

Meeting the Nutritional Needs of Animals

LIKE HUMANS, animals must consume food to survive, grow, and reproduce. Food provides nutrition to meet the varying needs of different animals. Some animals require much nutrition because of the environment they live in or the functions they perform. Others need less to stay healthy and survive. Animal nutrition is gained from grasses, grain crops, and processed products.



(Courtesy, Agricultural Research Service, USDA)

Objectives:



1. Explain the functions of feed.
2. Describe the various types of feed.

Key Terms:



basal maintenance
requirement
concentrates
feed
feedstuffs

fetus
free choice
growth
lactation
maintenance

rations
reproduction
roughages
supplements

Functions of Feed

Feed is any product consumed by an animal to meet nutritional needs. Feed provides the animal with energy to be mobile, protein to grow new or repair damaged cells, and vitamins and minerals to support various functions. Nutritional requirements from feed vary, depend-

ing on an animal's stage in life, the environment it lives in, and the activities it performs. The functions of feed can be divided into five major categories.

MAINTENANCE

A house cat or dog does not burn very much energy throughout a typical day. It may go for a walk or play in the yard, but usually it is not very active. Its nutritional requirements stay at a relatively constant level throughout life.

Foods fed to companion animals are designed for maintenance. **Maintenance** is the keeping of an animal's body at a constant state throughout its adult life. An animal should not substantially gain or lose weight when consuming a maintenance diet. It should continue to be healthy and carry out day-to-day activities without its nutritional requirements changing.

Energy needed for maintenance is called the **basal maintenance requirement**. A maintenance diet contains proper amounts of carbohydrates, fat, protein, vitamins, and minerals to maintain an appropriate weight and health status. Maintenance is the first need met by all animals when utilizing feed.

GROWTH

When animals are born, they are very small but are expected to grow into adults over time. **Growth** in young animals is the increase in body size, weight, and length of bones and the development of internal organs, among other aspects. When a calf is born, it may weigh 70 to 85 pounds. As an adult, it may weigh 1,200 to 2,000 pounds. This extreme development in the body is growth. For growth to occur, the animal must consume proper amounts of protein, carbohydrates, and fat. Vitamins and minerals are also utilized to build strong bones and healthy organs. After a young animal meets maintenance requirements from feed, it utilizes excess nutrition to create new cells and begin to grow into an adult.

REPRODUCTION

Many animals are utilized in production agriculture and other fields for purposes of reproduction. **Reproduction** is the production of offspring from the mating of adult animals.

For reproduction to be successful, proper nutrition must be supplied to both female and male animals. The animals must first have proper food to survive, develop into adults, and have the energy to pursue creating offspring. If proper nutrition is not provided, success of pregnancies is very low, and males may experience low sperm counts.

A pregnant female must be fed a proper diet throughout her pregnancy for the young developing animal to be born healthy. Protein, vitamins, and minerals must be supplied in adequate amounts for proper fetal growth and development. The female will also need increased levels of carbohydrates to produce enough energy to carry the excess weight of the **fetus**, or unborn offspring.

LACTATION

For most species, after birth of the offspring, the mother must provide nutrition to her young. This is done through **lactation**, or the production of milk. A mother's milk contains adequate nutrients to support growth and development of her offspring. These nutrients in the milk derive from the mother's body. Her lactation system extracts nutrients from the blood and feeds them into the milk for her young.



FIGURE 1. Dairy cows, such as this one, must be in adequate shape to maximize milk production. (Courtesy, Agricultural Research Service, USDA)

During lactation, a female must be fed higher levels of nutrients to meet the needs of both her and her offspring. This means higher levels of carbohydrates, protein, vitamins, and minerals. Animals utilized solely for milk production, such as dairy cows or goats, must be fed a high-nutrient diet at all times.

WORK

Animals have been used for work since they were first domesticated. They have been used to pull plows, transport people or goods, track other animals, or run on racetracks. All working animals are bred for their function and do best in a working environment. Their bodies are designed to utilize nutrients to the greatest extent possible for energy or power.

Working animals are not as commonly used for draft purposes today as they once were but are now used to provide a variety of other services. Modern-day working animals include service animals for persons with disabilities, tracking animals for law enforcement, race horses or dogs, and other sporting animals. They require higher levels of nutrients, such as carbohydrates, to maintain their athletic ability and perform the tasks for which they are bred.

Types of Feed

Feed is classified according to the type of nutrition it provides and the source from which it is derived. An animal's diet may be designed from a variety of **feedstuffs**, or ingredients. Animal diets can also be referred to as **rations**, or combinations of ingredients to meet all nutritional needs. A feedstuff used to develop a ration may add a missing nutrient, improve the flavor of the feed, or enhance growth and development. Feed can be broken down into three major types.

ROUGHAGES

Roughages are feedstuffs originating from plants and include the leaves and stems. They are high in fiber and lower in protein and energy than the other two types of feed. Roughages are commonly grown to feed animals because of their low cost and ease of access. They are also highly desired by certain animals. Horses, sheep, goats, and cattle do well on high-roughage diets. Typical roughages grown for animal feed include alfalfa, clover, and common grasses. They are most nutritious and most desired by animals when harvested at an immature stage of vegetation. At that stage, the stems are still somewhat soft, and the leaves contain the highest levels of nutrients.



FIGURE 2. This alfalfa will be harvested as a roughage for animal feed. (Courtesy, Agricultural Research Service, USDA)

CONCENTRATES

Concentrates are feedstuffs that contain a high level of either protein or energy. They are fed to animals that require additional protein or energy because of production, work, or a poor environment. Among high-protein concentrates are soybean meal, cottonseed meal, and sunflower meal. Among high-energy concentrates are corn, barley, wheat, rice, sorghum, and oats. Concentrates are sometimes fed to animals that are being raised to market weight for human consumption. They cause animals to gain weight more rapidly and create a more desirable final food product. Concentrates can also be fed to animals not able to digest roughages properly. They are typically fed at a lower rate in a maintenance diet.

SUPPLEMENTS

Supplements are any products added to a diet to fulfill specific requirements. They include protein, vitamin, and mineral supplements. Medications can also be considered supplements when fed as preventive measures. Supplements are commonly mixed with concentrates to add protein, vitamins, or minerals to a diet. They can also be fed *free choice*, meaning that animals have access to the products constantly. Cattle are commonly fed salt and minerals free choice.

Summary:



Feed supplies animals with nutrients to survive and prosper in their environment. The functions of feed can be divided into five major categories: maintenance, growth, reproduction, lactation, and work. Each category requires a different level of nutrition for the feed to be functional.

Feed can be broken down into three major types: roughages, concentrates, and supplements. Roughages are common in maintenance diets, concentrates are utilized in high-protein or high-energy diets, and supplements are added to diets to meet specific needs.

Checking Your Knowledge:



1. What are the five categories into which the functions of feed are divided?
2. Why do animals performing work require additional nutrients in their diet?
3. Feeds are broken down into what three major types?
4. When is the best time to harvest roughages to maximize nutrients?
5. What is meant by feeding free choice?

Expanding Your Knowledge:



Examine the nutritional tag from a bag of animal food, such as cat, dog, or bird food. Or, choose the tag from feed used to provide a large animal with a complete diet. Look over the list of ingredients. Categorize each ingredient as a roughage, a concentrate, or a supplement. Consider the animal consuming the diet. What function is the food performing for the animal? Does the animal appear fat, thin, or at the appropriate weight?

Web Links:



Body Condition Scores in Horses

http://www.oznet.ksu.edu/pr_eyas/body.htm

Feedstuffs

<http://www.feedstuffs.com/ME2/Default.asp>

Purina Research News

<http://www.purina.com/Science/Research/>