Lesson 7

**MANAGING STOCK ON PASTURE**

**Aim**
Assess the commercial and nutritional value of pasture species in the context of farm animal feed, and determine appropriate ways of managing stock.

**FACTORS AFFECTING FOOD INTAKE BY ANIMALS**
There is an interdependent relationship between the grassland and the grazing animals. The wellbeing of the grassland is dependent on animals grazing it just as much as the wellbeing of the animals is dependent on the grassland. The grassland is intimately bound up with grazing animals. Neither is more or less important than the other.

Grazing animals such as sheep and cattle convert grassland into meat. This is a very inefficient process in terms of intake and conversion. There are several factors that affect the food intake of animals on pasture. These can be grouped as follows:

- animal factors
- feed factors
- grazing factors

These factors will be discussed in more detail below.

**Animal Factors**

a) *Size of animal*
Among individual animals there is a big variation in size, intake of food and digestion of food. For example, younger animals tend to eat 10% to 15% more food. Older animals tend to eat less. Also, quite obviously, a large animal of one species is going to eat more than a small animal of another species.

b) *The Physiological State of the Animal*
This concerns lactation. Lactating animals do not eat the same amount of dry matter throughout the lactation. They start off by eating about 20% of the daily requirement, which will increase to about 100% after day 20 of the lactation. This will slowly decrease again as the calf increases in size.

c) *Pregnancy*
Intake varies with the stage of pregnancy. At the beginning of pregnancy, the intake might be as high as an animal that is not pregnant. Towards the end of pregnancy, when the foetus is large, the intake will be reduced.

d) *Degree of fatness*
Very fat animals tend to eat less than the very thin animals, which is a factor to be considered.

e) *Herd Influences*
There is very definitely a butting order within herds or flocks. This means that older or stronger animals bully weaker or younger animals. Even in herds of a uniform age, certain animals will become more dominant and create better access for themselves to food. The butting order is affected by the stocking pressure, the herd size, the class (age and sex) of the animals and the species of stock.
Feed Factors
Ruminants on forage differ from men, fowls and pigs all of which tend to eat a constant energy intake. The quality and type of feed that ruminants obtain from the grassland can vary according to the following factors:

a) Digestibility
The amount of fibre affects the rate of digestion hence the rate of passage and further intake of fresh food. If a food is high in fibre it is low in digestibility.

b) Chemical Composition
Different forages can be eaten in different amounts; for example, the pH level of forage will affect the intake of food. The nitrogen status of forage also affects food intake. This is important because nitrogen forms the protein in the food.

c) Moisture content
Forages with a higher proportion of moisture content reach the digested stage more rapidly and can, therefore, be eaten in greater amounts.

d) Palatability
Palatability refers to whether the animal is attracted to the taste of the fodder or not. The more palatable the fodder is, the higher the intake. If a particular fodder is unpalatable, livestock will reduce their intake.

Grazing Factors
a) Herbage Availability
If grass is extremely high (2-3 m) intake of food will be reduced. This will also happen if the grass is too short. A mixed sward of average height ensures a high intake.
If there is only one water point in a very large paddock, animals will stay close to the water and only graze as far away as a comfortable walking distance from the water source. Animals do not graze as well in thin, narrow paddocks or where there are awkward corners. The fodder may be there but the animals will not readily go into the corners to retrieve it. A square, rectangular or circular shaped paddock is optimum.

Stocking pressure affects herbage availability. The more animals per paddock, the more competition there is for food.

b) Sward Type and Structure
There are several factors here that require closer attention:
- Bunch or runner grasses: runner grasses tend to grow low to the ground that restricts intake but if fertility is good they can grow to an optimum height for grazing. Bunch grasses, being higher than runner grasses, can lead to a good intake unless they are scattered and sparse. In the latter case, intake would be low.
- Dense or sparse grass: if the sward is dense the intake will be high per unit area. If it is sparse it will be low for the same unit area.
- Dormant or growing grasses: dormant grasses tend to be unpalatable which leads to a low input. Growing grass, on the other hand, is very palatable and gives rise to a high food input.
- Species composition: some species are palatable, others are not. Where this occurs, animals will select the palatable species and ignore the others. Animals are by nature selective grazers so under natural circumstances they will select the grasses that are palatable to them.
- Fouling: this refers to the dropping of manure by animals onto the grass. Animals will not graze grass that has recently had manure dropped on it. In very small paddocks
where the number of animals is high, fouling can be a problem. In native pasture, however, where paddocks are generally large and stocking rates are not intense, fouling is rarely a problem. The manure breaks down slowly during which time the animals graze on other clean clumps of grass.

(c) Weather conditions
These include temperature, wind and rain. The farmer should look at weather data for his farm and ask "which of these factors are important to my stock? Do any cancel each other out (e.g. extremely high temperatures but refreshing afternoon showers?)". High temperatures will slow down the input of food by grazing animals. Wind could affect it either way; it could cool temperatures or make things more uncomfortable. Rain can also be a good or bad factor. You should not concentrate on one factor because often others will cancel it out.

GRAZING BEHAVIOUR
A good deal of research has been done on how animals graze. A farmer who understands the needs of grazing animals will be better able to provide an optimum pasture for his stock.

The mechanics of grazing
Research on jaw structures and lip thicknesses has shown that the closest a cow can graze to the ground is about 1.25cm. Sheep and goats can part the lips which enables the incisor teeth to nip off the grass right at ground level. Grazing action varies with grass length.

Under ideal conditions, maximum intake by cows occurs when the grass is about 12cm long. The animal will bite off the top half of the grass. Where the grass is greater than 20cm, the tongue action becomes important. The animal wraps its tongue around the grass then pulls and bites at the same time. On pastures that are thin and less mature, 20cm is an ideal length for maximum intake by cows.

An experiment was done to test just how much grass was taken in at different lengths. The experiment used dairy cows on good, dense grass and clover pasture. Although planted pasture differs from natural pasture, the results in Table 1 give a useful insight into grazing behaviour. (A 75 kg intake is equivalent to a heap of grass 1 m wide).

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<tr>
<th>GRASS HEIGHT</th>
<th>AVAILABLE FORAGE</th>
<th>GRAZED FORAGE</th>
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<tr>
<td>25cm grazed continuously</td>
<td>5000 kg/ha</td>
<td>70 kg/ha</td>
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<tr>
<td>10-12cm grazed rotationally</td>
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<tr>
<td>* 1st 3 days in</td>
<td>4500 kg/ha</td>
<td>150 kg/ha</td>
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<td>* 2nd 3 days in</td>
<td>2200 kg/ha</td>
<td>90 kg/ha</td>
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<tr>
<td>* 3rd 3 days in</td>
<td>1100 kg/ha</td>
<td>45 kg/ha</td>
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Table 1: Grass heights and quantities harvested by cows

Food is also affected by:
a) The number of bites per minute: and
b) The duration of continuous biting time.
On a perfect sward, 30 to 90 bites per minute have been recorded and up to 30 minutes of continuous biting. On succulent feeds such as silage, animals have a longer biting time.

**Grazing Time**
Normally at least 60% of the grazing occurs during the day. There appears to be a limit to how much of the day is spent in grazing. Research in North America showed that local dairy cows never spent more than 8 hours in a 24 hour period walking to and harvesting food. There are hereditary differences in grazing time between breeds and between individuals within a breed. A sound selection policy based on performance will take these differences into account and ensure that the farmer has a herd which can take the maximum benefit from whatever forage is available.

**Ruminant Time**
This is generally similar to grazing time but is proportionally longer if the grazing material is of poor quality.

**Routine**
The natural undisturbed routine of cattle is grazing then idling followed by ruminating.

**Grazing Periods**
Usually there are two main meals per day, after sunrise and before sunset and for a while afterwards. Minor snacks are taken at mid - morning and in the early afternoon and perhaps a bit at night.

**Selective Grazing**
This is an important aspect of livestock behaviour. The "cafeteria" experiment was carried out in West Virginia, which gave more insight into the ways in which animals select grasses. First of all, cows were grazed on a selection of different swards. The preference noted, the cows were then moved onto a pasture containing only the favourite sward. Several weeks later they were returned to the "cafeteria" paddock where they had free choice of grass. The previous favourite went to the bottom of the list.

Favourite species vary in palatability and feeding value at different stages in the growth cycle. Animals will always select the leafiest part of the grass to eat which is highest in protein. Only the best parts of the grassland or pasture are grazed.

**Herd Group Behaviour**
In general, the herd functions as a unit. All the individuals seem to carry out the same activity at the same time. There seems to be some kind of majority decision as to when to start each phase of grazing, idling and ruminating.

**Non - Homogenous Groups**
Different classes and species of animals have different grazing needs. For example:
- Weaners, milking cows and steers all have different feed requirements.
- When there is a goat in the sheep flock, the sheep will usually follow him although his grazing habits are not the same as theirs would be if they were on their own.

**Complementary Grazing**
Owing to the differences in grazing methods and tastes, two different species will ensure greater utilisation of available forage to their mutual benefit. An experiment was carried out in Wales using cattle and sheep. Herefords of about 250 kg and Welsh ewes and lambs were grazed alone and together on highly fertilised pastures at two different stocking rates. There was an improved performance when cattle were
combined with sheep. To achieve improved performances in this way, it is important to remember that the stocking rate should not exceed the carrying capacity of the grassland. Where sheep and cattle are to be grazed in a complementary situation advice should be sought from extension officers as a certain amount of damage can be done to the grassland if the grazing is not strictly controlled.

**Rank Order of Dominance**
This is a very important aspect of animal behaviour.

With animals that know each other, there is peace, which leads to better productivity. Whenever strange animals are mixed, the absence of order leads to fighting and stress and reduced productivity.

Factors that affect dominance are:
- age
- sex
- weight
- height
- aggressiveness and agility

Dominance is less marked amongst young animals. It is essential to separate the different age groups of animals for effective utilisation of the grazing. Table 2 shows the results of a study done to test whether different age groupings on grazing would affect the productivity of the animals. From the results you can see that the single age group and the similarly aged group did significantly better than the very mixed age groups.

The farmer needs to balance the productivity of his animals with the productivity of his grassland. Knowledge of how animals behave when grazing the grassland is useful for pasture management. Overgrazing or overstocking the grassland leads to more plant growth. This results in a larger number of poor animals instead of a smaller number of good quality animals, which are produced when the grassland is correctly stocked.

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<tr>
<th>AGE MIX</th>
<th>LIVE MASS GAIN \ LOSS (KGS)</th>
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<tr>
<td>2 y.o. heifers + older cows</td>
<td>Loss of 12 kgs</td>
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<td>2 y. o. heifers alone</td>
<td>Gain of 23 kgs</td>
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<tr>
<td>2 y. o. heifers + 3 y. o. heifers</td>
<td>Gain of 21 kgs</td>
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<tr>
<td>3 y. o. heifers + older cows</td>
<td>Loss of 108 kgs</td>
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<tr>
<td>3 y. o. heifers + 2 y. o. heifers</td>
<td>Loss of 23 kgs</td>
</tr>
<tr>
<td>3 y. o. heifers in a mixed herd including 2 y.o. heifers</td>
<td>Loss of 75 kgs</td>
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<tr>
<td>Mature cows (the loss includes calving)</td>
<td>Loss of 58 kgs</td>
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*Table 2: How age groupings affect live mass gain or loss*
PASTURE MANAGEMENT PRINCIPLES
Climate and vegetation types vary throughout the world. This means that any principles applied to pasture management will vary according to country and the region.

Nevertheless, there are several basic and established principles that apply to every region. These are:

Rest
This is the main principle of pasture management. The effect of grazing is to remove the leafy part of the grass plant and this is the part that manufactures the food. Any new growth on the grazed plant is made at the expense of stored food reserves. Rest of sufficient duration is needed after grazing to:

- allow grasses time to replenish their growth
- to restore seed supplies
- to renew carbohydrate reserves in the roots
- to maintain pasture vigour

The farmer needs to be extremely flexible in his approach to rest periods and adaptable to local and changing conditions. Inflexible systems are dangerous and will fail when rainfall and seasonal growth patterns are constantly changing. Failure is always reflected in lost animal performance that is difficult to put back or regain. As a general rule pasture should be rested for 30 - 45 days provided the pasture is not severely damaged.

Grazing Period
Animals tend to go back to those plants already grazed. If the period of utilisation is too long, there is a possibility that selected plants will be overgrazed. These plants are usually the most palatable and desirable species. If the grazing period is too short, however, grass production will be lost unless there are sufficient numbers of animals per hectare. Under grazing leads to an over-accumulation of old plant material and subsequent loss of vigour. When native pasture is grazed only during one season, the period of utilisation can be 6-8 weeks. This would apply to winter or summer grazing. If an intensive system of grazing is used, the period of utilisation should not exceed 3 weeks.

The grazing period can be worked out by the following formula:

\[
\text{Grazing days per hectare} = \frac{\text{no. of livestock units} \times \text{no. of days spend in a paddock}}{\text{Area of the paddock}}
\]

The grazing days per hectare (DH) will be governed to some extent by herd and paddock size. It is important to record the number of DH's taken per paddock per season. Accurate records allow the farmer to measure the success or failure of his pasture management scheme and to make correct decisions in future plans. (Note when referring to a particular animal, the term may be changed for example: cattle days per hectare = CDH; or sheep days per hectare = SDH)

Stocking
The correct stocking rate is at the heart of success with livestock and long term pasture management programmed. It is not so much the actual numbers of grazing stock that matter as their effect on individual plants within the sward. Most pasture types have a weak link - a plant which is at risk of overgrazing because it is highly palatable. If the stocking rate is too high, the weak link plant could be eliminated from the pasture.
Carrying Capacity
It is important to be clear about the difference between stocking rate and carrying capacity. Carrying capacity is the measure of productivity of the pasture (how many animals it can carry without losing vigour). This will depend on the region and the pasture. It gives an idea of how much herbage per hectare is produced by the pasture.

Carrying capacity is expressed as livestock units per hectare. One livestock unit is equivalent to a cow or steer. Four sheep will make up one livestock unit. If the carrying capacity for a certain piece of land is one livestock unit per five hectares but the stocking rate that the farmer applies is one livestock unit per ten hectares, we would say the land was understocked. Conversely, if the stocking rate for the same piece of land was one livestock unit per three hectares, the land would be overstocked.

Equal Utilisation or the Removal of the Top Hamper
If old dead material is allowed to accumulate in a tuft of grass, its effect is to shade out new shoots. These shoots will become moribund and die. The removal of dead grass material is therefore, essential in perennial grass, which propagates by throwing new shoots. Annual grasses only live for one season and rely on seeds for propagation.

It is difficult to achieve equal utilisation because animals select their grazing matter. The fencing of similar grass areas wherever practical does help. Elsewhere some effort must be made to knock down or remove the dead material. Concentrating animals artificially by moving licks to the moribund areas can do this. Fire can also be used provided there is adequate soil cover and burns are not too frequent.

The detrimental effect of the top hamper can be put to good use by allowing undesirable grasses to be purposely under grazed. This will encourage them to become moribund and die. If this is followed by good pasture management more desirable and palatable species can be encouraged.

Number of Herds
This will vary with the type of livestock enterprise and animal numbers. In the average breeding unit, the optimum would be three herds (cows plus two groups of followers).

Every farm has what is called a "ghost herd", so named because it is there but is overlooked when planning for pasture management. Animals in the ghost herd are often not handled often so are easily forgotten. Alternatively, they are animals kept for other reasons (e.g. milk for the house, horses for recreation etc.). Typical ghost herds are:

a) Bulls when not with the cows
b) Dairy animals for house use
c) Sick animals
d) Horses
e) Sheep

All these animals form another herd and should be catered for in the overall management scheme.
Herd Size
This varies according to the livestock kept. Managerial factors often dictate the size of a herd for ease of handling. It is important to remember that maximum summer gains are directly related to conception rates and are vital to the profitability of all livestock enterprises.

Guidelines for herd sizes for different classes of animals are:

a) Breeding Herds
In late summer and winter, herd size can be increased. The limiting factor will now be handling facilities as well as the number of cattle days per hectare taken during the grazing season.

b) Followers
Breeding herds have priority when there is competition for grazing. Followers are any class of animal that goes into a paddock after the breeding herd has grazed. The concentration of animals in the following herd is less critical than with breeding animals. Slightly larger herds may be run with higher stocking densities.

Wildlife
Under Australian conditions wild animals such as rabbits, kangaroos etc, may eat some of the pasture, reducing feed available for farm animals.

Paddock Size
The area of pasture required to support one animal will vary according to weather conditions (e.g. rainfall, temperature, evaporation, etc), soil fertility & structure, pasture plant species and density, size and type of animal, and the quality of grazing management. Carrying capacity may be increased by such things as irrigation, fertilising, weed control etc. The optimum size for different areas will vary.

Number of Paddocks
This will vary with the pasture type and the number of herds. The optimum number is about six to eight paddocks per herd. This number will provide adequate rest periods. There is little economic justification for having more than eight paddocks per herd if the reason for having them is to rest the pasture.

Fire
Fire has helped to shape our grasslands through geologic time and still has some part to play in grassland management. Fire is used in high rainfall areas, usually on an infrequent basis, to prevent an accumulation of top hamper, which has harmful effects on both the stock and the grassland. A problem with grassland burning is that it removes the layer of litter beneath the plants. This layer is important for seedling development and moisture retention. If the burn takes place after a good rain and while the litter is still damp, the top hamper can be effectively removed with little damage to the litter layer.

At no stage during the planning or the operation of grassland management schemes, can rules of thumb be substituted for sound common sense. Intelligent manipulation of flexible schemes offers the best chance lasting success for the livestock and the grassland.
APPLYING GRASSLAND MANAGEMENT PRINCIPLES
The most important principle of grassland management is rest of sufficient length to allow for regrowth after grazing. To ensure rest, paddocks must be securely fenced. The more paddocks provided per herd, the easier it is to provide rest periods. It is, therefore, in the interests of stock and grassland to provide as many paddocks as possible within the economic maximum of eight per herd. The more paddocks per herd, the less sensitive the grassland management system will be to mismanagement. The different grassland management systems are variations on paddock sub-division given local conditions and farmer preference. There are four major grassland management systems.

Continuous Light Stocking
This occurs on farms that are only fenced on the boundaries and have no internal fencing. It is impossible to apply a management system without paddocks unless the stock is herded. Consequently, stocking rates must be drastically reduced to limit overgrazing of palatable species. The stocking rate will be well below the carrying capacity of fenced grassland. By stocking lightly, the farmer should find that there is an overall improvement in herbage production, species composition and ground cover.

Split - season Systems
This is one step up from the previous system. Instead of no paddocks, the farmer aims to provide two paddocks - one for early season and one for late season. The grassland is grazed and rested according to Table 1.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>SEASON</th>
<th>PADDOCK 1</th>
<th>PADDOCK 2</th>
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<tbody>
<tr>
<td>Year One</td>
<td>Early summer</td>
<td>Rest Rest</td>
<td>Graze Graze</td>
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<td>Late summer</td>
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<td>Year Two</td>
<td>Early summer</td>
<td>Graze</td>
<td>Rest</td>
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<td>Late summer</td>
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<td>Winter</td>
<td>Graze</td>
<td>Winter Rest</td>
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Table 1: The split-season grazing system (one herd and two paddocks)

The late season rest builds up growth reserves. The early season rest allows the grass to exploit its increased growth reserves to ensure increased vigour. This system can be further refined if an extra paddock is provided. This will help to relieve grazing pressure in early summer (see Table 2).
Table 2: The split-season grazing system (one herd and three paddocks)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>SEASON</th>
<th>PADDOCK 1</th>
<th>PADDOCK 2</th>
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<td>Year</td>
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<td>Winter</td>
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Split-season systems have some very definite disadvantages - the worst being the concentration of stock in the early summer period when grazing might be limited if rains are late. Spreading the herd over the entire farm until adequate grazing is available could cater this for. It is extremely important that the herd is not kept in the early summer paddock for too long. This could result in excessive overgrazing from which the plants may not recover. The timing of change is vital to the success of this type of system. If in any doubt, it is better to move too soon than too late.

**One Herd, Four Paddock System**

This is a further refinement on the split-season system.

Each herd is provided with four paddocks in the following way:
- a) One paddock for the growing season;
- b) Two paddocks for the dry season; and
- c) One paddock being rested for burning

During the early season, when grass could be in short supply, the herd is divided between or rotated through three paddocks before being confined to the growing season paddock. Fire removes moribund grass.

**Intensive System**

Although there are several types of intensive system, the basic rule is to give as short a grazing time as possible per paddock coupled with a long rest. Average times are a maximum of two to three weeks grazing followed by a minimum of six to eight weeks rest. Factors that affect these figures are the time of year. Pasture conditions, and the stocking rate.

Intensive systems can lead to increased pasture vigour and herbage yields. This gives rise to improved soil condition and water infiltration with a decline in soil erosion. Disadvantages include the need for frequent movement of animals with the increased chance of lost calves or lambs at each move. This can be overcome by using either a split-season system for the breeding period or by making sure that any move involving mothers and offspring are onto adjacent paddocks.

Close attention must be paid to the early summer period when growth may be slow. The amount of grass must be continually assessed and grazing periods reduced if
necessary. Alternatively, two paddocks can be opened. Records should be kept of paddock use to highlight if a particular paddock is being grazed at the same time each year. Should this be the case, grazing periods can be varied or an additional paddock included in the rotation (see table 3).

Records should also be kept of animal numbers and grazing periods so that the Days Per Hectare (DH) number can be calculated. The DH value shows the number of cattle that have grazed per hectare per day. With this valuable information, grazing periods, intensity of utilisation Na herd movements can be planned. Even in better rainfall areas, an early summer DH of 16 is often all that can be planned, building up to a maximum of 24. Late in summer, 48 DH should not be exceeded. In winter (especially late winter) this number can be exceeded to help knock down old grass material and create light for next season's seedlings.

Intensive systems are sensitive to stocking rates. Where rates are excessive, plants can be damaged even grazing periods are followed by long rests. An increase in animal numbers should, therefore, be made with caution and only when there has been an increase in grass production OF MORE THAN ONE SEASON.

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<th>PADDOCK</th>
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Table 3: An Intensive Grazing System (one herd - six paddocks) showing several paddocks in use at the one time in early summer.

**Fire in Grassland Management**
Fire has plays a significant role in the development of vegetation. Extensive bush fires were part of the natural cycle long before the introduction of agriculture.
HORSE PASTURES
Horses tend to be very selective eaters, and as such tend to eat all of one plant species in a paddock, while leaving other species untouched. This tendency can lead to the composition of a pasture being changed quickly if a horse has an over supply of food, and hence the luxury of choosing what to eat.

To avoid (or minimise) such problems, horses are best to be restricted to the area of pasture available. Put a number of horses into a fenced area for a short time and then move them on to another area. As a general rule, areas should be left fallow for 75% of the time and grazed 25% of the time (there are however exceptions to this rule).

Horses love perennial and annual rye grass; and will eat reshoots as soon as they emerge, which can lead to these species disappearing from pasture. Weed species will thus tend to emerge in ryegrass pasture grazed by horses. For example: In temperate Australia, weeds which may invade and dominate such pastures grazed by horses include: Dock, Dandelion, Capeweed, Buttercup, Bent grass, Patterson's curse, Fat hen and Amaranthus. Thistles (i.e. Canada Thistle and Burdock) are common weeds found on horse pastures in America.

Some weeds are even poisonous to horses such as St.John's-wort, Nightshade, Rhododendron, Foxglove, Bracken Fern and Mountain Laurel, etc. Horses do not favour white clover, but white clover may be important in rye grass pasture, to maintain nitrogen levels and keep the rye grass vigorous.

Beware!
Feed brought into horse paddocks from outside a locality, can often contain weeds, which become a problem in horse pasture.

Ways to Improve or Maintain Horse Pasture
- Keep a maximum number of horses in a paddock so they compete for pasture feed.
- Spell paddocks regularly.
- Slash tall weeds between grazing.
- Graze horses together with cattle and/or sheep.
- Graze an area with cattle or sheep, following grazing with horses.
- Replant ryegrass annually (e.g. in autumn in temperate areas).
- Fertilise paddocks annually at a prime time (e.g. In temperate areas...autumn when ryegrass is planted)
- Drench horses for worms regularly (then move to a paddock which is free of worms and serious weeds. i.e. a paddock which has been fallowed).

PASTURE FOR FREE RANGE POULTRY
In the past, eating grass was not considered to be of ant significance to poultry. With a worldwide growth in free range management of poultry, the value of eating grass has been reconsidered for poultry. Poultry have been observed eating grass; and it is possible that eating grass and grass seeds could contribute in a small way to poultry nutrition. The environment of a pasture may however provide other high protein foods for poultry (e.g. insects and other small animals). More research is needed though before anything definite can be determined.
MANAGING CATTLE ON PASTURE
Don’t put cattle onto new sown pasture too early. The second leaf at least must have emerged on new sown grass before it can be grazed. It is better for the grass to be even more established before exposing it to a grazing cow. Rotational stocking is generally recommended for dairy cattle. This involves moving cows every 12-24 hrs onto a new paddock. This results in more consistent feeding for the cows as well as better health and longevity for the pastures.

FODDER TREES & SHRUBS
Trees and shrubs especially in the low land quality regions are of great value to the stock farmer during the dry season because their leaves, shoots and fruit provide palatable, nutritious animal feed.

Certain indigenous species are generally widespread and found throughout their country of origin. The Acacias fall into this category - their feed value is well known to farmers. Livestock eat Acacia leaves and pods. It is best to ground pods before feeding them to stock to ensure that the seeds, which are rich in protein, are easily digested.

Acacias are used for fodder feed in Saudi Arabia, North Africa, and South America. The foliage of some species, especially A. georginae (Georgina Gidgee), may be extremely poisonous to stock. Poisoning seriously affects sheep and cattle production in areas where natural stands of this species occur.

Indigenous trees are, however, often slow growing, and some faster growing exotics are being introduced into the country for new plantings. Such species include Carob and Mesquite. Recent interest has been shown in Paulownia, a deciduous tree from mainland China. This tree propagates easily, has rapid growth and can provide cattle fodder and wood for fuel and sale. It tolerates poor soils, but does not like to stand in damp areas. Paulownia does not compete with other trees so it does not become invasive like some other introduced trees.

Another tree is Luecaena leucocephala from Taiwan, which has similar properties to Paulownia. The crude protein content of Luecaena is similar to other legume forages. One drawback of Luecaena is that it contains mimosine, an amino acid that is difficult to break down. Animals fed only on this tree will lose mass and condition, although rumen bacteria can be injected into stock to enable them to make full use of the protein in the leaves.

<table>
<thead>
<tr>
<th>Nutritional Value of Fodder Trees and Shrubs</th>
<th>PROTEIN</th>
<th>FIBRE</th>
<th>FAT</th>
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</thead>
<tbody>
<tr>
<td>PODS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giraffe Thorn</td>
<td>11.5</td>
<td>31.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Ana Tree</td>
<td>11.0</td>
<td>27.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Umbrella Thorn</td>
<td>18.8</td>
<td>20.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Flat-topped Thorn</td>
<td>17.5</td>
<td>25.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Monkeybread Tree</td>
<td>6.5</td>
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</tr>
<tr>
<td>Chinese Lantern Bush</td>
<td>18.0</td>
<td>21.0</td>
<td>2.0</td>
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<tr>
<td>Carob</td>
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<td>9.5</td>
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<tr>
<td>Honey Locust</td>
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<td>5.0</td>
</tr>
<tr>
<td>Mesquite</td>
<td>14.0</td>
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<tr>
<td>LEAVES</td>
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<tr>
<td>Witgatboom</td>
<td>14.5</td>
<td></td>
<td>32.0</td>
</tr>
<tr>
<td>Mopane</td>
<td>12.5</td>
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<td>25.0</td>
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</tbody>
</table>
SET TASK

1. Visit a pasture currently stocked with grazing animals, and observe the grazing behaviour of the animals present. Do they seem to be avoiding any species of plants? Compare the pasture in a paddock, which is stocked to another paddock which is unstocked. Look for differences in pasture growth and lushness. How significant are these differences?

2. Consider at least three animals you have seen in the past, or go out to see three different animals grazing e.g. A cow, a horse, a buffalo. Observe their grazing habits.

3. Visit or consider a farm you have previously visited, regarding the management planning for stocking a pasture. How is the performance recorded? How does this affect future management plans?

ASSIGNMENT

Download and do the assignment called ‘Lesson 7 Assignment’.