

# Basic Nutrition for Amazon Parrots

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## Introduction

The Amazon Parrots belong to the order *Psittaciformes*, in the class *Aves*. They are characterized by their predominantly green color, with red, blue and yellow highlights, and their heavy hooked beaks.

They are credited with being a friend to the pirate who always seemed to be missing an earlobe. More recently they are accused of horrible crimes against the farmers of South and Central America such as crop destruction. Most of us keep them to entertain us, and to be our pets.

## Digestive System

Next to his color, the beak of a parrot is his most striking feature. This hooked structure is of very solid construction (Fig. 1) and has massive sized mandibles. Besides its obvious use in feeding, the beak is used as an aid to climbing and in behavioral display. The strength of the parrots beak is best judged during his feeding. A kernel of dried corn poses no obstacle. A hazel nut or an almond is cracked almost as if it were a sunflower seed. Obviously, perches, wood toys and pine molding can be reduced to toothpicks in a few days.

It seems that there is more to the beak than a mere feeding device. Many birds consume fruits, seeds, and nuts and their digestive systems are adapted to these foods without crushing beaks. Normally, most birds crack a seed and swallow the meat whole, or swallow it shell and all, letting the gizzard crush the object. Parrots, however, have their own method of particle reduction. The upper beak and tongue hold the food, and the lower beak grinds or shaves off pieces to be swallowed.

The tongue of parrots is markedly different from the tongues of other birds in that it is highly muscled. This strong

musculature is an aid to feeding. It also has a function in the well-known phonation of parrots. Normally a bird alters its vocal resonance by moving its glottis upwards and downwards. Parrots have the added option to use the tongue to alter the shape of the pharynx (the rear portion of the oral cavity) and shunt vocalizations through the nasal passages (Nottebohm, 1976).

The tongue of Amazons is broader at the tip than the base, bearing some resemblance to a thumb. It has shallow grooves in the central lateral edges. Salivary glands are in the back of the mouth (oropharynx), leaving the tongue dry. Taste glands are present on the surface of the tongue, but the density is not known. Hot and cold sensation also appears to be present.

Along with other feeding adaptations, the parrot has the ability to hold food in its foot and raise it to its mouth to eat. A majority of Amazons (71%) appear to use the left foot for feeding (Friedman and Davis, 1938).

The esophagus of parrots is typical of most omnivores and has abundant mucous glands. The crop is not as well developed as in many other seed eaters.

As in many other birds the Amazons' proventriculus, or glandular stomach, is lined with glands secreting pepsin and hydrochloric acid. These tubuloalveolar glands open into a collecting chamber that discharges by a duct into the lumen (food containing interior) of the proventriculus.

The ventriculus, or gizzard, is not of the muscular type as one would expect in a seed eater, possibly due to particle reduction by the beak.

The pancreas has two ventral and one dorsal lobe. The two ventral lobes may be fused at their posterior end. Each ventral lobe has a duct leading to an opening in the



Lisa McDaniel and Cousteau in an after-dinner chat.

Photo by Larry Williams

ascending duodenum, one in front and the other behind the left hepatic duct. The dorsal lobe is composed of smaller lobes or lobules scattered around the beginning of the portal vein. The anterior lobule is the largest, and a duct goes from it to the ascending limb of the duodenum. The pancreas which secretes digestive enzymes, also secretes the hormones glucagon and insulin, making it an endocrine organ. Both are used in the regulation of blood sugar levels.

Parrots have no gall bladder. Bile from the liver travels down the bile ducts directly to the duodenum. In relative length, villi structure, and gland abundance, the Amazons' duodenum is similar to those of other birds. The rest of the intestine is equally typical except for the complete absence of ceca. Ceca are outpocketings of the large intestine which may have functions in fermentation of cellulose, water absorption and bacterial production of certain vitamins.

## General Nutrition

We need to know a little about general avian nutrition before we can discuss Amazons, specifically. Birds like humans have a single stomach and are called monogastric. This makes their dietary nutritional requirements more critical than those of polygastrics or ruminants (cows, sheep). Very little information is available on the nutritional requirements of any birds other than domestic poultry. However, we shall try to make some generalizations.

Water is essential for all birds, but can be supplied by various means. A part of this water can be supplied by succulent foods. Parrots do need fresh drinking water.

Carbohydrates (starches and sugars) are provided by seeds, cereals and tubers. Starches are polysaccharides or long chains of monosaccharides. The most important monosaccharide or free simple sugar is glucose. It circulates in the blood, is trans-

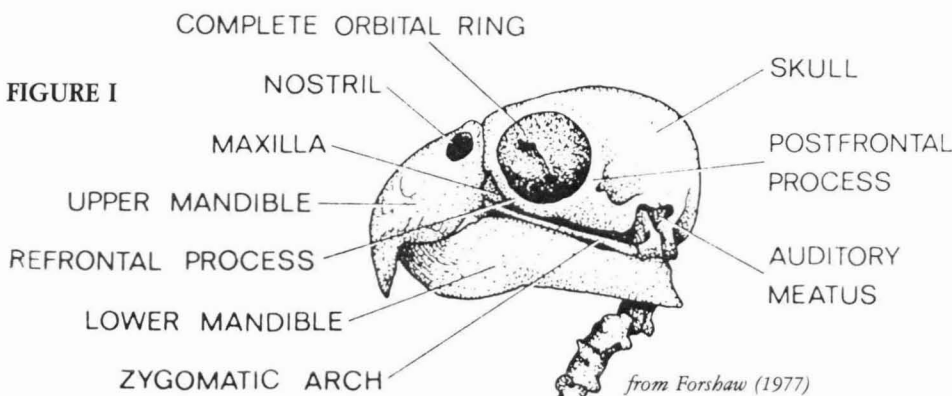


FIGURE 1

from Forshaw (1977)

ported across the cell membranes, and is utilized in oxidative metabolism as a source of energy. Glucose can be made metabolically by gluconeogenesis, or can be obtained from the breakdown of polysaccharides. Fructose and other monosaccharides are less important except to some fruit eating birds.

Birds are able to utilize fats and oils. Triglycerides (glycerol plus three fatty acids) appear to be utilized more readily than free fatty acids. The requirement for an essential fatty acid (usually linoleic acid) is generally accepted. Linoleic acid is abundant in most seeds and generally need not be added to the diet.

Protein requirements are not only quantitative but also qualitative. Proteins are made up of amino acids which are put into two categories: essential and non-essential. The body cannot synthesize enough of the essential amino acids to meet its requirements. The non-essential amino acids can be synthesized from the essential ones, but the metabolic cost of this synthesis can be excessive. So all of the essential and most non-essential amino acids should be provided in the diet.

Most essential amino acids are the same for all monogastric animals. They are arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. In addition, glycine is needed by birds because it is a part of the uric acid molecule that facilitates nitrogen excretion.

The main symptom of a protein deficiency or of an amino acid deficiency is essentially poor growth. A deficiency of the amino acid lysine can cause a loss of feather pigmentation.

Vitamins for birds, as for all life, are essential and some act as coenzymes in biochemical pathways. All captive birds should have vitamin supplements added to their diets. Marginal deficiencies, in general, can result in retarded growth, poor egg production, and hatchability. Specific and serious deficiencies in chickens can result in dermatitis, diarrhea, deformities, paralysis, respiratory difficulties, internal hemorrhages, and death. Some of these have been seen in caged birds also.

Minerals are classified as major or trace according to their requirements. The major minerals include calcium, phosphorus, sodium, potassium, magnesium, chlorine, and sulfur. Trace minerals are iron, copper, magnesium, zinc, molybdenum, iodine, chromium, selenium, and fluorine. When deficient the major minerals can cause serious problems. Trace mineral deficiencies are harder to induce because of the small amounts needed. Selenium, molyb-



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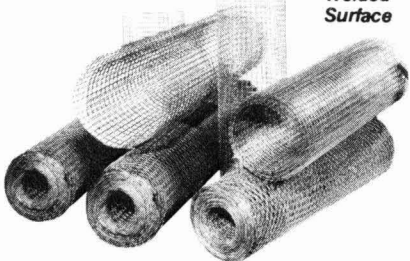
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denum and fluorine deficiencies have never been seen in birds.

### Natural Diets

The only way to determine the natural diets of birds is to do field studies. The most obvious and accepted methods is by direct observation by workers who sit in the habitat of a given bird and watch it feed. Species of food, part eaten, how much, how often, time of day and year, and number of individuals feeding are all recorded. Table 1 gives an overview of the observations obtained by this method. Most of the Amazons are seen eating fruits, berries, seeds, blossoms and leaf buds, specific examples are listed.

### Captive Diets

The idea of captive diets has been approached in many ways. I would like to relate some of the most commonly accepted diets with little comment on their relative merit. There is no scientific data available to analyze their virtues.

I think everyone agrees that supplemental calcium is necessary for breeding and growing birds and that supplementation of all birds is a good idea. It is usually supplied in the form of a mineral block, cuttlebone, in grit, or in a powdered form mixed with a supplemental food.

There are many commercially prepared vitamin mixes. Most are adequate but vitamins K & A are the most often neglected. Vitamins are usually mixed with water, and should be changed regularly because they lose their potency. One representative vitamin mix is mixed one drop of vitamin to one ounce water. One milliliter of vitamin mix contains the following:

Vit A . . . . . 3000 I.U.	Vit B <sub>1</sub> . . . . . 600 mg.
Vit D <sub>3</sub> . . . . . 100 I.U.	Vit B <sub>2</sub> . . . . . 300 mg.
Choline . . . . . 5 mg.	Vit B <sub>6</sub> . . . . . 150 mg.
Vit C . . . . . 3 mg.	Linoleic Acid 140 mg.
Niacinamide . . 3 mg.	Folic acid . . . 140 mg.
Vit E . . . . . 1 mg.	Vit B <sub>12</sub> . . . . . 10 mg.
Pantothenic	Vit K . . . . . 7 mg.
Acid . . . . . 1 mg.	

Grit is not a necessity for Amazons and most can live their entire life without consuming any. Although Galvin (1979) has encountered a few Amazons that do require it for proper digestion. Whole undigested seeds could be seen in the feces in these cases.

There are two recipes commonly used to formulate the main diet for Amazons. One was suggested by the late Duke of Bedford.

2 parts	Canary Seed
1 part	Millet
1 part	Oats
1 part	Hemp
1 part	Sunflower Seed
1 part	Peanuts
	Fruit Daily

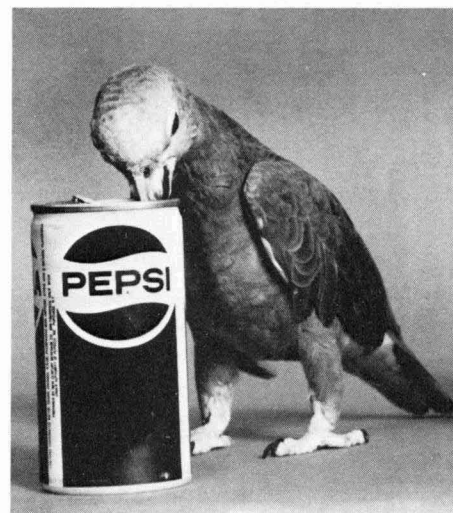


Photo by Larry Williams

*Cousteau, please, pop for parrots is not on the list.*

The only problem I see with this diet is the size of the canary seed and millet. I have seen a few Amazons eat millet sprays, but many appear to prefer starvation to a canary-millet mix.

The diet that is most widely accepted in this country is a mix of varying quantities of the following seeds:

- Sunflower seed
- Safflower seed
- Peanuts
- Hot Red Peppers
- Corn
- Squash Seed
- Kaffir
- Milo

The Kaffir and Milo seeds are used occasionally and the peppers are improper in the Amazon diet according to many. The reason usually cited is that it will give them indigestion. But the birds that I have seen consume it, do it with great zeal without regard to the possible digestive consequences.

In addition to the basic diets many people have supplementary mixes. These usually contain a cereal, a fruit and/or vegetable. One such recipe was given to me by a veterinarian-breeder several years ago.

- 1 part Rice
- 1 part Wheat
- 1 part Barley
- 1 part Oats
- 1 part Corn
- Plantain or
- Banana Honey

The grains are boiled until soft, the fruit and honey are added for taste.

Along with these supplements many other foods can be fed for you and your bird's enjoyment. They are vegetables, fruit, eggs, yogurt, meat, fish, poultry, dog biscuits, canned cat food. Richard Rundell in "Zoo and Wildlife Medicine" (1978) recommends dry kibbled dog food in addition to fruit and vegetables as supplements.

These supplements are important also in

the color of birds. Many of the bright colors in your bird are carotinoid pigments. They are taken from food and incorporated into the feather as it grows. Without these pigments the colors are lost. Flamingos become quite white after molting when pigments are absent in the diet. They are responsible for yellows in the green feathers, oranges, reds, and violet.

Because there is no scientific data on feeding your Amazon, it is best to use a common sense approach. If it's good for you it is probably a good supplement for your bird. Milk is the main exception. Birds have lactase, the digestive enzyme necessary to break down lactose in milk but not enough in the G.I. tract to handle large quantities. Without the enzyme, the lactose in milk is not broken down and absorbed in the digestive tract and can cause diarrhea. Of course excessive salt or sugar is not good for any animal.

This variety in menu is probably not necessary, but it can provide a healthy change in your bird's daily existence. It can supply them with certain pigments for their feathers. There can be therapeutic value for some birds, a bird crunching carrots, celery, or oats may not pick feathers or perches as much. Plus there is a definite entertainment value for you as your Amazon learns to eat new foods in new ways.

TABLE 1

Food Preferences of Amazon Parrots

Species/Common Name	Observations
<i>Amazona agilis</i> . . . . .	Plantain
Black-Billed Amazon	Pimento Seeds
<i>Amazona albifron</i> . . . . .	Figs
White-Fronted Amazon or Spectacled Amazon	Corn
<i>Amazona amazonica</i> . . . . .	Palm Seed
Orange-winged Amazon	Hog Palm Fruit
Orange, Mango, Swamp	Immortell Seed
<i>Amazona autumnalis</i> . . . . .	Palm Fruits
Red-lored Amazon	Citrus Fruits Mango Fruits
<i>Amazona barbadensis</i> . . . . .	Organpipe cactus fruit
Yellow-shouldered Amazon	Mangos
<i>Amazona fischeri</i> . . . . .	Wild Figs
Lilac-crowned or Finsch's Amazon	Corn Bananas
<i>A guildingii</i> * . . . . .	Pennypiece Fruit Bullet Fruit
<i>Amazon leucocephala</i> . . . . .	Palm Seeds
Cuban Amazon	Pine Shoots & Seeds
<i>Amazona ochrocephala</i> . . . . .	Pereskia
Yellow-Crowned Amazon	guamacho
Double Yellow Amazon	Curatella
Tres Marie Amazon	amercana Kanakudiballi fruit
<i>Amazona pretrei</i> * . . . . .	Araucaria seed
Red-spectacled Amazon	
<i>Amazona ventralis</i> . . . . .	Corn
Hispaniolan Amazon	Palm Seeds Guayacan Trees, Cacti Guava, Banana, Plantain
<i>Amazona vinacea</i> . . . . .	Araucaria seeds
Vinaceous Amazon	

<i>Amazona viridigenalis</i> . . . . .	Corn
Green-cheek or Mexican Red Amazon	Pine seeds
<i>Amazona vittatta</i> . . . . .	Sierra Palm Palm Seeds

\*endangered species

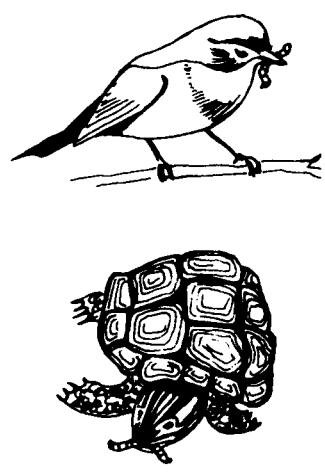
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