

Minerals and Grit: of Vital Importance

by Rosemary Low

NATURAL history films have revealed many wonders of nature to the world. One of these is the sight of macaws, Amazons and Pionus parrots feeding at clay licks in South America. It is one of the most colourful spectacles in the world, and several accessible licks have become famous ecotourism destinations.

Parrots queue to take their turn at feeding on the clay, exposing themselves to predators in order to do so. Just why is this so important to them? Seeds and plants contain strychnine and other poisons. The popular theory is that the chemicals bind to the clay or soil, preventing them from being absorbed through the gut wall.

Whatever the reasons for individual parrots visiting a clay lick every few days, the birds know instinctively that they need to eat clay or earth. There might be more than one reason for this, such as mineral content. Often I give my Yellow-fronted Amazon sowthistle or chickweed with roots and soil attached. The first thing she eats is the earth. I suspect that she, too, knows instinctively that it contains essential minerals.

Our knowledge regarding the role that minerals play in food digestion, nutrition and general health is not fully understood at present. Until we know more we should “play safe” by ensuring that minerals are available to our birds. The two most commonly used forms are powdered mineral supplements made for birds, and mineral grit.

In recent years there has been some debate regarding whether grit should be offered to parrots and other seed-eating birds. The myth has sprung up that it is harmful. On post mortem of some parrots and seedeaters the gizzard has been compacted with grit. The conclusion has been that this was the cause of death. Today, perhaps as a result of this, many breeders and pet bird owners do not feed grit to their birds. But perhaps they are withholding unknown substances of value to them.

An acquaintance of mine obtains a certain kind of clay that he adds to the food of parrot chicks he hand-rears. He is convinced that it has highly beneficial qualities. There is no doubt that clays from certain areas possess almost miraculous curative powers. Take pascalite, for example. Formed more than 30 million years ago at the top of the Big Horn Mountains of Wyoming in the USA, it is described as a rare calcium bentonite. Over the centuries it captured the calcium from the limestone formation and many other minerals known to be vital to life in trace amounts. These include manganese, cobalt and copper, magnesium, aluminium, sodium, chromium, cadmium, phosphorus, iron, potassium and vanadium. Slowly cooling temperatures converted these to oxides, readily absorbed in the human metabolism and almost certainly also in the avian metabolism. The pascalite was further enriched by plant life, and tissue, bones and hide of animals that added proteins and amino acids.

While perhaps few clays are as rich in minerals as pascalite, its description gives an indication of the kind of elements they contain. Magnesium, for example, is reported to be involved in virtually every cellular activity. With aluminium, it helps to regulate the human digestive system (and presumably therefore that of birds too) and controls both diarrhoea and constipation. (Is this why some sick birds over-consume grit?) It joins with calcium in the prevention of kidney stones and helps to regulate blood sugar.

I believe that grit is beneficial to the well-being of most seed-eaters. I suspect that those which died with the gizzard compacted with grit were suffering from a digestive problem that caused them to consume excessive quantities. Or they had contracted some other illness. Thus it might be advisable to remove grit from sick birds.

A friend recently showed me a photograph of the gizzard contents of a cockatoo on post mortem. The gizzard was full of unshelled pine nuts. They had caused a compaction that sadly led to the cockatoo's death. He believed that, in the absence of grit, the cockatoos had swallowed the small nuts whole. He commented: "A £600 cockatoo died for the lack of 10p worth of grit."

Renowned American avian vet Greg Harrison states that in the USA the provision of grit is not favoured because, if it is too freely available, it leads to over-consumption

and obstructive gastritis. I find this difficult to believe. For decades all small seed-eating birds in the UK, including Budgerigars, Canaries and Cockatiels, as well as finches, normally had access to grit without such results. He notes that in Australia it is offered to companion birds with few ill effects.

It is also offered to aviary birds. In their book *A Guide to Cockatiels*, Peggy Cross and Diana Andersen state that providing minerals and grits “is one of the most neglected areas of feeding. Birds require soluble and insoluble grit in their diet. Insoluble grit aids in digestion and is particularly important for birds kept in cages or suspended cages without access to sand and dirt floors. Soluble grit is the major source of minerals in a bird’s diet and is essential for the well being and successful breeding of all birds.” These authors also believe that lack of salt (sodium) and iodine might predispose some birds to pluck themselves.

In his encyclopaedic work, *Avian Medicine, Principles and Application*, Greg Harrison states: “Grit is not required in the normal, healthy psittacine or passerine bird. Grit, defined as a granular, dense, insoluble mineral material (generally granite or quartz) is required in birds that consume whole, intact seeds.”

Here we have two totally conflicting statements, one from a vet, the other from breeders! I sought comment from an avian vet who is also a bird keeper. When I asked Dr Stacey Gelis from Melbourne for his views, I found that they coincided with mine. He told me: “Grit is not essential in parrots, but that is not to say that they do not benefit from it or, indeed, do not like it. I think that birds benefit from eating soluble grits, especially ground-feeding species. One point worth mentioning is that birds which do not dehusk their seed often have thinner walls to their crops if not fed grit compared to those that are offered grit.”

Pigeons, chickens, pheasants, etc., come into the category of birds which swallow grain whole and therefore undoubtedly need grit. If parrots and finches have no need for grit, why is it that wild birds eat it? Many of those whose crop contents have been examined for scientific studies, were found to contain grit. In Australia these include Red-cheeked Parrots (*Geoffroyus*), Adelaide and Northern Rosellas, and Galahs and Greater Sulphur-crested Cockatoos. Three of the latter collected in New South Wales

had swallowed small quartz pebbles. The crop contents of nine Many-coloured Parrots (*Psephotus varius*) collected by scientists included fine grit, sand and charcoal. Fine grit and sand are swallowed by various species of *Neophema* parakeets.

Of interest is a report I read that even lorikeets have been seen to pick up grit and swallow it. As they are mainly nectar- and pollen-eating birds, grit is not used in the gizzard (also called the ventriculus) to grind food, as it is in seedeaters. The gizzard is poorly developed in lories. I suspect that many birds seek grit for the minerals they contain.

In Greg Harrison's opinion, birds fed formulated diets (pellets and extruded foods), are unlikely to need grit, either soluble or insoluble. This is presumably because these soft foods are not ground up in the gizzard and because, one would hope, the necessary minerals have been added to the food. He believes that grit is also unnecessary for birds that hull seed, because the kernel is easily acted upon by the digestive enzymes.

Different kinds of grit are packaged or offered by bird food manufacturers. Mineral grit consists of a variety of small stones such as limestone and oystershell, which are made of calcium carbonate, also quartz and charcoal (soluble). Calcium carbonate is digested by acids in the proventriculus and is therefore of no use in grinding down food, but is a good source of calcium. The proventriculus is the first part of a bird's stomach, where digestive enzymes act upon the food before it goes to the gizzard.

In his book, Greg Harrison rightly points out the possible dangers of feeding crushed shell (such as oystershell) derived from contaminated sources – contaminated for example, with heavy metal. The same is true of cuttlefish bone. A risk exists, but how great is impossible to measure.

This poses the question: Why feed cuttlefish bone anyway when one can use a variety of calcium supplements specially formulated for birds? Calcium cannot be absorbed without Vitamin D in the diet or unless the bird has access to sunlight. In theory, then, a bird fed mainly on seed or nothing but seed and kept indoors would gain little benefit from cuttlefish bone as it would be unable to absorb the calcium it contains.

However, I always ensured that my breeding pairs had cuttlefish bone available. This is because of the enthusiastic, almost desperate, way in which females consume it before they lay. I have rarely seen males eat it. Females instinctively know when they need it. The same might also apply to grit.

An effective source of calcium is of vital importance to a laying female. Breeders do not need to be told this but sometimes it takes a tragedy to underline the fact. Just study the photograph of a Jardine's parrot (*Poicephalus gularis*) on post mortem. The cause of her death was all too clear on looking at the quality of the shell. It was so thin the unfortunate female could not pass the egg. Not for one moment am I suggesting that one should rely on grit as a source of calcium but I do believe that calcium should be available to females in three forms: grit, cuttlefish bone and a calcium supplement containing the vital Vitamin D.

Some bird breeders might feel it is pointless to offer grit because so little is consumed. However, a typical grit product contains several kinds of stones. The bird might select the kind it needs and leave the rest. Thus the grit container should be completely emptied and refilled at intervals.

Grit does have some specific uses, as in the treatment of heavy metal poisoning. Calcium-EDTA is commonly used to treat this condition. When it is caused by lead poisoning (such as when swans swallow lead fishing weights), administering a few pieces of grit can assist in their removal from the gizzard by reducing their size. Vets also believe that grit can be highly beneficial to a bird that is having a problem in the physical digestion of its food or one with a pancreatic dysfunction. The role of grit would be to improve the surface area on which the digestive enzymes act.

Enzymes cannot function properly if the diet is deficient in certain minerals or trace elements. Birds need the following trace elements in minute proportions: zinc, iron, iodine, manganese, sulphur, selenium, cobalt and molybdenum. These are metallic and non-metallic elements not found in foods, or found in infinitesimal quantities (eg, molybdenum and iron are found in some foods) – but they are probably available in typical bird grit mixtures, also in powdered mineral supplements. Birds fed mainly on seed and kept without access to fresh soil or green plants with roots and soil, or not

given mineral supplements, will be deficient in trace elements. A deficiency of manganese, for example, can result in dead-in-shell and premature ageing. The major elements, such as calcium, phosphorus, sodium and chlorine, are also found in grit. Sodium, for example, assists digestion and chlorine is said to help prevent excessive deposition of fat.

Perhaps grit is going out of fashion because today so many bird keepers feed mineral supplements. It therefore no longer plays such an important role in keeping birds healthy as it did 20 or 30 years ago when the use of these supplements was much rarer and the choice limited. Nevertheless, I think that our birds should be the judges of whether or not they need grit. Make a little available, either in a small container or by sprinkling it on the aviary floor, and let them decide. It costs so little to provide and it might just be providing a vital element that they are not obtaining from other sources. Remember that mineral supplements can be overdosed with harmful effects but given the option to obtain grit, a healthy bird will not take more than it needs.