Feed Management Practices

Structural features - digestion

Farm animals have one of two main types of digestive system. The ruminant system is in sheep, cattle, goats, and deer. The non-ruminant systems is in horses, pigs, and birds, such as poultry.

The two systems have evolved to digest different types of food. Ruminant animals eat mainly plant material, including grass, hay silage, chaff, grains, and leaves. Non-ruminant animals eat only small amounts of plant material as well as other types of food that contains complex carbohydrates. Complex carbohydrates break down quickly, so non-ruminant animals need only one stomach. This type of digestion is called mono-gastric (mono means ‘one’).

Ruminant digestion

Ruminant animals have four stomachs. Four stomachs are need to breakdown the tough cellulose that makes up the cell walls of plants. Colonies of bacteria and other micro-organisms in the first three stomachs feed on the cellulose, breaking it into smaller particles that can be absorbed into the bloodstream of the animal for uses around the body. In the fourth stomach, chemical enzymes also help digest food.

As food moves through the four stomachs, most cellulose is broken down and the products absorbed. Any remaining cellulose is pushed through to the caecum, which is the final organ responsible for the breakdown of cellulose. Any cellulose that is not broken down in the caecum passes through the large intestine to be expelled in the dung.

Animals food

Food constituents: Foods are substances digested, absorbed, and used by the animal to keep it healthy. It is important to understand the functions of the various components of food.

Water: Plant cells contain water, which is absorbed into the animal’s body in the large intestine. Approximately 80% of the weight of all animals is water. Milk is 85% to 90% water. Water is needed for animal systems to function. For example, in the blood system, the red and white blood cells and platelets are carried around to in the plasma, which is mainly water. Most substances must dissolve in water before they can used by the cells of the body. Water is also responsible for for controlling body temperature. More water is excreted (from small openings in the skin, called pores) to keep the animal cool during hot weather than in cold weather, when the pores close up to stop water from evaporating and cooling the animal.

Protein: The leaves of clover plants and other legumes such as lucerne contain protein. During digestion, protein broken down into amino acids, which are small enough to be absorbed into the bloodstream. Pregnant animals need protein to build body tissues of the growing foetus. Young animals rely on protein for growth. Alls animals need protein to repair any damaged tissues.

Carbohydrates: Carbohydrates, including cellulose, are found in the leaves and stems of clover and grass plants. Carbohydrates are broken down into starch and sugars, which must in turn be broken down into glucose before they can be absorbed into the blood stream.

Vitamins and minerals: Vitamins and minerals are found in many plants, particularly herb plants, such as chicory and plantain. They are required in very small amounts to maintain animal health and vitality. They can be provided in supplements.

Amount of food

The amount of food an animal requires depends on its

- age

- breed

- sex

- stress factors, e.g. health and climate.

Age: Young animals that are still growing need to take in large amounts of protein to build muscle and bone tissues, and carbohydrates to provide energy. Older animals require less protein and carbohydrate than younger animals because their bodies have stopped growing. However, they require feed to maintain their body weight.

Breed and sex: Generally, the larger breed of animal, the more feed it needs. The sex of the animal is also important. Pregnant and lactating females need much carbohydrates and protein because their bodies are supporting developing offspring and producing milk.

Stress: As animals become more stressed, their nutritional requirements change, so the amount of food they eat changes. For example, when the weather gets very hot, lambs do not need to eat as much grass as when the weather is colder. The lambs main requirement is water, and they still grow rapidly. When an animal is under stress from disease it goes off its feed, and does not grow efficiently.

Types of animals food

The table compares three main types of animals food: roughages, succulents, and concentrates.

Livestock Breeding Management Practices

Reproduction

Sexual reproduction involves male and female animals. Fertilisation occurs when a sperm from the male joins with an ovum from the female. The resulting zygote grows into the young animal.

Male reproductive system

The function of each of the male reproductive organs in a mammal such a a cow or sheep is shown in the following table.

Female reproductive system

The function of each of the female reproductive organs in a mammal such a a cow or sheep is shown in the following table.

Stages of reproduction

Ovulation: At ovulation, ova are released from the ovary. The oestrous cycle is the length of the time between each ovulation, which varies for different animals.

Heat: Following ovulation, the female comes on heat, which means the female will stand still for a long enough for mating to occur.

Mating: During mating, the male ejects semen into the female reproductive tract. The sperm swim along the tract to the Fallopian tubes.

Fertilisation: When a sperm meets an egg inside the Fallopian tube they join - this is fertilisation. The fertilised egg is called a zygote. It becomes an embryo, attaching itself to the wall of the uterus and increasing in size.

Birth: Hormones initiate contractions of the walls of the uterus, which push the animal through the vagina to the outside.

Lactation: During lactation, the female produces milk for the newborn animal. The first milk produced is colostrum, which is thick and rich in protein and vitamins. Colostrum is important because it contains antibodies, which give the young animal short-term immunity to some diseases.

Genetics

Genetics is the science of how characteristics are handed on from one generation to the next. All animal cells carry their hereditary material as DNA in chromosomes inside the nucleus. Chromosomes are in pairs, one from each parent. Chromosomes are made up of genes, which are the units of inheritance. Genes control characteristics, which can be physical, such as coat colour, or behavioural, such as a calm temperament. Different forms of the same gene are alleles. Alleles control traits - different expressions of the same characteristic, which can be inherited, e.g. brown coat colour or white coat colour.

Alleles

Since chromosomes are in pairs, genes are also in pairs - the alleles. The symbol for an allele is usually a single letter - e.g. ‘B’ for ‘brown coat colour; and ‘b’ for ‘white coat colour’. Both letters are the same letter of the alphabet, because they both describe different forms of the same gene. Gametes (sperm or ova) contain only one of each allele. At fertilisation, the zygote regains two of each allele.

Homozygous and heterozygous

For any gene, an individual animal or plant can have two alleles the same or two alleles that are different - e.g. a sweet pea plant might have either two alleles for red flower colour, RR, two alleles for white flower colour, rr, or one of each, Rr. When both alleles are the same (e.g. RR or rr), the individual is homozygous for that trait. An animal or plant homozygous for a trait is a pure breeder for that trait because it has only one sort of allele to pass on to its offspring at fertilisation.

If the alleles are different (e.g. Rr), the individual is heterozygous for that trait. An animal or plant heterozygous for a trait is not a pure breed for that trait because its gametes can contain either of the different alleles, which are then passed on to its offspring at fertilisation.

Dominant and recessive

The recessive allele (shown by a lowercase letter, e.g. ‘r’) does not show up in a heterozygous individual. A dominant allele (shown by an uppercase letter, e.g. ‘R’) always shows its related trait in the individual when present, they show up in the individual, as the following coat colour example:

- BB = brown coat, because dominant B allele is present

- Bb = brown coat, because dominant B allele is present

- bb = white coat, because dominant B allele is absent.

In crosses, recessive features show up in the offspring less often than dominant features do.