Protein Requirements for Maintenance in Adult Parrots

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Protein is required in adult animals for the maintenance of body tissues and for the production of feathers, various hormones, and pigments. Proteins are constantly being broken down and rebuilt in the body. Some of this protein is lost during the cycling process and needs to be replaced by dietary intake. Proteins consist of a number of elements including carbon, hydrogen, oxygen, nitrogen and sulfur. The amount of protein is generally defined as the amount of nitrogen multiplied by a factor (usually 6.25). In classic studies of the requirement for protein in adult animals, the amount of nitrogen ingested in the form of protein is measured and the amount of nitrogen which is excreted in its various forms, including uric acid, urea, and ammonia are also measured. When the level of protein in the diet reaches a point where it contributes less nitrogen than is being lost from the body, the animal is said to be in negative nitrogen balance. That is, the protein requirement in the animal is not being met. When the animal is receiving exactly enough protein to meet its requirements, it is said to be in balance, and when the animal is receiving more protein than is necessary for its requirements it has an excess. This excess is burned for energy and its nitrogen is excreted as urea, uric acid or ammonia. To estimate the protein requirement, we measure the amount of protein which allows us barely to achieve balance between the intake and excretion of nitrogen. This system of measuring nitrogen balance in order to determine the protein requirement of adult animals is generally reliable. It appears, however, that some of the nitrogen that should normally be found in the excreta is escaping. The exact form of this nitrogen and how it escapes is not known, but an animal that is fed the level of nitrogen which is slightly in excess of its requirements, registers a positive nitrogen balance. That is, the animal is excreting in the droppings less nitrogen than it is eating. If all this unaccounted nitrogen were constantly being added to the animal, body weight should rise significantly. This enigma leads us to question whether

nitrogen balance is a useful tool in estimating the protein requirement of a bird or whether it always yields an underestimate of the protein requirement. A possibly more reliable system of measuring the protein requirement of an adult animal would be to take groups of animals and feed them different levels of protein over a long time. If an animal loses weight because it is not receiving enough protein, then that animal would be deficient in protein. Any animal fed a slightly higher level of protein which does not have a net loss of weight would be said to have adequate protein in the diet. In this way, we are actually measuring the amount of nitrogen retained in the animal as body weight instead of trying to measure the amount of nitrogen ingested and excreted by the animal. This is a more reliable system to measure nitrogen balance because the amount of protein in the body must remain relatively constant if body weight is not to change unless the bird becomes fat. Over the long term, the changes in body composition should average out so that we don't have more than small variations in the body weight of an adult animal. This technique of measuring protein requirement has an additional advantage particularly in our work with psittacines. In work with Orange-winged Amazon Parrots, we prepared pellets which had different levels of protein. Birds were fed these diets for a period of time and then attempts were made to collect fecal samples which were not contaminated with food. We found this to be virtually impossible. Parrots were too proficient in gathering bits and pieces of food and carrying them around and dropping them on their cage bottoms. We found this to be a technical difficulty which was virtually insurmountable.

In order to bypass this problem, we would choose in our future experiments to use the body weight maintenance technique of measuring the protein requirement of adult birds. It is our proposal that we make diets with various levels of protein and then feed them to parrots over a period of one to two months, weighing the birds periodically to assess body weight changes. In this way, we can measure the protein requirement of these birds and compare it to data others have produced with species of similar size. This will give us some estimate whether the data in the literature are reasonable estimates or underestimates of the protein requirement of the adult birds. ●