



Cooperative Extension Service
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Understanding Pet Bird Nutrition¹

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The decision to own and care for exotic birds is a decision which cannot be taken lightly. A lot of responsibility has to be accepted because a pet bird is not a low-maintenance pet. All pet birds require at least some specialized care. Very few "beginners" know the answers to the questions that arise concerning the management, breeding, rearing, disease prevention, and proper nutrition of birds. The "survivors" in aviculture have successful aviaries because their teacher has been experience, coupled with trial-and-error. Sometimes this teacher is expensive and can result in thousands of dollars of investment being lost. "Beginners" can increase their general knowledge in aviculture and come up with answers to their questions by reading articles, traveling to pet bird shows, attending lectures and talking with people who have experience with pet birds.

Many of the problems such as poor health, poor fertility and hatchability, and decreased life span can be related to poor nutrition. Improper nutrition can leave the bird susceptible to many diseases and result in overall poor performance and lack of vitality. The term "improper nutrition" does not always mean undernutrition. It can also refer to overnutrition. Allowing any pet to consume more than they actually require can be just as bad and cause just as many problems for the owner as the deficiencies that develop from undernutrition. Today, believe it or not, many pet bird owners are killing their birds with kindness. Providing too much food (often referred to as treats) too

often and providing too much of a good thing (i.e., too little variety) is often the cause of the problem.

There are more than 8000 species of birds alive today. There will probably never be an ideal diet for all bird species. However, for the average pet bird owner a general knowledge about basic nutritional concepts and feeding can be of benefit when decisions have to be made. The following material provides information as a starting point for beginning pet bird owners who want to try and make the correct choices regarding the feeding of their birds.

What Provides the Backbone of Proper Nutrition?

To properly nourish a pet bird, balanced amounts of nutrients must be ingested, digested and absorbed into the body. The food that your pet bird eats is composed of a variety of ingredients and the ingredients are composed of nutrients. There are six major categories of nutrients: (1) water; (2) proteins; (3) carbohydrates; (4) lipids; (5) minerals; and (6) vitamins.

Because of the complex nature of these nutrients in the natural ingredients which make up your bird's diet, they have to be digested in order to release the building blocks from which they are made. Once these building blocks are released during the digestive process they

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can be absorbed into the body and nourish the trillions of individual cells in the bird. Therefore, any food that is eaten is really not yet inside the animal body until it is digested and the prepared nutrients are absorbed. Remember, the digestive tract is only a hollow muscular tube which stores and prepares the nutrients for absorption. If the feedstuff is not able to be digested, then the animal does not usually benefit from these nutrients the feedstuff contains. A healthy digestive tract is essential if an animal is expected to benefit from the nutrients in feedstuffs.

The Six Classes of Nutrients

Water

Water is the most important nutrient. Your pet bird can lose almost all of its body fat and stored carbohydrate, as well as over half of its protein, and still survive. However, a 10% loss of body water can cause serious illness. Without replacement of the water which is lost, death will result. Water provides a medium for digestion, absorption, transport, metabolism (actual utilization of the nutrients by the cells), and the removal of cellular waste products out of cells and eventually out of the bird in the urine and feces.

There are two basic sources of water, ingested and metabolic. Ingested water is that consumed by drinking and that which is contained in food. Metabolic water is the water produced when the food is utilized and can arise from carbohydrate, protein and lipid metabolism inside the cells. Some feedstuffs contain more water than other types of feedstuffs. For instance, fresh fruits and vegetables compared to dry seeds. When the amount of water consumed in food increases, the amount the animal drinks will usually decrease. Water consumption increases with increased salt intake, increased environmental temperature, increased activity and the consumption of dry feedstuffs. Attempts should be made to have clean, fresh water available to any animal at all times.

Protein

Proteins are very large, complex molecules which are made up of amino acids hooked together as links of a long chain. These linkages between amino acids are referred to as peptide bonds. Proteins in the body are constantly being made and broken down. When energy

is in short supply the animal has to use amino acids for energy. Amino acids have much more important jobs to do in animals than to be used for energy. Therefore, it is always necessary to have adequate carbohydrate and fat calories available for use as energy.

There are 22 different amino acids required by animals, and all animals require them at the cellular level. While about 12 of these amino acids can be made inside animal cells, the other 10 have to be consumed in the animal's diet. Without a sufficient dietary supply of these ten "essential" amino acids, the necessary proteins cannot be made by pet birds. The term "protein quality" is used to describe the amount and proportion of the essential amino acids in relation to an animal's requirement for each of these amino acids. Animal protein is of better quality than plant protein. This means that the plant proteins do not have an amino acid profile that resembles the amino acid make-up of the proteins in your pet bird. Therefore, it is necessary to give your pet bird a variety of feedstuffs so that the amino acid(s) that are somewhat deficient in one feedstuff can be obtained from another feedstuff that has more of that particular amino acid. Usually, plant proteins are deficient in the amino acids methionine and lysine with regards to your pet bird's amino acid requirement. It is best to keep the protein intake of your pet bird adequate but not in excess. Too much protein is often fed to pet birds and this leads to problems in the liver and kidney.

Carbohydrates and Fiber

A carbohydrate molecule is composed of repeating units of the simple sugar called glucose. Starch is the most common useable form of carbohydrate in the diet and is considered a soluble carbohydrate by nutritionists. Many glucose molecules are linked together just as the amino acids in a protein are linked together to form a long chain. The carbohydrate, starch, is stored by the plant in seeds for the immediate utilization by the young plant after the seed germinates. However, the seeds also furnish an excellent source of carbohydrate for pet birds to use as energy.

In the plant kingdom there is also another type of carbohydrate that is made up of repeating glucose units. This is a structural carbohydrate referred to as cellulose or "crude fiber". Unlike starch, cellulose cannot furnish energy to pet birds and is considered insoluble. Bacteria

in the digestive tract can utilize cellulose. The reason the bird is not able to utilize the cellulose is because the linkage (bonding) between the glucose molecules in the long cellulose chain is not able to be broken during digestion. Animals do not produce the enzyme called cellulase which can free the glucose for absorption. The reason some animals such as cattle and sheep (ruminants) can do well on grass is because their stomachs have the bacterial population that produces cellulase, and this structural carbohydrate can be utilized by the bacteria. The bacterial cells are then used by the cow or sheep as food. It is important to understand that even though crude fiber cannot be broken down for an immediate energy source, a proper amount of cellulose is necessary in the diet to promote normal movement of food through the bird's digestive tract. It also helps to provide the bulk which is necessary for normal droppings. As the crude fiber in the diet increases, the amount of water consumed by the bird also will increase.

Lipids

This nutrient group is composed of the fats and oils which are found in plants, especially in the seeds. These stored fats and oils in the seed furnish the energy necessary for the young plant to start its life processes as germination begins. Once the young plant starts to produce leaves, then photosynthesis occurs and the plant can manufacture and store more nutrients. These fats and oils are made up of fatty acids. These fatty acids do not link together to form long chains as happens with glucose to form starch and cellulose or with amino acids to form proteins. However, because of their chemical structure the fats and oils when used by animals for energy are known to furnish 2.25 times more calories of energy per unit weight than the carbohydrates and proteins. In other words, if a pet bird eats one gram of fat it gets 2.25 times more calories from the gram of fat than from 1 gram of protein or carbohydrate when they are used for energy. Therefore, it is possible for pet birds to become obese if they are fed seeds high in oil. An example is sunflower seeds.

The lipid in the diet is not only an excellent energy source but there are essential fatty acids that are needed by birds. Without the essential fatty acids in the diet there will be a reduction in egg size and hatchability. Also, poor skin covering and feather growth will occur. Overall growth is impaired, and the liver will have a

tendency to accumulate fat. Without lipid in the diet the bird cannot absorb the fat soluble vitamins A, D, E and K. Even though taste plays a somewhat minor role in a pet bird's eating habits, fats are added to animal diets to enhance palatability.

Minerals

Minerals usually make up less than 1 percent of the body weight of an animal. The majority of the minerals in the animal belong to a group referred to as the macro-minerals such as calcium, phosphorus, sodium, potassium, chloride, magnesium and sulphur. The requirement for these minerals in the diet is usually expressed as a percent of the diet because they are the most abundant in the diet. The word "macro" is a Greek word that means big or large. Therefore, the reason why some minerals are needed in large amounts in the diet is because these same minerals are found in animals in large amounts.

The minerals such as iron, zinc, copper, manganese, iodine and selenium are not found in the diet in large amounts and are called the micro-minerals. Sometimes these minerals are called trace minerals. These minerals are just as important to the well-being of the bird as those required in larger amounts. The word "micro" also is a Greek word and means small. When the nutritionist adds these minerals to the diet, they are added in very small amounts, usually in parts per million.

The functions of the macro and micro minerals in pet birds and all other animals is the same at the cellular level. Any nutrition text, whether basic or advanced will give the functions of the minerals in the body. The signs of deficiency also are given.

Vitamins

Vitamins are divided into two groups based on their solubility rather than their function in the animal. These groups are: fat soluble and water soluble. The fat soluble vitamins are going to be associated in plants and animals where fats and oils are located and stored. Whenever feedstuffs are processed and the lipid is removed, the fat soluble vitamins also are going to be removed. An example of this is when soybeans or corn are processed and the oil is removed. The meal remains and has a low lipid and fat soluble vitamin content.

The fat soluble vitamins are known as vitamins A, D, E and K. Because in the bird they are stored in association with fat, it usually takes an extended period of time to develop a deficiency when the diet has a very low fat soluble vitamin content. However, deficiencies can and do exist in pet birds, especially when the owners are not providing the bird with enough variety of feedstuffs in the diet. The ability of fat soluble vitamins to be stored has its advantages, but this ability also has its disadvantages. The possibility of hypervitaminosis exists. In other words, the fat soluble vitamins can be toxic if consumed in large amounts. This can happen when oversupplementation or over-fortification occurs, especially with the fat soluble vitamins capable of being administered through the drinking water. Overfortification with vitamins A and D should be of major concern. Normally, if pet birds are provided with a variety of fresh, wholesome feedstuffs, supplementation of the vitamins is unnecessary and is an additional expense that can be avoided. The age, health, present diet and breeding status may help determine if dietary supplementation is necessary.

The water soluble vitamins are the B complex as well as Vitamin C. These vitamins such as thiamin, riboflavin, niacin, pyridoxine, etc., can not be stored in the animal because they are soluble in water. They must be in the diet on a continuous basis. The B-complex vitamins are involved in the regulation of energy metabolism in the cells and participate in so many biochemical reactions that it is difficult to separate out their individual deficiency signs. These vitamins are sometimes referred to as the "sparkplugs" in the cell that help the enzymes utilize the energy provided by the fuel nutrients (i.e., carbohydrates, lipids and protein).

Life in animals and plants arises from the millions of organized biochemical reactions occurring simultaneously each second in trillions of cells. These cellular reactions are dependent on enzymes, and most of the enzymes require assistance to carry out these reactions. These helpers are the B-complex vitamins. Therefore, where there is life there are enzymes and B-vitamins. It should be obvious then that the richest source of B-vitamins in plants and animals should be located where there are the most life processes (biochemical reactions) occurring. In other words, the highest concentrations of B-vitamins in plants and animals are usually found in the tissues doing the most living. In animals these tissues would be the liver,

kidney, muscle, brain, etc. Rich sources of B-vitamins in plants are the leaves, the germ of the seed, and young sprouts. Therefore, keeping this in mind will help the beginning pet bird owner select proper food combinations.

The numerous cellular functions of both the fat and water soluble vitamins, along with the signs common in their deficiencies, are discussed in detail in basic nutrition books. As with the minerals, the functions of the vitamins at the cellular level in animals are similar. To say that one mineral or vitamin is the most important in birds is misleading. Each of the individual minerals and vitamins is important. No mineral or vitamin is more or less important than any other.

What Is the Best Diet to Feed My Pet Bird?

A balanced diet, sometimes referred to as a complete diet, is the best type of diet to feed to any companion animal. A balanced pet bird diet contains a combination of the nutrients to meet the nutritional requirements of the bird. Of course, the diet being fed should furnish the nutrients required by the animal as related to age, health, breeding status, etc. For instance, a diet designed for a growing bird or one designed to maintain an older bird is not sufficient for breeding purposes because the nutritional requirements change.

The knowledge that now exists regarding the proper nutritional requirements of pet birds lags behind other animal industries. There will probably never be one perfect diet available for all the pet birds available today. The nutrient needs and eating habits of the various birds are different. Many commercial companies manufacture and sell properly formulated bird diets (pellets, crumbles, etc.). In the long run, these are the best - but may not be as much "fun" to feed or watch the pet bird eat.

If I Can't Feed a Balanced Diet to My Pet Bird, Then What Should I Do?

The nutrients that animals need are found in natural feedstuffs. These feedstuffs can be divided into the four common food groups. These are: (1) grains; (2) fruits and vegetables; (3) protein sources; and (4) dairy products.

A wide variety of feedstuffs (seeds) are available in grains (group 1). The seeds will be used mostly by the bird as an energy source. The majority of energy will be from the starch. The seed hull is mostly complex insoluble carbohydrate and is of very little nutritional value. In fruits and vegetables (group 2), a greater concentration of vitamins is present than is found in grains. This is especially true for vitamins A, E, K and the B-complex. Even though vitamin A is not present in plants, a plant pigment known as carotene is present and is converted into vitamin A. Usually, most green leafy vegetables and colorful vegetables contain carotene.

Protein sources (group 3) include beef, fish, chicken, pork, eggs, beans, peas, etc. Animal tissue and animal products, such as milk and eggs, contain vitamin B12. Only microorganisms can make B12 and yes, the B12 that is in your body and other animals was produced by these microorganisms. Remember, nothing that grows out of the earth or flies, swims or walks can synthesize vitamin B12. This group of feedstuffs supplies the protein and essential amino acids required by pet birds. Meat also contains other nutrients such as vitamins and trace minerals. In dairy products (group 4), protein, essential amino acids, vitamins and minerals (especially calcium) are furnished in the diet. If it is not possible for a pet bird owner to provide a complete-pelleted-balanced diet each day, then the bird should be furnished with the feedstuffs found in these four major food groups along with fresh water. The nutritional requirements will be met if the bird eats some feedstuffs from each group. Normally, this type of feeding practice results in excessive nutrient consumption (above the requirement) and wastage.

Can I Feed My Pet Bird Only Seed?

The answer is no. Do not feed pet birds only seeds. Seeds do not contain sufficient nutrients to sustain a healthy bird or provide adequate nutrients for reproduction. Seeds are very low in calcium. The requirement of calcium for growing birds is probably close to 1 percent of the diet or 10,000 parts per million in the diet. Seeds contain only 200 to 500 parts per million (0.02 to 0.05 percent) calcium. Therefore, your pet bird will be very deficient in calcium. Bird seeds are also deficient in protein, and the quality of the protein is poor. Sodium, zinc and manganese are deficient. Carotene (vitamin A) and vitamin D are deficient. A

lack of vitamin D is known to make the calcium deficiency worse. Seeds are higher in phosphorus than in calcium. This imbalance of calcium to phosphorus will cause severe problems in the bird if all the bird eats is seed. Sunflower seeds are well-liked by parrots, and there are 8 parts phosphorus to every part calcium in this seed. Many seeds are rich in fat, and this can lead to obesity in the bird because they will overconsume on energy. Birds usually eat to satisfy an energy requirement; however, because the seeds are consumed and swallowed whole, the bird overconsumes before the desire to stop eating occurs. Many seeds are deficient in the essential fatty acids. All seeds are also low in iodine and goiter can develop. If seeds are going to be fed, then a variety of other feedstuffs also should be furnished. It is important to realize that pet birds can be fed all seed diets for many years before they begin to look unhealthy. Usually, by the time a pet bird really looks sick it is not long before the bird will probably die. This is true for nutritional, bacterial and viral-related diseases.

What about "Fortified" Seed Mixtures?

When a feedstuff is fortified it means that something has been added to it to hopefully increase the nutritional value. Many manufacturers supplement seed-based diets in a variety of manners. One of the least efficient methods is coating the seed with nutrients (usually sprayed on the outside of the hull). Waste occurs and very little of this nutrient is consumed in this manner. Many vitamins and trace minerals are added to seed mixtures in this way. A pellet which contains adequate nutrient levels is sometimes added to the seed mixture. The pellet usually supplements the seed by providing the bird with what is lacking in the seed. However, the pet bird owner does not really know if the bird is being selective and eating more of the seed than the pellet.

What Are the Common Problems That Pet Bird Veterinarians See Today That Are Caused by Feeding?

Today, obesity is a big problem in the pet bird. The owner of the pet bird wants to shower the bird with affection and one way to show affection is to shower the bird with love and care. Many times the love is

accompanied with too many "treats". Energy intake is increased and the bird becomes obese. Fat deposits inside the body occur around the vital organs, and the reproductive tract is infiltrated with fat. This can cause problems with reproduction. Also, a fat bird is subject to liver and pancreas problems.

Another problem that is commonly seen is caused by not allowing the bird access to a variety of foods in the four basic food groups. An example is providing only seeds. This can lead to severe nutritional deficiencies. Variety is sometimes said to be the spice of life. However, the nutritionist knows very well that in animal nutrition variety is essential for life.

Too much protein consumption is another problem that occurs often in pet birds. Any excess protein above the bird's requirement for amino acids will be converted to energy and used or stored. The nitrogen in the amino acids has to be handled in a very special way by the liver and then this nitrogen has to be excreted. The liver and kidney can be damaged from excess protein, especially if it is continually fed to the bird in large amounts.

Pet birds enjoy eating as much as any companion animal. Hopefully, having read this information, you now will enjoy feeding a variety of feedstuffs to your pet bird. By providing a variety of feedstuffs, you are allowing your bird access to the nutrients necessary for good health.