclude air from ensilage.
* The moisture content of the material ensiled
* The degree to which the temperature rises during ensiling.

***Reasons for making silage***

* For getting money
* Increase total amount of herbage produced per unit area
* Get feeds for use during periods of forage scarcity
* Conserve forage in succulent form
* Avoid forage wastage in periods of planting and abundance
* Increase number of livestock that can be kept per unit area
* Enables animals eat plant materials that they would not eat when fresh.

***Advantages of silage over hay.***

* In increases the animal’s appetite since it is very palatable and so increases an animal’s intake of a feed.
* It is easier to store than the same quantity of hay since it requires less space per unit weight to store.
* The losses incurred during ensiling are less than those incurred in making hay.
* Many species that the animal cannot eat in fresh form can be eaten when ensiled.
* Under proper storage, silage can stay for several years without losing quality.
* Because the materials retain succulence, fire outbreaks during storage are avoided unlike in the storage of hay.
* There is increased efficiency of feed use since the animal rejects very little of the feed.

***Problems of using silage.***

* Some nutrients are lost due to seepage in the process of silage.
* Its more laborious
* The plant materials are difficult to compact effectively and some rotting is inevitable.
* It is expensive in terms of preservatives used.
* It requires large quantities of materials for it to be economical
* Poorly fermented silage has a bad smell that it may be introduced into the animal products.

**How to reduce losses during silage making**

* Careful harvesting of the material to reduce losses of leaves and contamination by soil.
* Proper sealing of the silos to prevent re-entry of air into the silo.
* Proper fermentation of the material to exclude oxygen and acid fermentation.
* Proper chopping of the material to ensure proper fermentation.
* Wilting of the material before ensiling to reduce the moisture content and reduce the possibility of rotting.
* Addition of additives to increase the energy supply for the bacteria and preservatives.
* Quick use of the material once the silo has been opened to reduce the chances of spoilage due to exposure to the environment

***END***

**Happy holiday and nice revision**

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