Macaw Parrot Nutrition

Find out the nutrient requirements for this bird species

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Military Macaw
Courtesy Michael Patterson, Indiana

Water: Water is often the forgotten nutrient, but it is the most essential nutrient for most birds. It is used to maintain cells, skin integrity, food digestion, hygiene and metabolic processes. When environmental temperatures rise, water requirements increase as the bird evaporates water from the skin and through its breath. A macaw may drink 10 times as much as normal in very hot weather, whereas a macaw with access to a surplus of fresh fruit and vegetables (more than 85 percent water) drinks less water than otherwise expected.

Individual birds also vary widely in water consumption preferences; some individuals drink much more than others. This extreme variability in water consumption renders the results of medicated drinking water dubious at best. (Many avian veterinarians advise against the practice of medicating a bird's water.)

Energy Needs
The activity level of a macaw — as with a human — influences its energy needs. The needs of a wild bird typically exceed those of a companion bird because wild birds expend more energy foraging for food, regulating their temperature and defending themselves.

The only known daily energy requirements for companion psittacine species are for budgerigars. For a variety of poultry species, there is a good correlation between daily energy expenditure and the bird's basal metabolic rate (BMR). Calculations of the BMR are made based on weight to derive the kilocalories the bird needs per day. We assume that companion birds' needs can be similarly judged. These values are more critical in sick birds when special formulas are administered.

Of course, the amount of food required depends on the energy density of the food (rich in fats or deficient) and its digestibility. Birds allowed free access to food generally eat an amount that satisfies their daily energy expenditure, adjusting the amount of food consumed according to its energy density. However, the regulation of food intake is not always perfect — obese birds exist, especially when a high-fat diet is present . Activity levels and behavioral factors (boredom, stress) might play a role in food intake, too.

Protein and Amino Acids: Protein is the main component of most cells, and amino acids are the building blocks of proteins, which build muscle, connective tissues, feathers and skin. Birds generate many amino acids, but avian species, including macaws, are generally unable to synthesize the essential amino acids arginine, isoleucine, leucine, lysine, methionine, phenylalanine, valine, tryptophan and threonine.

These birds might also require dietary glycine, histidine and proline to meet metabolic demands, as well as enough protein to meet nitrogen requirements.

In general, larger psittacines, such as macaws, require higher levels of protein.

Preliminary experiments with non-breeding African grey parrots suggest a requirement of between 10 to 15 percent protein in the diet. Because most domestically grown seeds have lower levels of protein, diets must be supplemented with higher protein foods such as soybeans, peanuts, or sunflower seeds.

The physiological state of the bird also mandates the amount of energy needed. For example, growing chicks and laying females require more fuel to meet their energy needs whereas a non-laying adult bird requires less. Growing birds need protein and amino acids to build up tissue as well as for maintenance. The fact that macaws are altricial (born without feathers and slow to mature) might increase their total amino acid requirements, compared to precocial birds like chickens (feathered and capable of walking shortly after hatch).

Molting and the generation of new feathers increase the need for adequate supplies of protein, too. Feathers are a large part of the protein mass of birds. When birds molt, the synthesis of new feathers requires amino acids, especially cysteine and amino nitrogen. Because feathers grow continuously throughout the day, part of the amino acids must come from

tissue protein between meals.

Birds increase their food consumption to meet the higher energy needs caused by new feather formation and the need to keep warm. With increased protein needs for feather formation, birds have a higher need for balanced amino acid intake as well. If the food has the correct balance of amino acids in relation to the amount of energy consumed, then feather development proceeds normally. If there are amino acids missing or other stresses while the feathers are growing, the feathers form poorly or show “stress bars.” For example, methionine deficiencies during chick growth or molting results in dark, horizontal stress bars on feathers.

Protein or amino acid deficiencies also reduce growth rates of chicks as well as the amount of skeletal muscle deposition. Amino acid imbalances can cause anorexia, and specific amino acid deficiencies can cause distinct pathologies.

Although it has been suggested that high levels of dietary protein cause renal dysfunction and gout, this is not supported by experimental evidence. In one study, there was no evidence of gout in cockatiels fed diets containing 70 percent protein for 11 months, but there were fatty masses in the liver. These fatty tumors were suggestive of liver damage.

Calcium: Calcium is used to mineralize bone, maintain metabolic equilibrium and calcify eggshells. Chickens laying daily eggs require only a small amount, 1.0 percent of the diet. Despite this low requirement, the seed commonly fed to companion birds typically does not have enough to meet the bird’s need.

We do not known if macaws are able to identify calcium-rich foods in order to match consumption to need. Observation of large numbers of macaws on clay licks or cliffs suggest they search out minerals in clay deposits when living in a relatively mineral-depleted environment. However, the calcium content of the clay might not be high, suggesting the parrots use the clay to bind to ingested toxins.

The requirements for other minerals besides calcium are not known.

Vitamins: Vitamin A, a fat-soluble vitamin, provides necessary components for vision, cellular differentiation and immune function. Vitamin A does not excrete from the body as easily as water-soluble vitamins, so vitamin A toxicities do occur in companion birds. Still, vitamin-A deficiency is far more common than Vitamin A toxicity.

Although we do not know how much vitamin A a macaw requires, we do know that a cockatiel can be maintained with a diet containing 2000 IU/kg.

Sources of vitamin A in the diet include plant and animal matter. Carotenoids from plants (green vegetables and corn) act as vitamin A precursors in chickens and cockatiels, so macaws should be able to use them as well. Animal foods such as eggs and meats provide vitamin A in the form of retinyl esters, which are considered highly available. Because vitamin A is so important, it has a narrow range for its requirement. That means too much is as bad as not enough. Choose safe plant choices for your bird’s vitamin A needs. These include sweet potatoes, winter squash, broccoli, mango, cantaloupe, carrots and kale or other leafy greens.

Other nutrients: Macaw parrots, like other species, need essential fatty acids and numerous vitamins and trace minerals beyond those already described. Because specific research information is unavailable, assumptions based on poultry literature are used to help formulate psittacine diets.

The fruits and nuts that macaws consume in the wild are very high in a variety of essential fatty acids, which might be necessary to optimize their skin and feather quality. This could be why they tend to do better with the addition of true nuts, not peanuts, to their daily diet.