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What a Veterinarian Should Know About Nutrition

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The rapid development of scientific agriculture in recent years has been due largely to advances in chemical research, especially in the field of biochemistry. The modern chemical techniques have made it possible to make accurate analyses of the essential food nutrients necessary for the economical production of livestock. Consequently, the science of nutrition has made phenomenal advances in the past few years.

The importance of proper nutrition in the maintenance of health, resistance to disease, and to recovery from diseased conditions is now fully recognized. Sanitation, hygienic measures, and other principles should also be acknowledged as contributing factors in maintaining the health of animals. Certain pathologic conditions due to nutritional deficiencies have been definitely established. Methods of prevention and correction of many of these conditions have been satisfactorily worked out. The veterinarian must be familiar with the fundamental principles of nutrition in order to successfully handle the many complex problems which are presented in the production of poultry and various species of domestic animals.

Veterinarians, trained in animal nutrition, should always keep infectious diseases in mind and not contribute all dysfunctions to malnutrition. The feeding of balanced rations is necessary in order to keep animals in top physical condition, which in turn makes them more resistant to pathogenic organisms. In the event pathogenic organisms make a successful invasion, the animals receiving the most complete rations will withstand the disease longer than poorly nourished animals. Regeneration of blood cells and tissues cannot take place unless the body is properly nourished. Tissues are constantly being destroyed in the animal body by catabolic processes; therefore the proper nutrients must be supplied in the ration for repair and the building of new tissue.

In nutrition, as well as other subjects, there are certain principles and terms which must be understood before the subject can be fully comprehended. Many of these terms are commonly used by farmers trained in farm management and animal husbandry. It appears that veterinarians should be able to use language in which their clients are trained if they expect to secure the respect of farmers and maintain the prestige of the profession in the community in which they serve.

A Balanced Ration

A balanced ration must contain proteins, carbohydrates, fats, minerals, water and vitamins in such proportions and amounts as will properly nourish an animal. Feeds or rations containing the...
proper proportions of all the essential amino acids supply protein of good quality. Various feeds whose proteins are of poor quality, furnishing insufficient amounts of any of the essential amino acids, are not all necessarily deficient in the same amino acids. Therefore, two or more feeds, each furnishing poor quality proteins when fed alone, may supplement each other and supply adequate protein in the ration. This is one of the reasons why multiple ingredients in a ration are usually far better than one or two.

Veterinarians should be able to calculate rations and determine whether or not a ration is deficient in the various nutrients. It is not necessary to be trained in the higher mathematics to compute balanced rations. The basic information may be secured from any standard textbook or reference on nutrition. Simple arithmetic is all that is needed for the necessary calculations. The nutrient requirements for livestock especially protein, minerals and vitamins, must be available. These requirements vary with each species of animal, and one does not need to be able to quote the requirements from memory. The National Research Council has published the nutrient allowances for the domestic animals and these publications are inexpensive to buy. Morrison¹ discusses the nutrient requirements for domestic animals very well. This book also serves as a source for the average composition of feeds, which is essential in calculating rations. Other publications may be used as supplementary sources; however, Morrison's book will suffice in most cases.

**Calculating Rations**

In calculating rations one must always consider that the nutrient requirements of animals vary with the purpose for which the animals are being kept. Therefore, rations are designed for growth, maintenance, fattening, reproduction, production of eggs or milk, work in the case of some horses, and various other purposes. Animals during lactation require more calcium and phosphorus than non-lactating animals. Hens in production require more calcium and phosphorus than growing chicks, although the latter require one per cent calcium in their ration. The nutrient requirements of the growing animal are also different than adults. Consequently, rations should be designed to meet the animal's requirements which in turn helps to obtain maximum feed efficiency.

Veterinarians should be able to recognize pathologic changes associated with each nutritional deficiency. This may not be easy because under natural conditions multiple deficiencies are more likely to exist than single deficiencies although either may occur. Therefore, field conditions may present a different picture than laboratory conditions. Veterinarians must be alert to distinguish between pathologic changes caused by nutritional deficiencies and those caused by infectious diseases. The cooperation of diagnostic laboratories may often be necessary to make the distinction.

The prognosis of any disease, either of nutritional origin or caused by infectious organisms, is usually more favorable when a balanced ration is fed. Fortification of the balanced ration (beyond the recommended levels) with the essential nutrients which may have been a predisposing factor in causing the disease is suggested. The source of the various feeds should be considered. Rendering plant tankage contains more of the essential nutrients than packing plant tankage. Packing plants remove many of the organs, such as the liver and heart, whereas rendering plants do not.

**Selecting Feeds**

In selecting feeds for rations it is well to include feeds that have been grown locally in order to reduce transportation costs. In Iowa, soybean meal is an excellent source of plant protein. Farmers are often confronted with the problem of mixing rations properly. Reliable feed dealers and elevators having feed mixers usually solve the problem. It is futile to attempt mixing large amounts of feed by hand, especially when trace minerals
and small quantities of other nutrients are included in the ration. Large quantities of feed should not be mixed if the ration is going to be stored for some time. After mixing, the ration should be fed within a reasonable length of time to prevent undue oxidation of vitamins by trace minerals. Stabilization of the trace minerals helps in preventing oxidation of the vitamins. In purchasing trace mineral mixtures, one should make sure that they have been stabilized.

**Mineral Deficiencies**

Good pastures, especially legume pasture, should not be overlooked because they are excellent sources of good quality proteins, minerals and vitamins. The mineral content of pastures reflects the mineral status of the soil. Many soils are deficient in calcium and phosphorus, producing plants of low mineral content. The mineral deficiencies in the soil are often attributed to continuous cropping (lack of crop rotation), erosion, and insufficient use of fertilizers. Soil testing laboratories should be an asset to farmers and also to veterinarians in determining the status of crops grown on farms when nutritional deficiencies are suspected. Veterinarians should know if they are practicing in an area where the soil is deficient in iodine or contains toxic quantities of selenium. Also, a knowledge of the poisonous plants present in the area in which a veterinarian is practicing should be helpful.

Some nutritional deficiencies are more likely to occur at a certain season of each year. Vitamin A and D deficiencies are more apt to occur in late winter or early spring, when the animals are less likely to receive green feed and are away from sunlight. Also, the vitamin reserves in the body are likely to be the lowest at this time of year. It is well to remember that feeds and pastures which are adequate under normal conditions may become decidedly inadequate under drought conditions. Consequently, the incidence of nutritional deficiencies is greatest during seasons of drought.

Veterinarians should be able to advise their clientele about good feeding practices. A list of excellent sources of the essential nutrients should be at hand to recommend to farmers in case a nutritional deficiency is diagnosed. In the management of breeding stock, it is well to stress that the time to start feeding livestock is prior to conception. Feed during the gestation period and after birth is also very important. The female should be in proper state of health and condition to conceive and carry her young throughout the gestation period. Mortality is decreased and stronger young are born if balanced rations are fed.

Veterinary schools throughout the country are becoming aware of the necessity to include more courses in nutrition and biochemistry in their curricula. A practical working knowledge of these subjects is a primary requisite in applying the principles of nutrition to livestock. Knowledge of nutrition and biochemistry without practical application is of little value. The inclusion of the essential courses in animal nutrition in the veterinary curriculum is necessary in order to provide adequate training for veterinary students.


**Anesthesia**

Beta naphthoxyethanol is reported to be a satisfactory short-acting anesthetic for horses. There appears to be no postanesthetic sequelae of any consequence. The drug can be given in 10 percent suspension in doses of 30-50 mg./kilogram of body weight in two to five minutes with little or no restraint. The animal is up and walking in 15-27 minutes from the start of anesthesia, though prolonged anesthesia may be obtained by continu- gram body weight is not recommended ing the injection after the primary induction dose. Dosage of over 100 mg./kilo- however. N.A. Vet. Vol. 31, March 1950.