Lecture 1

Grasses as feed for ruminant animals

The natural feed of the herbivorous animals is forage and for most of the year this forms all or most of the feed of ruminants.

Grasslands/Forage plants may be classified into two main groups as follows.

(a) Herbaceous plants
(b) Woody plants

Among the herbaceous plants, two groups are important as sources of forage. These are:
Grasses: They make up the bulk of the plants found in many mixtures of natural vegetation used as forage. They also supply the bulk of the energy content of forages.
Legumes: because these have relatively high nitrogen content in the vegetative matter and their ability to fix atmospheric nitrogen.

Grasses and legumes are found in the various vegetations that constitutes the grazing resource or sources of feed for ruminant animals.

These vegetations are commonly referred to as grasslands which may be divided into two main groups:
Natural grasslands which are not cultivated and managed in any form of deliberate human intervention. This is generally referred to as **natural pasture.**
Cultivated grassland which are cultivated and managed generally referred to as **cultivated, planted or sown pasture.**

Cultivated grassland may also be sub-divided into permanent and temporary pastures. The latter form part of a rotation of crop whereas permanent pastures is intended to remain as grassland indefinitely.
Natural pastures normally include a large number of species of grass, legumes, herbs, shrubs etc whereas cultivated grasslands may consist of single species or mixtures of relatively small numbers of species.

Growth pattern of Grasses

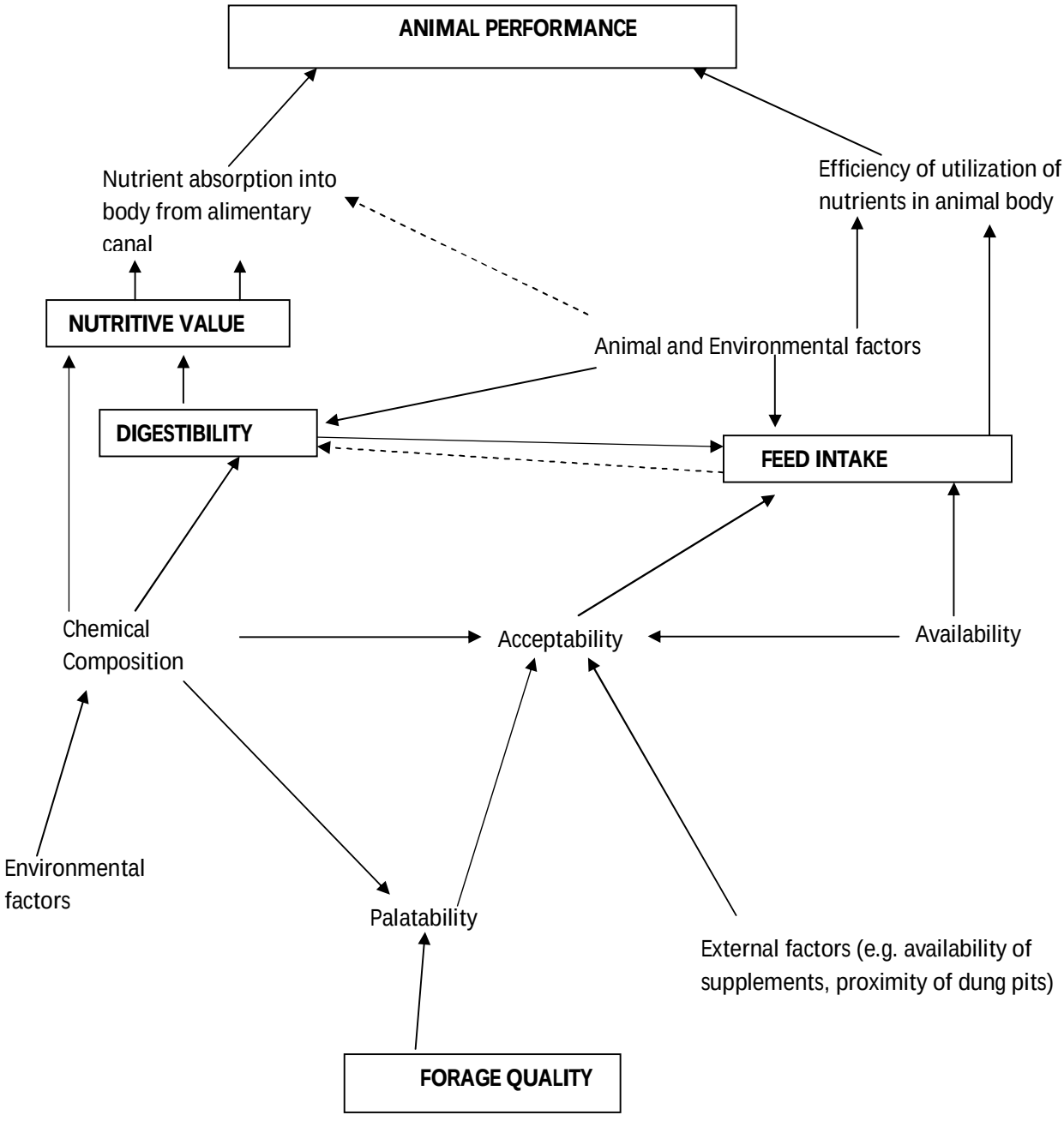
In tropical climates, soil temperature is high enough to permit the growth of grasses throughout the year, but such growth is commonly restricted by insufficient moisture supply for definite periods of the year. The climate is characterized by clearly defined wet and dry seasons but grass growth is very rapid during the wet season and as the soil dries up towards the dry season, the herbage matures and dies, leaving a feed resource that is some time described as 'standing hay'. In cold and temperate climates grasses start to grow in the spring when the soil temperature reach 4 to 6^{o}c. There is a rapid production of leaf followed by an increase in the growth of the stem leading to the ultimate emergence of the flowering head and finally to the formation of seed.

The rate at which grasses grow is dependent upon climate, available nutrients in the soil and the amount of leaf on the plant which intercepts light.

Immediately after harvesting, there is a period of slow re-growth followed by an accelerated rate and finally a period of decreasing growth as the herbage matures. As grass swards increase in leaf area, the photosynthetic capacity of successive newly expanded leaves is progressively reduced because of the increasing shade in which they develop. The rate at which re-growth occurs depends upon the maturity of the crop at the time of harvesting. If the grass is young and leafy it recovers more quickly and starts re-growth earlier than when mature herbage is harvested.

Definition of Forage Quality or Feed Value

Animal performance depends on an inter-relationship between a number of factors both internal and external to the animal itself. The interrelation is shown in the scheme below.



Schematic relationships between different aspects of nutritive value which influence animal performance

As shown in the scheme above, **nutritive value, digestibility** and **feed intake** are the main factors which determine animal performance.

These three factors are, in turn, influenced by a number of other factors related to both the animal (e.g. species, physiological status, age, grazing experience, management, etc) and the forage (species, stage of growth/maturity, management, season, location, etc).

Taken together, these three main factors define what is called FORAGE QUALITY. Chemical composition and digestibility are often linked to the term nutritive value, which describes the amount and types of nutrients that the animal can derive from the feed.