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Pasture, animal feeds and nutritional disorder in agriculture

Terminologies

1. **Pasture** is land covered with grass and other low plants suitable for grazing animals, especially cattle or sheep.
2. **Fodder** is a grass or legume that is cut and carried to the stall for indoor feeding.
3. **Forage** is a plant grown primarily for feeding livestock.
4. **Hay** is feed produced by hydrating green forage to a moisture content of 15% or less.
5. **Silage** is type of fodder made from green foliage crop which have been preserved by fermentation to the point of acidification.
6. **Palatability** is the relative attractiveness of feed to an animal.
7. **Herbage** refers to leaves, stems and other succulent part of forage plant that animals can feed on.
8. **Stocking rate** is the number of animal grazing in unit area of pasture land irrespective of reliable or available herbage.
9. **Carrying capacity** 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

Natural pasture

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

Advantages of natural pasture

- 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 of natural pasture

- 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.

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 of ley pasture

1. High cost of establishment i.e. money is needed to prepare the land, buy seeds and fertilizers.
2. Lack of viable seeds – seeds are not readily available on a commercial basis for Ley pastures.
3. Poor quality animals – Most farmers rear poor quality animals which cannot give profitable returns to cover the cost of leys.
4. 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.
5. Poor soil – Most farmers are not willing to surrender their fertile soil for Ley pasture production.
6. Unreliable rainfall – Ley pasture production requires rainfall which is not less 800mm annually and must be well distributed.

Importance of pastures

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

Improvement of natural pastures

1. Fencing - The area should be fenced to exclude wild animals and intruders.
2. Remove bushes and dense tree canopy so that the pasture grasses can receive enough light.
3. Weeds control – Poisonous and notorious weeds should be removed.
4. Provision of water to animals – Watering points should be well distributed to avoid over grazing and trampling on pastures in some places.
5. Erosion control – Stoloniferous grass spp should be planted on bear surface or in over grazed area to reduce soil erosion.

6. Over sow – this is the introduction of improved forage spp more especially legumes in natural pasture to improve nutrient content.
7. Control grazing / rotational grazing / strip grazing – This encourages efficient forage utilized and reduces over grazing.
8. Establishing fodder bank that can be fed to animals when fresh herbage is scarce.
9. 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.
10. Practice control burning so that all pasture with parasites are got rid of to give way for the young and nutritious forage.
11. Draining water logged area so as to encourage proper forage growth and control parasites

Factors to consider before establishing a pasture

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

Characteristics of a good pasture species

1. It should be easy to establish hence reducing cost involved in replacing the seeds that failed to establish.
2. It should be able to provide herbage even in times of scarcity
3. It should be drought resistant. In order to meet this deep rooted species are always preferred.
4. It should be easy to manage i.e. easy to plant, weed and harvest.
5. It should be highly palatable so that the animals can take it.
6. Should match with the nutrient requirement of animal.
7. 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.
8. It should be highly resistant to pest and diseases that can attack the pasture.
9. Should be able to produce a large quantity of dry matter in a year for the animals to graze on.
10. It should have a suitable height from the ground to allow easy grazing by the animal.
11. It must be a pasture that can be easily mixed with other pasture species without having any effect on them or being affected.
12. 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	-	<u><i>Panicum maximum</i></u>
➤ Rhode grass	-	<u><i>Chloris gayana</i></u>
➤ Congo Signal grass	-	<u><i>Brachiaria ruziziensis</i></u>
➤ Elephant grass	-	<u><i>Pennisetum purpureum</i></u>
➤ Kikuyu grass	-	<u><i>Pennisetum clandestinum</i></u>
➤ Nandi grass	-	<u><i>Setaria anceps</i></u>
➤ Thatch grass	-	<u><i>Hyparrhenia rufa</i></u>
➤ Star grass	-	<u><i>Cynodon dactylon</i></u>

Examples of common pasture legumes

➤ Green leaf Desmodium	-	<u><i>Desmodium intortum</i></u>
➤ Silver leaf Desmodium	-	<u><i>Desmodium uncinatum</i></u>
➤ Stylo	-	<u><i>Stylosanthes gracilis</i></u>
➤ Glycine	-	<u><i>Glycine wightii</i></u>
➤ Centro	-	<u><i>Centrosema pubescens</i></u>
➤ Lucerne	-	<u><i>Medicago sativa</i></u>
➤ Clovers	-	<u><i>Trifolium spp</i></u>

Advantages of including legumes in a pasture

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

Adaptation of forage plants to the environment

1. They produce very many feeds which increases their chances of survival
2. Their seeds are light hence can be easily dispersed by wind.
3. they can withstand defoliation and regenerate quickly
4. They have short life cycle hence able to utilize the shortest period of good conditions
5. some have thorns and hair which discourage animals from eating them
6. Some species produce chemicals which keep off animals

7. Some have under ground stem (rhizomes) which will sprout when the leaves and stems are destroyed.
8. Some grass seeds possess hard seed coat that can not be destroyed by the animal digestive system.

Conservation of herbage

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

- Hay
- Silage

Hay

Characteristics of a good hay

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

Factors affecting the quality of hay

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

Procedure of making hay

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

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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)

1. Cut the grass when it is about to flower and in case of legumes when they have formed pods.
2. Chop the grass into small pieces of about 4cm long that can be easily packed.
3. Pack the material in the air tight chamber (silo) and compress it to exclude air.
4. Add fermentable water soluble carbohydrates like **molasses** which provide energy to the microbe during fermentation process.
5. Add **urea** at a rate of 5Kg per ton so as to increase nitrogen content of the silage.
6. When the silage chamber is full, seal it off from the atmosphere to exclude air and water.
7. Allow the materials to ferment for Atleast three weeks
8. 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.

Fermentation process

- a. The material is under fermentation through the action of lactobacillus bacteria.
- b. Organic acids are produced and the major one being lactic acid
- c. Lactic acid gives silage a good flavor, kills off the harmful microbes and acts as the preservative for silage.
- d. The PH has to be low between 3.8 - 4.3 and the temperature must rise to about 37.8°C to encourage fermentation by lactobacillus.
- e. If the temperatures are low, add more **molasses** into the silage.
- f. 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.

- 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.

Forage utilization method

- Continuous grazing
- Rotational grazing
- Zero grazing
- Deferred grazing.
- Strip grazing

a. Continuous grazing

This is an extensive system of grazing in which livestock remain on the same pasture for prolonged period.

Advantages of the system

- Fencing costs are reduced or avoided completely.
- It allows animals to have free access to any part of the pasture
- No costs are involved in improving pastures.

Disadvantages

- It allows selective grazing which can lead to pasture wastage
- It encourages the buildup of ticks and internal parasites within the grazing place.
- It may result into under stocking or over stocking as plant growth and seasonal conditions change.
- It's difficult to control / diseases amongst animals since the system encourages communal grazing
- Pasture improvement is extremely difficult as more people are involved in using the pasture.
- May easily result into overgrazing and destruction of pastures

b. Rotational grazing

This is where pastures is divided into paddocks and animals are allowed to graze in one paddock at a time until the herbage is uniformly grazed to a given height then moved to another paddock. High producers like lactating animals are allowed first into paddocks for it to graze the more nutritious herbage.

Advantages of rotational grazing:

1. Provides a uniform developed pasture due to uniform grazing
2. It allows maximum utilization of herbage by avoiding selective / spot grazing.
3. Forage yield is potentially higher since pastures are allowed to regenerate than in other systems.

4. Intervals between grazing allow for remediable practices like fertilizer application, weeding etc.
5. It's a good method used in the control of parasites like ticks, roundworms, liver fluke.
6. It reduces instances of over grazing and under grazing hence controlling destruction of pastures
7. It makes management practices easy as animals are confined in one place.
8. It allows flexibility in the use of pasture land since crops can be planted in the idle paddocks.
9. It can allow higher stocking rate of animals.
10. Controlled breeding is easy to practice since animals can be grouped according to sex

Disadvantages of rotation grazing

1. It requires a high initial cost of establishing fences on pasture land.
2. Requires a high level of managerial skills in terms of repairing the fences, improving the pastures etc.
3. Fences can easily injure animals.
4. Over trampling on pastures by animals leads to wastage
5. May require a lot of Labour for repairing farm structures and managing animals

Zero grazing

This is where animals are confined in structures / stalls where they are fed on fresh forages cut on a daily basis.

Advantages of zero grazing

1. Animals are protected from adverse climatic conditions
2. Feed taken in by each animal is easily known hence easy to keep feeding records.
3. it's easy to identify sick animals since they are in close observation
4. it's easy to collect manure from the animals since they are confined in one place.
5. Disease spread is reduced since animals are not in contact with others from another herd.
6. There is high production since animals do not spend a lot of energy looking for pasture and water
7. Selective grazing and trampling on pastures is effectively controlled since animals are fed on pastures cut from the field.
8. it's easy to carryout management practices on animals under this system as animals are under confinement.
9. The system permits high stocking rate since a large number of animals can be kept on a small piece of land

Disadvantages of zero grazing:

1. The method is capital intensive i.e. requires a lot of capital for constructing animal structures and feeding
2. It requires a lot of Labor which can be used in collecting fodder, cleaning the stalls etc.

3. It cannot support a large number of animals
4. The system is applicable economically in places where market for milk is readily available to cover the costs involved easily.
5. It may lead to loss of soil fertility if manure is not taken back to the fodder garden.
6. The animals lack exercise which can affect their health.

d. Deferred grazing

This is where a certain paddock is set aside to allow the accumulation of standing hay which can be grazed on during periods of pasture scarcity

Advantage of deferred grazing

1. Pasture seeds are dispersed for pasture stand improvement
2. It provides herbage during periods of scarcity.
3. It allows pastures to develop greater root and crown which is important for subsequent re-growth.
4. The pasture can be used in the control of soil erosion.
5. It allows for natural establishment of pastures

Disadvantages of deferred grazing

- i. The pasture is not as nutritious as the fresh pasture hence a need to supplement it.
- ii. Requires a large piece of land for practicing deferred grazing
- iii. Does not permit high stocking rates

e. Strip grazing

This is where strips of fresh pastures are made available each day to animals by moving an electric fence forward.

The grazed area is sealed off for regrowth and excess pastures conserved.

Advantages of strip

- i. The animals enjoy fresh grasses each day
- ii. The grass is eaten at its highest nutritive value
- iii. Allows intensive grazing hence utilizing pastures efficiently
- iv. It is highly flexible since it may allow more than one activity on the land

Disadvantages of strip grazing

- i. Requires more Labor
- ii. Requires more skills in using an electric fence
- iii. Pastures may be destroyed as a result of overgrazing.
- iv. Ground where animals pass is destroyed and lost since pastures may fail to grow there

Establishing a pasture

- a) Clear the land to remove trees and bushes that may interfere with pasture growth
- b) Prepare a firm (for moisture conservation), fine (to bring small seeds in contact with soil) and weed free (reduce competition for nutrients) seedbed by burning, ploughing, and harrowing
- c) Apply fertilizers to the seed bed to improve soil fertility more especially phosphatic fertilizers for proper pasture establishment
- d) Select good quality seed for planting depending on the animal's needs and environment
- e) Treat the seeds to ensure uniform and proper germination by scarification, inoculation and pelleting
- f) Sow the seeds shortly after the rains so as to take advantage of soil nitrogen made available by mineralization. Methods of sowing are drilling, broadcasting and row planting
- g) Apply pesticides and fungicides to control pests and diseases in pastures

Principles of feeding animals

Terminologies in animal nutrition

- (i) **Digestibility**
It is the proportion of the feed absorbed by the animal's body or the difference between the amount of feed ingested and amount of feces produced
- (ii) **Digestible energy**
This is the portion of the total carbohydrate contained in the feed which an animal is capable of utilizing or the amount of energy in the feed minus the energy lost in feces.
- (iii) **Crude proteins**
This the sum of total nitrogenous compounds contained in a feed.
- (iv) **Production ratio**
It is the amount of feed an animal need to produce products such as milk, meat, eggs and offspring in addition to the maintenance ration required for basic functions.
- (v) **Digestible crude proteins (DCP)**
It is the amount of proteins which can be digested or it is a measure of nitrogen in the feed consumed that is retained in the body of an animal after subtracting loses through feces.
- (vi) **Starch Equivalent (SE)**
This is the measure of energy requirement which an animal can obtain from the food. Or it is the amount of pure starch which has the same energy as 100kg of a feed
- (vii) **Palatability of animal feed**
Palatability refers to acceptability/preference of the feed by the animal,; it is associated with taste, odor, texture, appearance and temperature
- (viii) **Ration**
A **ration** refers to the total amount of feed consumed by an animal within 24 hours. It comprises all the nutrients needed for the animal's well-being and provided for in sufficient amount.

The characteristics of concentrate feeds

- have low crude fiber content
- have high protein and carbohydrate contents
- are highly palatable to animals
- have high digestibility
- mainly derived from grain and their byproducts
- have low moisture contents
- have fairly constant food value

The factors that should be considered when formulating a ration for farm animals

- The nutrient requirement of for the animals whose ration is being formulated
- The palatability or acceptability of the final mixture of the feed
- Availability of ingredients and their cost
- Health status of the animal
- Nutrient composition of the final mixture
- Physical nature of feed
- The wholesomeness of the food stuff. The final mixture should not harmful to the animals
- Age of animal i.e. young animal requires high proportion of proteins
- Level of production for instance milk cattle and layer require high proportion of calcium.
- Type of animal for instance ruminant can digest cellulose

Nutrition and metabolic disorders in livestock

(a) Milk fever

Causes

It is caused by insufficient calcium in the diet

Symptoms

- Loss of appetite, poor GI tract movement, and cold extremities
- Excitability, nervousness, hypersensitivity, and tremors
- Weakness, weight shifting, and shuffling of hind feet
- Inability to stand
- Coma and death if not quickly treated.

Control and treatment

- intravenous or subcutaneous injection of calcium gluconate
- giving calcium, vitamin D and phosphate supplements

(b) Grass tetany (grass stager/hypomagnesemia)

Caused by magnesium deficiency

Symptoms

- The animal becomes nervous suddenly
- Twitching of muscles especially those around the head and the neck
- The head of animal is lifted high
- Accelerated respiration
- Over salivation followed by death

Treatment and control

Provide magnesium in the diet

(c) Bloat

Causes

Accumulation of gases in the rumen due to fast fermentation of young succulent grass with high moisture content especially in some animal susceptible to bloat

Symptoms

- Loss of appetite
- Distention of the abdomen,
- Feeling fullness, pressure, uncomfortable/distress
- Rectal protrusion.
- Difficulty breathing due to pressure on the diaphragm.
- The animals stands with its legs spread wide apart and its head extended forward
- The animal lies down and fails to stand up due to distress.

Control and treatment

- control the amount of succulent feeds and younger pastures fed to the animals
- carry out drench using any vegetable oil
- use stomach tube to release gas from the stomach
- drenching using anti-bloat drugs, cooking oil or beer to stop production of acids
- use of trocar or cannula to puncture the lumen to allow escape of gases
- exercising the animal
- Use of broom stick method i.e. wooden rod is inserted across the mouth to keep the mouth open to allow escape of gases from the rumen
- avoid giving the animal cassava, excess grain and protein concentrate

(d) Piglet anemia

Caused by iron deficiency in mothers milk

Symptoms

- Ears and belly of piglets become pale
- Body weakness
- Pale mucus membrane
- Rapid breathing

Treatment

- Inject with iron solution after birth
- Give mineral supplements rich in iron/anthill soil to the mother **and piglet**

(e) Ketosis (acetosemia /pregnancy toxemia)

Caused by high production exceeding feeding capacity leading to low glucose levels in the blood

Symptoms

- Emaciation
- Hypoglycemia
- Drop in milk yield in lactating animals
- Walking in cycles
- Apparent blindness

- Increased keto acids in blood due to malfunctioning of the liver

Prevention

- Adequate and proper feeding

(f) Curled toe paralysis (peculiar lameness)

This occurs in poultry due to insufficient vitamin B2 (riboflavin) in the diet

Symptoms

- Poor growth of feathers in chicks
- Retarded growth of chicks
- Diarrhea
- Poor hatchability

Control

Provide diet rich in vitamin B2

Revision exercise

- Which of the following is the problem associated with feeding silage to cows during milking?
 - Attracts flies
 - Introduction of germs to the milk
 - Tainting milk with bad odor
 - Disruption of milk let down
- Which one of the following metabolic disorder is likely to occur in high yielding cattle fed on lush grass only
 - ketosis
 - grass tetany
 - pica
 - milk fever
- Why is the amount of proteins calculated and expressed as crude proteins?
 - Proteins consumed in excess is deaminated
 - Feeds with proteins are very expensive
 - The amount include substances like ammonia
 - Only the animal can purify it at apprehension
- In silage making, the material are chopped to facilitate
 - Palatability
 - Digestibility
 - Packing
 - fermentation
- Which of the following pH is best for fermentation of silage?
 - 7
 - 4
 - 10
 - 14
- The main source of energy in farm animals is
 - Lactic acid
 - Aceticacid
 - Butyric acid
 - Propionic acid
- What is the importance of deferred grassing?
 - Maintain soil fertility
 - Let perennial grass accumulate nutrients for the next season
 - Let annual grasses and legumes accumulate nutrients for the next season.
 - Control grazing so that a certain preferred species reaches a minimum
- Why should indigenous goats not be grazed on pasture early in the morning?
 - To enable them feed on feed concentrates and remains first
 - The morning dew can easily cause bloat
 - Goats don't browse on very soft pasture such as those in the morning
 - To avoid parasite infection
- Best hay is obtained by
 - Cutting grass at flowering stage

- B. Complete drying of grass in the sun
 - C. Cutting grass at the stage of maximum growth
 - D. Balling grass immediately it is cut
10. Which one of the following describes the word ration as used in animal feeding?
- A. The amount of food required to keep the animal alive
 - B. The palatability of the feed
 - C. A mixture of the feed that meets an animal's body requirement in a day
 - D. The amount of feed eaten by an animal in a day
11. A grazing system which leads to production of standing hay is known as
- A. Zero grazing
 - B. Wet and dry grazing
 - C. Deferred grazing
 - D. Continuous grazing
12. The quality of hay depends on the following factors except
- A. Season of the year
 - B. Method of drying pasture grass
 - C. Type of pasture
 - D. Stage of pasture growth
13. Ruminants animals are able to digest grass because of the
- A. Possession of the rumen that digest grass
 - B. Presence of microorganisms in rumen
 - C. Inability to utilize other forms of feed
 - D. Possession of teeth to digest grass
14. Which of the following best explains the reason for chopping grass before feeding to animals?
- A. Improve palatability
 - B. Improve nutritional value
 - C. Increase its intake
 - D. Increasing digestibility
15. Which of the following compounds provide the major source of energy to ruminants?
- A. Acetic acid
 - B. Glucose
 - C. Fats
 - D. ammonia
16. Well fermented silage will have a high proportion of
- A. Propionic acid
 - B. Acetic acid
 - C. Butyric acid
 - D. Lactic acid
17. Which of the following are products of microbial fermentation in the rumen?
- A. Fatty acids and glycerol
 - B. Volatile fatty acids and ammonia
 - C. Peptones and peptides
 - D. Glucose and alcohol
18. The limitation of feeding animals on concentrates is that concentrates

- A. Provide limited amount of nutrients
 - B. Are expensive
 - C. Increase water intake
 - D. Cannot be digested by all animals
19. Roughage in animals nutrition is essential because it;
- A. Contains plenty of nutrients especially proteins
 - B. Eliminates possibility of constipation
 - C. Is easily digested by bacteria in the cecum
 - D. Stimulate the secretion of bile salts
20. Which one of the following best explains the reasons for chopping grass before feed to animal
- A. Improving palatability
 - B. Improving its nutritional value
 - C. Increased feed intake
 - D. Increased digestibility of the feed
21. Well fermented silage will have a high proportions of
- A. propionic acid
 - B. Acetic acid
 - C. butyric acid
 - D. Lactic acid
22. Silage is not recommended for feeding calves because
- A. It is likely to be contaminated with harmful microorganisms
 - B. Calves cannot digest silage efficiently
 - C. It is not palatable to calves
 - D. It contains chemicals which are harmful

Answers

1A. 3C 5B 7B 9A 11C 13B 15A 17B 19B 21D
 2B 4C 6B 8D 10 D 12A 14C 16D 18B 20C 22C

Other questions

23. (a) Give four effects of feeding animals on feeds lacking calcium
- Rickets (weak bones) in young animals or osteomalacia in old animals
 - Milk fever in early lactating animals due to heavy drain of calcium in the milk
 - Poor acid-base balance of the body fluid such as blood
 - Lameness
 - Stiff legs
 - Ruffled feathers
 - A reduction in growth
 - Leg bones appear rubbery
 - Joints become enlarged.

b) State three observable symptoms of each of following nutritional disease

(i) Milk fever

- Loss of appetite, poor GI tract movement, and cold extremities
- Excitability, nervousness, hypersensitivity, and tremors
- Weakness, weight shifting, and shuffling of hind feet
- Lying down unable to stand, head in a tuck position, and unable to get up
- If untreated the cow become comatose and dies within a day after the first sign.

(ii) boat

- Loss of appetite
- Distention of the abdomen,
- Feeling fullness, pressure, uncomfortable/distress
- Rectal protrusion.
- Difficulty breathing due to pressure on the diaphragm.
- The animals stands with its legs spread wide apart and its head extended forward
- The animal lies down and fails to stand up due to distress.

24. (a) Explain the following terms as used in animal nutrition

(ix) Digestibility

It is the proportion of the feed absorbed by the animal's body or the difference between the amount of feed ingested and amount of feces produced

(x) Digestible energy

This is the portion of the total carbohydrate contained in the feed which an animal is capable of utilizing or the amount of energy in the feed minus the energy lost in feces.

(xi) Crude proteins

This the sum of total nitrogenous compounds contained in a feed.

(xii) Production ratio

It is the amount of feed an animal need to produce products such as milk, meat, eggs and offspring in addition to the maintenance ration required for basic functions.

(xiii) Digestible crude proteins (DCP)

It is the amount of proteins which can be digested or it is a measure of nitrogen in the feed consumed that is retained in the body of an animal after subtracting loses through feces.

(xiv) Starch Equivalent (SE)

This is the measure of energy requirement which an animal can obtain from the food. Or it is the amount of pure starch which has the same energy as 100kg of a feed

(b) Give the characteristics of concentrate feeds

- have low crude fiber content
- have high protein and carbohydrate contents
- are highly palatable to animals
- have high digestibility
- mainly derived from grain and their byproducts
- have low moisture contents
- have fairly constant food value

(c) State one method of controlling each of the following nutritional disorder in farm animals

(i) Bloat

- control the amount of succulent feeds and younger pastures fed to the animals
- carry out drench using any vegetable oil
- use stomach tube to release gas from the stomach
- drenching using anti-bloat drugs, cooking oil or beer to stop production of acids
- use of trocar or cannula to puncture the lumen to allow escape of gases
- exercising the animal
- Use of broom stick method i.e. wooden rod is inserted across the mouth to keep the mouth open to allow escape of gases from the rumen
- avoid giving the animal cassava, excess grain and protein concentrate

(ii) Milk fever

- intravenous or subcutaneous injection of calcium gluconate
- giving calcium, vitamin D and phosphate supplements

(iii) Piglet anemia

- Give mineral supplements rich in iron

25. Give ways in which digestion in ruminants is more beneficial to the animal than digestion in non-ruminants

- Ruminants can upgrade protein through bacterial proteins
- Ruminants have bacteria that digest proteins.
- Ruminants synthesize vitamin K, C and B
- Microbial organism synthesize volatile fatty acids
- Ammonia gas is recycled and used to make proteins

26. Outline the importance of microbe in rumen of ruminants

- They digest cellulose in herbage into simple carbohydrates.
- Synthesize vitamins like K, C and B
- They build proteins from non-nitrogen substances such as ammonia gas and urea.
- They die and digested to absorbable nutrients

27. (a) State the factors that determine the amount of feed given to an animal per day

- Body weight/size; big animals consume more
- Health status of the animal
- Animal age; old animals consume more
- Physiological condition whether pregnant, sick etc.
- Level of production or the purpose for which the animal is kept.
- Previous feed eaten i.e. what is already in alimentary canal
- The form in which the feed is taken i.e. chopped or ground
- The palatability of the feed
- The ambient temperature
- Type of animal such goat or cow
- Type of feed whether grass or concentrate

(b) State the factors on which the choice of feed stuff to use depend on

- The cost of food stuff

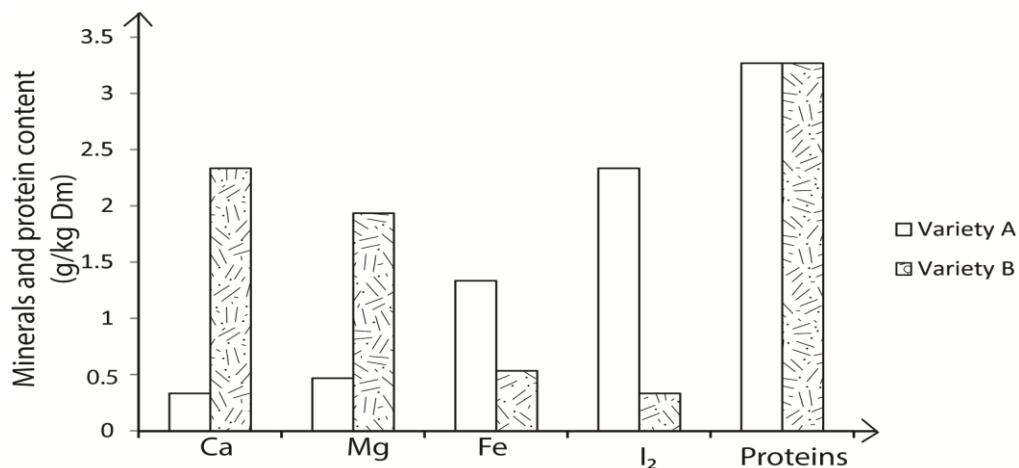
- The physical nature of food stuff
 - The nutritional composition
 - The age of animal
 - Availability of the food stuff
 - Species of animal
28. (a) State the factors that should be considered when formulating a ration for farm animals
- The nutrient requirement of for the animals whose ration is being formulated
 - The palatability or acceptability of the final mixture of the feed
 - Availability of ingredients and their cost
 - Health status of the animal
 - Nutrient composition of the final mixture
 - The wholesomeness of the food stuff. The final mixture should not harmful to the animals
 - Age of animal i.e. young animal requires high proportion of proteins
 - Level of production for instance milk cattle and layer require high proportion of calcium.
 - Type of animal for instance ruminant can digest cellulose
- (b) Give reasons for including feed additives in livestock feeds
- To improve palatability by enhancing taste and flavor
 - To prevent deficiency diseases
 - To treat deficiency diseases
 - to promote proper growth
- (c) Why should a farmer mix animal feeds on the farm instead of buying already mixed feeds from outside the farm
- to minimize cost
 - to ensure that the nutrition requirements of his animals are cater for.
 - To reduce the level of contamination
 - To utilized the crops or byproducts on the farm
29. (a) What is digestibility
- It is the measure of the extent of feed is digested
- Or
- It is the proportion of food absorbed by the animal's body
- Or
- It is the oral-fecal difference of the feed
- (b) Explain factors that influence digestibility of feeds
- the type and chemical composition of the feed for instance presence of trypsin inhibitor in soya bean.
 - The level of processing subjected to the feed prior to serving. Highly processed feeds say by grinding increases digestibility.
 - Health condition of the animal; healthy animals easily digest feed
 - Type of animals; ruminants have advance digestive system to digest and absorb food
 - Physiological state of the animal; this affects nutrient requirements for example lactating mothers and laying birds there is high digestibility of feed with high protein content.
 - Age of animals; feed digestibility increases with and later decreases with age due to increase and then decrease with nutrient requirements with age
 - The animal species; ruminants have high digestibility for roughages

- The ratio of energy to protein in the feed
- Quantity of food in alimentary canal of the animal
- Amount of water consumed

(c) Explain why allowance is given for extra ingredient during feed formulation

- To cater for variation of nutrient composition of feed stuff
- To cater for nutrient losses during feed processing and prolonged storage
- To provide label guarantee
- To cater for animals that may require higher than average nutrient requirements
- To cater for losses due to feed spillage during serving and feeding.

30. A study was carried out on two varieties of elephant grass to determine the content of macro and micro nutrients and proteins in them. The two varieties were planted and harvested at the same time although grown in different fields. The results are shown in the figure below. The minimum required content of macro and micro nutrients is 1.5g/kgDm and 0.8g/kg Dm respectively



(a) What is the difference between macro and micro nutrients?

Macro elements are nutrients required by plants or animals in large quantities and if the supply is inadequate they produce deficiency symptoms while micro nutrients are required in small quantities and when supplied in excess produce toxic results.

(b) What observations and conclusions can be drawn from the result in the figure above

Observation

- Variety B contained more calcium and magnesium than variety A
- Variety A contained more iron and iodine compared to variety B
- Both varieties contained equal content of proteins

Conclusion

- Both varieties A and B contain all nutrients but in varying quantities

(c) Account for the difference in the mineral content of the two varieties

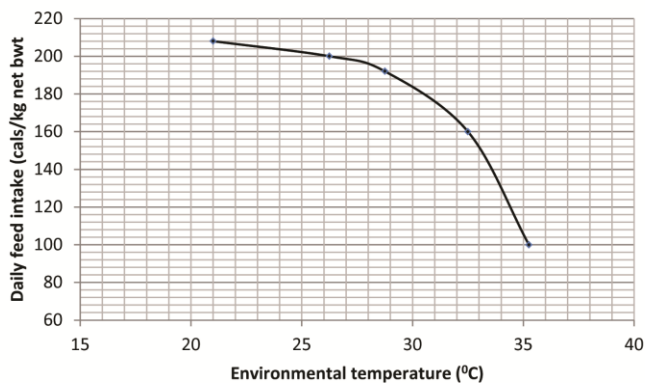
- Difference in the mineral contents of the two fields
- Differences in genetic composition of the two varieties leading to difference in absorption and utilization of minerals.

(d) What would be the effect of grazing dairy animals on variety A alone.

It would result in deficiency disease due to calcium such as milk fever.

- (e) What is the best way of utilizing the two varieties of pasture?
- Mixing them before feeding to the animals
 - Add mineral supplements before using any of them.
- (f) Give three ways in which proteins are important in the bodies of animals
- Make up body structure
 - Make up hormones
 - Make up enzymes
 - Source of energy
 - Maintain blood pH

31. The figure below shows the relationship between environmental temperature and daily feed intake by layers per unit of metabolic body weight. Use it to answer the questions that follow.



- (a) How does the environmental temperature affects the daily feed intake in layers
Feed intake decreases as the environmental temperature increases
- (b) Suggest explanation for the effect of environmental temperature on the daily feed intake in layers.
When the environmental temperature rises the metabolic rate of the birds falls due to decrease in the rate of heat loss.
- (c) From the graph, what would be the consequences of high environmental temperature on the performance of layers?
- Egg laying would drop
 - Reduced feed intake
 - Increased water intake
 - Layers become stress/uncomfortable
- (d) (i) Birds are endotherms. What is importance of these characteristic?
Maintenance of constant body temperature and activity over a wide range of temperature range.
- (ii) As endotherms, how do poultry react to high environmental temperatures?
- They pant or open their beaks to allow heat loss
 - They flap their wing
 - Seek shade
 - Bathe in sand
 - Become thirsty and drink water

(e) From the figure , suggest consideration to be taken in formulation of feeds and construction of houses for poultry bird in hot climate.

Consideration of feed formulation

- Feed should be wholesome not to harm birds
- Balance to cater for nutritional requirements of the layers
- Easily digestible to provide nutrients easily
- Palatable to attract the birds to eat it.

Consideration of construction of houses for poultry birds in hot climate

- Ensure proper ventilation
- Consider direction of sun rays to avoid over heating
- The height of the roof should be high enough
- Use roofing material that reflect heat or are insulators to prevent heating of the house.

32. (a) Describe the characteristics of a good pasture plant

- Should have high nutritional value
- Should not be poisonous
- Should grow fast
- Should be able to regenerate after the animal has eaten its parts
- Should be resistant to pest and disease
- Resistant to extreme weather conditions
- Should have broad leaves to be eaten in small number
- Should be easily digestible
- Should have suitable height to be reached by browsers
- Should be able to survive on poor soils

(b) Discuss the measures that could be taken to improve pastures for increased livestock production.

- Introduction beneficial species with high nutritional value
- Introduction of well adapted legumes
- Removal of toxic and dangerous species such as thorny plants
- Apply manure
- Irrigate in dry seasons
- Drain in case of floods
- Clear shrubs and trees that might be shading the pasture
- Provide drinking water in the pasture
- Fence the pasture to control grazing and pest and diseases
- Provide animal shades

Thanks

Dr. Bbosa Science