Nutritional Deficiencies and Diseases of Poultry

An adequate and balanced diet keeps poultry healthy and sustains the birds' natural resistance to disease if management is good.

THE artificial conditions under which poultry flocks are reared and kept necessitates careful attention to the composition of a diet not only complete in proteins, carbohydrates, and fats, but also containing certain essential accessory food substances (vitamins and minerals). Extremely small amounts of these substances are required, but their absence or deficiency in the ration gives rise to fairly definite disease symptoms. In this article by J. J. Thompson, Veterinarian (Poultry), Department of Agriculture, Wellington, only the deficiencies likely to occur under ordinary New Zealand feeding conditions are discussed.

MODERN commercial poultry keepers in many cases favour the housing of poultry under intensive conditions which prevent the birds from correcting the lack of essential elements in the diet by grazing on pasture. This has led to considerable research into poultry nutrition to establish the complete requirements of chicks, growing stock, and laying and breeding birds. From this study has emerged a mass of scientific information which makes the subject of poultry nutrition and its effect on the health and productivity of the fowls very complex.

Fortunately, relatively little of this information need concern the poultry keeper. By emphasising the practical essentials to the exclusion of the remainder and reducing the scientific technicalities to simpler terms, stress is placed on the elements necessary in the normal diet. All the minerals and vitamins required for feeding poultry are contained in the foodstuffs in common use. Preparation of a balanced ration which will supply the necessary nutrients consists largely of making intelligent use of these foods in the proper proportions.

A good diet is one which keeps the bird healthy and sustains its natural resistance to disease if management is good. The unbalanced diet makes the flock more susceptible to diseases of bacterial origin, coccidiosis, worm parasites, and colds.

MINERALS

Numerous mineral elements are required by poultry. They enter into the composition of bone, the functions of the organs, and clotting of the blood, and are necessary for the maintenance of life and reproduction. The essential minerals are calcium, potassium, magnesium, phosphorus, zinc, chlorine, sodium, manganese, iodine, iron, copper, sulphur, and cobalt. The ordinary constituents of rations contain most of these elements in sufficient quantity. Calcium, phosphorus, sodium, chlorine, and manganese are the only minerals which require practical consideration. The feeding of minerals in excess may have harmful effects.

Calcium (Lime)

The important part played by calcium in the composition of bone and egg shell underlines the necessity for the inclusion of this mineral in the rations of both growing and laying stock. Deficiency of calcium in the diet of young stock leads to poor growth and rickets. In laying stock it causes poor egg-shell quality, lowered production, and poor hatchability.

Growing stock require 1 per cent. of calcium in the ration. To meet the needs of egg-shell production laying stock require a higher percentage, and the recommended amount is 2½ per cent. of the ration. This is usually supplied by adding up to 1 per cent. of ground limestone, shell grit, or oyster shell to the mash and supplying the remainder in troughs.

Confusion is sometimes encountered through the use of the term grit to cover two different substances. Soluble or shell grit such as oyster shell or limestone grit is used to supply the calcium requirement. Insoluble or hard grit is necessary if whole grain or coarse feed is supplied; it is stored in the gizzard and assists the grinding action of that organ in breaking down large food particles such as grain, leading to more efficient digestion of the food material. Granite chips or gravel are good types of hard grit and should be made available for laying birds to eat at will. For chicks coarse sand is useful.

Grains and their by-products—bran and pollard—have a poor calcium content; meat meal and fish meal contain a relatively high percentage. A large excess of lime in the diet affects hatchability adversely and may also cause digestive upsets.

Phosphorus

Phosphorus is also necessary for bone formation, and occasional cases of rickets are caused by deficiency. The close association of calcium and phosphorus in the formation of bone and in the body metabolism is well established and they are usually considered together.

The utilisation of both minerals depends on the presence of adequate vitamin D in the ration. If sufficient vitamin D is not present, calcium and phosphorus are not deposited normally in the bones of the chicks, leading to rickets.

Because of their close relationship a ratio between the two minerals has been laid down. This ratio is generally accepted at 1½ to 2 of calcium to 1 of phosphorus for growing birds. The higher requirement of calcium by laying birds because of shell production necessitates a higher ratio.

If a vegetable protein concentrate such as ground nut meal is fed, the inclusion of bone meal in the ration may be necessary. Meat meal, fish meal, bran, and pollard are good sources of phosphorus and rations in which these form a considerable part do not require any phosphorus supplement.