Avoiding Malnutrition in Pet Parrots

A guide for avian healthcare providers

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Meadow's Animal Healthcare
Foreword

The last century has seen an increasing level of pet parrot ownership and parrots are now one of the more common family pets. With this rise in popularity has come a similar increased level of veterinary involvement in their welfare. In the early days the majority of the birds in the ‘pet trade’ came either from importations or from poorly managed breeding establishments, and these birds were often presented to vets as emergency cases suffering from infectious diseases, immunosuppression, parasites and husbandry related issues. As a consequence, veterinary surgeons developed their avian clinical skills principally in diagnostic and therapeutic procedures. Veterinary care was geared towards the treatment of these acute cases and preventative medicine was not given much consideration.

In the twenty-first century the keeping of pet parrots is as popular as ever. Information about their care and well-being is instantly available on the internet, avian veterinarians have continued to make massive strides in their clinical and surgical abilities and governments have finally seen fit to help curb the exploitation of wildlife by banning avian imports. All have brought a huge decrease in the level of intrinsic avian diseases. One could be forgiven, therefore, for thinking that the life of a twenty-first century captive pet parrot would be good. According to experienced avian practitioners, however, malnutrition, a preventable disease, persists as the greatest contributor to captive parrot disease. It would seem that, despite all our modern sophistication, we haven’t moved very far in addressing that most basic aspect of captive parrot welfare – good nutrition.

On a more positive note, the last 30 to 40 years have seen big advances in the development and use of formulated diets for captive parrots – nutritional products embraced worldwide by the cat, dog and poultry industry many years previously. Whilst this is a large stride towards correcting the nutritional ills brought on by inappropriate feeding regimes, there is still a long way to go. In the UK we still lag behind the USA in embracing formulated diets, but with continued education and greater awareness of the problems of feeding a seed-based diet there is a gradual move within the parrot-keeping community towards feeding a nutritionally complete food. Pet parrots are kept primarily for the pleasure we derive from their company, and we should repay them by ensuring their lives are as free from disease as possible – and this includes preventing malnutrition. If you haven’t done so already, I hope that the contents of this booklet, based on over 30 years as an avian clinician observing and combatting avian malnutrition, encourages you to move away from feeding seeds and start to improve the health of pet parrots by using a formulated diet.

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Introduction

The general consensus among experienced avian practitioners worldwide is that: 

**Malnutrition still underlies up to 90% of all the clinical cases presented to vets and is the biggest cause of death in pet parrots**¹

Whether you are a professional in the avian healthcare sector, an aviculturist, breeder or simply a dedicated and caring owner, these figures are alarming. Malnutrition is, or should be, a preventable disease.

This booklet will help clarify some of the issues that surround avian malnutrition:
- Why do so many of our pet parrots suffer from malnutrition?
- What are the clinical signs and consequences of this malnutrition?
- What can we do to try to resolve the problem?

What is nutrition?

When discussing malnutrition it is important to clarify some simple definitions:
- Feeding should not be confused with diet.
- Feeding is what is put in the feeding bowl.
- Diet is what the bird actually eats from the foods that are fed.
- Nutrition is not another word for feeding.
- Nutrition comes from the assimilation of the nutrients from the foods that the bird actually eats. Food selection and quality obviously have a strong bearing on the levels of nutrients as does nutrient interaction within the body.

Basic nutritional requirements

The nutrients in a bird’s diet supply the energy to fuel metabolism and provide the building blocks for the synthesis of structural and metabolic components. These nutrients are generally categorised as:
- Macro-nutrients - fats, proteins, carbohydrates with dietary levels that can be measured in grams.
- Micro-nutrient - the vitamins and minerals that are needed in micrograms.

Nutrient requirements are not static and a bird’s physiological state is a major factor. The demands of growth, breeding, incubation, moultng and thermoregulation increase nutritional needs above those for maintenance and the pathological states of stress, disease and injury also modify nutritional requirements.

The theory of good nutrition is therefore to provide captive birds with a diet that will deliver adequate levels of both macro- and micro-nutrients, appropriate to the individual bird’s requirements.

¹ (Harrison G.J 2011) Journal of Avian Medicine and Science
What do we mean by malnutrition?

If good nutrition is:

‘the provision, through the intake of food, of appropriate levels of essential nutrients necessary to maintain healthy cellular function’

then malnutrition is a failure to provide these appropriate levels, predisposing to suboptimal cellular function. Suboptimal cellular function leads to organ and system dysfunction and subsequently to disease.

What, therefore, is nutritional disease?

Nutritional diseases are a range of conditions arising from this lack of optimal cellular function. Depending on which tissues are affected, and to what degree of severity, nutritional disease can express itself as a wide range of clinical pictures. These may present as an acute clinical emergency, for example hypocalcaemic fits, or they may be chronic, taking many years for the symptoms to manifest themselves, for example fatty liver disease. Some symptoms, such as the sudden onset of destructive feather behaviour, may even be acute manifestations of chronic disease.

Whilst many conditions are overt some are not and occur unperceived. Subclinical disease exists under the surface predisposing to secondary conditions, bacterial sinusitis being a common example. With these subclinical diseases the bird may survive but it will not thrive either physically or mentally, often due to a compromised immune system.
The current causes of avian malnutrition

The need to eat

In order to fulfill its nutritional requirements a bird needs to eat. A bird’s energy needs are considerably more variable than other nutrient requirements and a bird will eat to meet this primary demand. Activity levels, ambient temperature, and the energy concentration of the diet all influence a bird’s feeding rate.

In captivity there will generally be a reduced food intake due to the bird’s lower energy requirement and/or through eating more energy dense foods when compared with those eaten in the wild. As the need for other nutrients remains reasonably constant, however, the food consumed by captive parrots should have a higher proportional percentage of these nutrients to compensate for the lower consumption rates.

This simple concept has a fundamental part to play in the pathogenesis of avian nutritional disease.

Common feeding practices

The majority of pet parrot owners still feed their birds commercially constructed ‘parrot mixes’ which contain a variable range of grains, seeds and nuts, most of which would be foreign to their ‘free-living’ relatives. The seeds included vary from mix to mix, generally depending on their size and the target species at which the food is aimed. As well as the seed type, the quality is also often variable. This may be due to the source, with many being second-grade leftovers from the human food market or the way in which the seeds have been handled and stored.

The role of seeds in avian malnutrition

When offered these ‘parrot mixes’ the bird rarely consumes many of the different seeds, and those that are eaten provide inadequate levels of many of the essential nutrients required to maintain healthy cellular function.

Notwithstanding their type, size or source, it is well established that seeds are a deficient source of essential nutrients and whilst the nutrients available from each individual type of seed or nut vary, no seeds come close to fulfilling the dietary requirements of birds.
The nutritional content of seeds

Seeds provide a rich source of calories. This can be in the form of carbohydrates – corn, canary seed; fats – sunflower, hemp, rape, nuts; or protein – legumes.

Seeds are, however, considered to be missing **32 essential nutritional ingredients** from 8 groups:

<table>
<thead>
<tr>
<th>Vitamins</th>
<th>Vit A, Choline, Niacin, Pantothenic Acid, Riboflavin (B2), Cyanocobalamine (B12), Biotin (H), Vit D₃, Vit E, Vit K, Folic Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minerals</td>
<td>Calcium, Phosphorus (70% tied up as non-digestible phytates in plant products), Sodium</td>
</tr>
<tr>
<td>Trace Minerals</td>
<td>Selenium, Iron, Copper, Zinc, Manganese, Tin, Iodine, Chromium, Vanadium, Bismuth, Boron</td>
</tr>
<tr>
<td>Pigments</td>
<td>Chlorophyll, Canthexanine</td>
</tr>
<tr>
<td>Essential Amino Acids</td>
<td>Lysine, Methionine</td>
</tr>
<tr>
<td>Fibre</td>
<td>Mucopolysaccharides - soluble and insoluble</td>
</tr>
<tr>
<td>Vitamin Precursors</td>
<td>Beta-carotenes (converted to vitamin A in the liver)</td>
</tr>
<tr>
<td>Fatty Acids</td>
<td>Omega-3</td>
</tr>
</tbody>
</table>

**Protein:** Much is made of the level of protein in a diet. Whilst dietary levels of protein are relevant, it is protein quality, based on the profile of the essential amino acids, that is crucial. Ten of the twenty or so amino acids that make up proteins are recognised as essential in birds. The proteins found in seeds are deficient in a number of these essential amino acids; lysine, necessary for good growth and the sulphur-containing amino acids, methionine and cysteine, needed for feather growth, are major deficiencies.

**Calcium, Phosphorus and Vitamin D:** For effective bone growth, reproduction, and metabolic function a bird’s diet needs to contain around a 0.1% level of calcium – seeds have around 0.03%. Looking solely at the levels of calcium in a diet, however, can be misleading as calcium metabolism is inexorably linked with the levels of phosphorus within the diet. Renal excretion of phosphates requires an associated excretion of calcium ions and a diet containing a calcium-to-phosphorus ratio of around 2:1 is considered optimal. In broad terms, for seeds the ratio is around 1:4 or worse (1:7 in sunflower seeds) and this, along with a lack of active vitamin D in the diet (or exposure to UV-B light), is a big contributor to the calcium deficiencies observed in many pet parrots.

**Vitamin A:** Vitamin A is not found in plants - it is exclusively an animal, or synthetic product. What plants do have are carotenoids, the vitamin A precursors, and seeds are generally short of these vitamin A building blocks. Seeds can in essence, therefore, be considered to be short of vitamin A. Vitamin A is responsible and necessary for a number of major metabolic functions within the body.
**Parrots eat seed in the wild so what is the problem?**

We know from observations of wild parrots that for the majority of species seeds represent a high percentage of their dietary intake. So where does the problem lie?

- Birds, both wild and captive, eat to satisfy an energy need. Wild birds have a higher energy need than captive birds so consume a greater amount of food to meet this need. In so doing they eat sufficient food to acquire adequate levels of the essential micro-nutrients.

- Whilst the energy expenditure of captive birds is much lower than wild birds their need for trace elements for vital body functions is not. In fact, one might suggest that it may be higher as controlling stress (often captivity induced) necessitates high levels of micronutrients. For captive parrots, easy ‘fixes’ such as high fat seeds and nuts provide a readily accessible source of energy and satiation is generally reached quite quickly. As a consequence of the relatively reduced intake of foods, which themselves are of generally lower (micro)nutritional quality, pet parrots run into a micro-nutrient deficit.

- Wild parrots also have access to, and eat, a much wider range of food types and tend to eat semi-ripe seeds, rather than dried (the types available in most seed mixes), which have a much higher level of nutrients. Their diet is also augmented with fruits and invertebrates which provides them with a richer level of nutrition than caged birds on a standard seed diet.

**Diets for captive birds therefore need to be lower in energy, to stimulate appetite, and higher in trace elements, to take into account the lower ingested levels and greater needs, than those of wild birds.**

**The role of the bird in avian malnutrition**

‘Sunflower seed junkies’ - What compels a bird to eat the foods that it eats?

Why do certain parrots become fixated, almost to the exclusion of everything else, on eating only one or two type of seeds - the so called ‘sunflower seed junkie’? Dietary habits are based on a number of issues. Food availability is an obvious one and ease of procurement, palatability, and digestive capabilities are also important. Taste (although parrots have only around 350 taste buds compared with around 9000 for humans!), shape and colour have also been implicated in food selection. The quest for energy, as discussed above, has a direct effect on seed selection, but perhaps the most fundamental principle in formulating the eating habits of birds is learning.
Learning: A parrot is taught its dietary practices by both its owner and its peers. Exposure to a wide range of foods at an early age more readily creates an acceptance of new food types. By subjecting birds, particularly at the time of weaning, to a limited range of foods (in most instances seeds) we are effectively creating the principles for their dietary habits for the rest of their lives. In later life the introduction of new foods can often not be perceived as ‘food’ and ignored in preference for the bird’s accepted diet. Previous dietary experience has a considerable bearing on the eating habits in older captive parrots.

Even if we were to assume that a cultivated seed mix could be assembled that would meet the necessary nutrient requirements if completely consumed, preferential self-selection of favoured, but nutritionally unbalanced foods, would still result in an unbalanced, deficient diet.

The role of the owner

Owners, regrettably, must also take some of the responsibility for the existence and persistence of avian malnutrition. Nutritional misconceptions and inappropriate feeding regimes, such as those mentioned in the previous sections, perpetuate the problem.

‘Mother Nature knows best’ is a commonly held belief, but sadly it is a misconception that pet parrots will selectively eat foods that are rich in certain micro-nutrients as and when their bodies require them. With very few exceptions (increased calcium intake by certain species of birds prior to egg-laying being an example) the ‘Mother Nature knows best’ philosophy does not apply. Whilst pet parrots do selectively eat foods high in fats, they do not choose foods based on their micro-nutrient content. It is the role of the owner to feed a diet that provides the necessary micro-nutrients and not presume that the bird’s innate physiology will resolve the problem.

Some owners who are aware of selective feeding and the nutritional shortfalls of seeds, still decline to change away from their ‘parrot mix’ in the belief that having a variety of seeds available provides their pet with ‘entertainment value’ and prevents ‘boredom’. Many birds, however, even when offered a choice, would still preferentially select the same seed (often a sunflower seed) over and over again, because birds eat to fulfil a need for energy and not as a means of ‘personal entertainment’. Feeding and food should not be used as a substitute for additional mental and physical stimulation (toys, games, ‘playtime’, baths etc), and whilst the end result, of say a foraging toy, can be an edible reward it is the journey not the arrival that is important. By feeding a complete diet, and providing a stimulating environment, both the bird’s nutritional and mental needs are satisfied.
The diagnosis and clinical manifestations of avian malnutrition

Is there a test for malnutrition?

The ways in which the body stores and processes nutrients mean that there are limited simple diagnostic procedures that can be used to highlight the presence of malnutrition. Tests for some specific nutrients, such as the blood levels of certain minerals and vitamins, can be carried out, and while abnormal levels are significant and strong pointers towards non-effective nutrition, they are essentially used as additional confirmation of what an avian clinician is able to diagnose from physical examination and observation of the bird. Similarly, whilst radiographs will often clarify the extent or severity of certain nutritionally related conditions, such as metabolic bone disease or an enlarged liver, more often they are used to confirm what the clinician already suspects from their clinical examination.

Clinical examples of avian nutritional disease

It is worth emphasising that when considering the challenge of identifying the effects and underlying pathogenesis of avian malnutrition that:

- Nutritional disease is invariably: multi-factorial in its cause
  multi-systemic in its effects
  multi-presentational in its appearance
- Very rarely can malnutrition be isolated to a deficiency of one or two specific nutrients, causing specifically identifiable problems.
- Malnutrition affects the body in an all-inclusive manner.

The following sections highlight some of the commonly encountered, and more directly attributable, nutritionally related conditions associated with a particular body system. Identifying lesions in one part of the body, however, does not preclude equally diagnostic signs occurring in other systems. Most birds suffering from malnutrition exhibit multi-systemic problems and multiple observable symptoms. The key to sound diagnostic appraisal is an appreciation of the presenting signs and good clinical observation. The following overviews may help.
Skin and feathers

The skin and feathers are perhaps the easiest areas in which to identify cellular dysfunction because as cell turnover is high the consequences are more readily observable. The production of the wide range of keratin proteins is complex and heavily dependent on vitamin A for their accurate biosynthesis. Low dietary levels of vitamin A, or their carotenoid precursors, and a lack of the appropriate essential amino acids, will lead to suboptimal protein construction resulting in poor quality feathers and epithelium.

Signs of nutritional conditions affecting the integument and feathers

- Dry, flaky skin (itch)
- Bleeding blood feathers
- Stress bars
- Overgrown/flaky beak
- Overgrown/misshapen claws
- Failure to shed shafts
- Slow to moult
- Feather colour breaks
- ’Bumble foot’
- Poor feather durability (melanin shows through)
- Preen gland dysfunction: abscessation/impaction
- Change in feather lustre
- Lack of skin elasticity (especially the propatagium and tail)
- Feather plucking and self-multilation
- Secondary bacterial and fungal infections

Stress lines and retained feather shafts

Poor feather durability

A slow moult with retained ‘pin feathers’

Feather colour breaks

Lack of tissue elasticity resulting in skin cracks, irritation and self mutilation
Metabolic disease

These conditions are not always as easy to appreciate or interpret as those affecting the integument as they influence the biochemical processes of the body.

One metabolic condition that is readily apparent, however, is obesity. High levels of fat intake, caused by inappropriate foods and feeding behaviour, and exacerbated by a lack of exercise, are obvious causes of this problem. Because of the thin skin of birds, fat can often be seen as yellow deposits in the sub-cutis, but fat deposition also occurs around and within organs of the body. Here it can disrupt both normal mechanical function, atherosclerosis for example, and metabolic function, especially where fatty-liver disease is implicated. Whilst all birds are susceptible to obesity, some species, such as Amazons, galahs, cockatiels and budgies, would seem to have a greater disposition towards it.

Another observable metabolic dysfunction is hypocalcaemia – a lack of usable calcium within the blood stream. As well as being responsible for good bones and egg shell, calcium is needed for the smooth working of the muscles and nervous system. Low circulating blood calcium levels will result in acute seizures which, if unattended, can often be fatal. A combination of low calcium intake (seeds, as mentioned, are generally deficient) and inadequate levels of active vitamin D and/or non-exposure to unfiltered sun light, will predispose to this life-threatening problem.

Signs of nutritional conditions affecting the metabolism

- Obesity - Atherosclerosis
  - Cardiomyopathy
  - Pancreatitis
  - Diabetes
  - Hypothyroidism
  - Hernias
  - Xanthomas, Lipomas and Fibrolipomas
  - Fatty liver disease

- Iron Storage disease (ISD)
- Hypocalcaemia
- Gout
- Hypervitaminosis toxicity
- Vitamin competition

Abdominal hernia  Visceral gout  Wing xanthoma
(cholesterol deposits)
The Reproductive system

The nutritional requirements for a hen bird to breed can be divided into three general categories: nutrients required for egg production; nutrients needed to maximise hatchability; and adequate and appropriate foods to raise chicks. Parrots are designated as income-breeders, that is they form eggs from the nutrition that they receive at the time of laying. A diet specifically designed for egg-laying in parrots should not be necessary. Providing that a female bird has been on a good diet that will have already optimised her body condition, her nutritional requirements for breeding will be being met and her regular diet will provide the daily replenishment of transiently depleted stores.

A malnourished hen bird, however, will, when given an up-lift in her nutrition, put her own house in order first by replenishing depleted reserves and repairing and renewing damaged cells. She will not use these extra nutrients to breed, or if she does she will not fund the egg as well as she might.

A chick is only as good as the egg from which it has hatched. An egg produced by a hen which has been fed on a nutrient-replete diet is normally a rich source of essential amino acids, essential fatty acids, energy, and all the vitamins, minerals and antioxidants required for normal cell division, growth and maturation of an embryo. If a hen is fed on a nutrient-deficient diet, albeit one that may still allow egg production, then embryo development may occur but not proceed normally. Early embryonic death, dead in shell, malformation or problems with subsequent growth and development, and neonatal infections due to a poor immune status can all be consequences of a poor female diet.

For a male bird to produce good levels of quality sperm (high count and viability) there has to be good levels of essential vitamins and antioxidants to protect the sperm from peroxidation.
Poor parenting

- Egg binding -
  - Egg peritonitis
  - Cloacal prolapse
  - Prolapsed oviduct

- Unwelcome sexual activity -
  - Bonding
  - Aggression/screaming
  - Feather plucking
  - Masturbation (leading to cloacal abrasions or cloacal prolapse)
  - Regurgitation
  - Chronic egg-laying

Infertility -
- Lack of libido
- Low sperm count and viability
- Failure to ovulate
- Failure to incubate; multiple nesting attempts

The Paediatric bird

Inappropriate nutrition during hand-rearing or parent rearing can predispose to a variety of issues during a chick’s growth. Gross deficiencies (or excesses) will lead to identifiable problems. Equally important, as the direct result of suboptimal feeding, is the effect that suboptimal nutrition has on the baby bird’s immune system, depressing it and potentially predisposing the chick to a wide range of infections.

Signs of paediatric nutritional conditions

- Failure to grow - ‘stunting’
- Slow crop emptying - primary or secondary to candida infection
- Skeletal -
  - Osteodystrophy (Metabolic bone disease)
  - Splay leg or tibiotarsal rotation
  - Angel wing
- Inappropriate food intake - obstruction
- Dead in shell
The Respiratory system

Pet parrots are commonly presented to their vets with sneezing, chronic nasal discharge, sinusitis, respiratory noise and, occasionally, more severe respiratory distress. The lining of the nares and sinuses are designed to inhibit the inhalation of foreign particles and to act as an active barrier to micro-organisms. To function properly the cellular lining must have the ability to secrete mucous and generate normal healthy epithelium. Malnutrition has a profound effect on the lining of the sinuses and its ability to do this. Often designated as vitamin A deficiency due to the role of this vitamin in cell division (although as pointed out, malnutrition is never confined to a single nutrient), there is a progressive change in the nature of the cellular lining of the sinuses from mucous-producing epithelial cells to dry, metaplastic cells. These die, flake off within the sinuses and nares, initially causing an inflammation, irritation, and then accumulate as swellings.

Signs of nutritional conditions affecting the upper respiratory system

- URT infections
- Nasal discharge
- Sinus ‘abscesses’
- Rhinoliths and destruction of the nares
- Oral ‘abscesses’

Top left: A Cockatiel with classical upper respiratory infection exhibiting conjunctivitis, rhinitis, sinusitis and respiratory effort. Many of these symptoms are secondary to a poor quality nasal mucosal lining.
Top right: An African Grey showing a classic example of a rhinolith with enlarged nasal openings.
Bottom right: A Conure exhibiting a large sublingual ‘abscess’ arising from metaplastic change to the salivary glands.
Bottom left: An African Grey with a sinus ‘abscess’.
Behaviour

Why should nutrition have an effect on behaviour?

A lack of essential nutrients means that normal organ functions are not carried out. This may influence the production of enzymes, hormones and other biochemicals that regulate normal metabolic activities, and in such cases atypical, often undesirable, behaviour may arise. Should this metabolic dysfunction result in the production or non-breakdown of toxins and metabolites, these too can have an adverse effect on normal function. Behavioural changes can manifest themselves in subtle ways which the owner perhaps thought was normal for their bird – to more discernible changes such as self-mutilation, screaming or aggression. In breeding birds poor parenting is often attributed to the individual birds themselves or aspects of husbandry unrelated to diet.

The Immune system

The most subtle, but arguably one of the most significant issues of avian malnutrition, is suppression of the immune system. The immune system is the firewall that protects the body against attack from potential disease-causing organisms (viruses, bacteria, fungi and parasites) and toxins, both internal as well as external. The immune system comprises of a wide range of cells, biological structures and processes that depend on essential nutrients to maintain their function. Failure of the immune system, by the very nature of its function, predisposes the body to attack. Whilst a lot of the structures and chemical responses that constitute the immune system are complex others are not. As has already been highlighted, simply by having poor quality cells lining the sinuses and the skin affords reduced protection and allows colonisation of opportunistic pathogens.

Above: A Healthy Faecal Grams Stain: Psittacine birds unlike passerines, have a healthy bacterial gut population that functions as part of their immune system. Malnutrition reduces both the numbers and types of these beneficial micro-organisms. Faecal Grams stains can identify abnormal bacterial patterns in the gut flora and can thus act as a warning signal that all is not well. Increasing levels of ‘healthy flora’ can also be a good (and reasonably rapid) indicator that the body is responding to a healthier diet.
Combatting malnutrition

Having looked at the distressing consequences of avian malnutrition, we can now turn our attention to how we might address the situation. One must bear in mind that nutrition is not a static process - it is dynamic and influenced not only by life-stage and lifestyle, but by a range of inter-related metabolic processes occurring within a bird’s body.

Treatment of the malnourished bird

Such is the level of prevalence of avian malnutrition that the veterinary clinician will be presented with cases on a regular basis. Some of the cases will be suffering from primary deficiencies, whilst others will be exhibiting secondary symptoms as their main presenting sign, but have an underlying nutritional element in the disease aetiology. Treatment will involve addressing the presenting condition, however whilst treating the symptoms without addressing the underlying cause may achieve a short-term alleviation of the problem, it is unlikely to affect a cure.

The initial approach to resolving nutrient deficiencies may involve a ‘quick-fix’ of injectable vitamins or minerals or the administration of oral nutrients such as Bird Builder, Booster or Sunshine Factor from the Harrison’s Wellness Range, but inevitably it will require a complete reassessment of both diet and feeding protocols. Treating malnutrition needs to be an all-embracing nutritional and lifestyle reappraisal to achieve long-term correction, and not just a top-up of presumed deficient nutrients. Discussing the approach to better husbandry with the owner is paramount to resolution of the malnourished bird as correcting malnutrition requires education as well as medication.

A change of diet should be achieved as quickly as possible whilst supportive treatment is taking place. Care should be taken, however, where the disease processes have progressed to a point where the bird is anorexic. Whilst a long-term dietary change is essential, a bird that is not eating well should be hospitalised and encouraged to eat a high nutrient food such as Harrison’s Recovery Formula or, in more severe cases, gavage-fed until its condition has improved.

Many conditions can be greatly improved by treatment; some may even be ‘cured’ in that the observed effects are no longer present, as for example with hypocalcaemic fits. It would be optimistic, however, given the subtle, insidious and permanent nature of some nutritional diseases to suggest that they will always be cured by treatment hence the necessity for preventative action.

Even when presented with birds that do not, as yet, show any signs of deficiencies, it is inevitable that any bird fed on a predominately all-seed diet will eventually succumb to malnutrition. Dietary change should be recommended and implemented at the earliest opportunity so as to reduce the impact of the previous deficient diet.
Moving away from seeds – Feeding alternative foods

If we accept, from nutritional analysis, that seeds and nuts are both deficient in many of the essential nutrients and in general oversupplied with fats, then it is clear that a seed diet would not be nutritionally complete. Dietary correction of these nutritional shortfalls needs to be addressed.

Attempted dietary correction using supplements

To feed a diet in the knowledge that it is deficient, and then trying to correct the deficiencies, seems (to the author at least) at best counterintuitive. Those who continue to feed seed, but recognise the deficiencies and imbalances in the diet they provide, try to rectify the problem through the additional supply of vitamin and mineral supplements.

Unfortunately the effective provision of supplements can be challenging. The fortification of nutrients through the bird’s water is problematic as aqueous solutions of vitamins and minerals are very unstable and water consumption can be variable. Powder application to the surface of seeds is also a very hit-and-miss method of medication, with most ending up in the bottom of the bowl or remaining on the shell of the seed post-husking so that it is not known how much has been consumed.

Whilst the use of supplements may halt a temporary decline in micro-nutrient reserves, it is generally ineffective at ‘balancing’ a deficient diet and has been shown, in many cases, to be unsuccessful at preventing deficiency diseases and certainly has no effect on the excessive intake of fats. Many birds on mineral and vitamin supplements still suffer from clinical nutritional disease. A common example is hypocalcaemia; birds that are being given regular calcium and vitamin D supplementation are still presented to veterinarians exhibiting symptoms of deficiencies. At the other extreme, hypervitaminosis (A and D3 in particular) where owners have been ‘over enthusiastic’ in their use of supplements, is also documented.

Nutritional correction of seed-based diets using supplements is generally ineffective. Dietary correction should not be, and indeed cannot be, a top-up of presumed deficient nutrients within a bird’s diet, especially as the exact deficiencies are not known. Alternative foods need to be considered.

Alternative foods to seeds and nuts

Most parrots, whilst having an evolutionary preference for certain foods are generally, often through necessity, diverse, flexible and opportunistic in their eating habits. There is no sound reason why, within the constraints of the bird’s digestive capabilities, food-types and forms other than seeds and nuts cannot be used, and accepted by parrots, to provide the levels of nutrients needed for a healthy life. Parrots do not need to eat seeds.
**Fruit and vegetables in the diet.** Fruit and vegetables are fed in varying amounts to pet parrots. Amazon and eclectus parrots are considered more frugivorous and tend to eat more fruit, than for example the more omnivorous African Grey. Whatever their food preferences, however, the levels for micro-nutrients required by all the species are generally consistent, and these levels cannot be achieved by simply feeding high levels of fruit and vegetables alone.

Fruit should not be seen as a complete diet and whilst providing good levels of dietary fibre, fruit is deficient in many macro- (protein) as well as micro-nutrients. In general cultivated fruit, because it is designed for the human palate, tends to be high in sugars but low in minerals and vitamins. Wild fruits and berries are better sources of micro-nutrients and do contain higher levels of phytonutrients. These are complex products with diverse metabolic actions, some of which are considered to offer an ‘added extra’ to the food, but as yet their value in a diet is unproven.

Vegetables are generally higher in minerals than both fruit and seeds, and dark coloured vegetables such as peppers, carrots, spinach and broccoli provide good levels of carotenoids. However, like fruits they are fundamentally short of many of the essential nutrients needed to prevent malnutrition. Both fruit and vegetables are good adjuncts to a nutritionally complete diet but, like supplements, should not be seen as a way of correcting a deficient seed-based diet.

**Table-foods.** Some types of table-foods do no harm to pet parrots; rice, pasta, potato, bread and cooked chicken, all in limited amounts, will provide carbohydrate and protein to the diet, but little more. Some human food items should, however, be avoided; those that have been cooked in fats or contain high levels of fat (chips and crisps for example) have the potential not only to do harm but to create undesirable eating patterns. The main issue with feeding table-foods is that, whilst most will do no harm, the energy levels of the birds are being met with foods that do not contain adequate levels of micro-nutrients. In general, feeding table-food is more likely to exacerbate dietary problems than to correct them.

**Moving towards a formulated diet**

Over the last 40 years or so there has been an increasing body of knowledge assembled as to which nutrients are required to ensure sound avian health. This research has included information on the levels of nutrients required to sustain healthy life in adult birds and to achieve optimal growth and health in young birds. Diets that have been fed over a period of time without signs of nutritional disease have been analysed, and data has been obtained from diets fed to resolve known nutritionally related disease. The resulting information from these and many other sources has given a sound basis on which to access the levels of nutrients that should be available in parrot diets.
Due to the complexity of both avian nutrition and eating patterns, together with the variable nutrient content of individual food items, it is rarely possible for the average parrot owner to create an accurate nutritionally balanced diet by simply feeding a range of specific food items. This difficulty has been overcome by the development of formulated diets specifically designed for pet parrots. They have been constructed to ensure that the minimal levels of all required nutrients are met and they are provided in a digestible and palatable form. Using a formulated diet means that dietary nutritional deficiencies and excesses are avoided and ‘buffet feeding’ is eliminated.

The use of formulated diets

- Due to the problems in achieving a balanced diet through feeding a mixture of foods, nutritional experts consider formulated diets to be the best method of feeding our pets and formulated diets now play an integral role in feeding both farm and domestic animals.
- The principal of formulated diets is to provide a balanced level of essential nutrients in an acceptable and palatable form. The formulas are based on food-types that form the birds’ natural diet and then, following analysis, additional supplements are added to attain the required levels for each essential nutrient.
- Energy levels in the foods are kept reasonably low to ensure that eating is encouraged and micro-nutrients intake levels are maintained.
- Avian veterinarians would generally agree that the development and feeding of formulated diets represents the biggest advance in captive avian health and welfare seen over the last 30 years or so. (The use of formulated diets became the norm in the poultry industry many decades ago.)
- Harrison’s Bird Diets are at the forefront of this nutritional know-how and have taken their products one step further by becoming certified organic, not only providing quality human-grade ingredients but also removing any risks of the bird ingesting harmful agro-chemicals.
- The extrusion process used by Harrison’s in the production of their diets, enhances the digestibility of the ingredients, breaking down many of the naturally occurring digestion inhibitors and reduces potentially harmful myco-toxins levels.
- By taking this formulated approach to feeding, an owner ensures not only that all the essential nutrients are provided within the diet (something the use of mineral and vitamin supplements fails to address), but also that there are no excesses, and that their pet is unable to ‘buffet feed’ on selected seeds, which as we have seen, is a major contributor in inducing malnutrition.
The positive effects of dietary correction

Just as the presenting signs of avian malnutrition may be dramatic or subtle, the visual results of dietary correction can also be varied. The two pictures below emphasise the subtle nature of dietary correction seen by improved feather quality. What can’t be seen or measured is the improvement in the general overall health of the bird and the increased pleasure gained by the owner in having a happier and healthier pet.

1: Inflamed nares with mild discharge. Nasal discharge from birds is almost invariably abnormal.

2: Lack of feather lustre due to poor production of oils. The production of both body and preen gland oils require healthy cellular function. One of the effects of oil application to the feathers is to create an optical colour effect – that of lustre – by altering the refractive light patterns of the feathers. Non-lustre is therefore symptomatic of poor cellular function.

3: Scruffy feathering due to failure of barbs to fully interlock. Poor feather growth results in defects in the nanostructure of the interlocking barbs and barbules resulting in an ‘unzipped’ appearance.

4: Blackish tinge to the normal green feathers. Failure to moult results in longer feather retention and thus a greater degree of abrasion; and/or poor structural quality as a consequence of feather follicle dysplasia resulting in poor quality keratin, causing the black melanin base layer of the feather pigmentation to become visible.
Using formulated diets to prevent malnutrition

The prevention of malnutrition revolves around two considerations: being aware of the potential for nutritional disease; and providing a suitable diet from pre-egg through all life-stages from juvenile to geriatric. This is especially important at metabolically demanding periods such as growth, moulting and reproduction when maternal under-funding of the egg can have subsequent life-long issues for the chick.

For most birds the provision of seed-based diets - with or without additional supplements - will not achieve this and it is recognised that the best way to provide a nutritionally complete diet is through the feeding of a formulated diet. For the majority of pet parrots, providing a diet of at least 80% of Harrison’s Bird Foods and up to 20% by volume of fruit and vegetables, (these levels are species dependent) will ensure that correct nutrient levels are established and maintained.

Hand-reared birds can be weaned from Harrison’s Juvenile Formula through High Potency Fine and onto High Potency Coarse, if this is more appropriate for the species. It is important to use a ‘complete’ Harrison’s formulated diet from as early an age as possible because it is rarely possible to play ‘nutritional catch-up’. The effects of juvenile metabolic bone disease, for example, will not be corrected by a change to a nutritionally replete diet; even minimal deficiencies or excesses have a cumulative effect on the bird’s body that can result in unresolvable conditions.

For older or fully weaned birds, the process of conversion should begin as soon as possible. Nutritional disease is generally the cumulative result of low level deficiencies, so prompt restoration of normal nutrient levels will prevent both clinical and subclinical disease progressing into ‘malnutrition’.

Conversion from a seed-based to a formulated diet

Converting a bird onto a formulated diet is often reported to be difficult and while some birds do undoubtedly take longer than others to change their, often habituated, eating habits the majority convert readily. Breeding birds, aviary birds and young birds are generally easier to convert than the older tame pet parrot. There are a number of reasons for a bird to not immediately accept formulated diets, the biggest one being the novelty of a new food, however, when the owner has a positive attitude towards the change, birds tend to convert more readily. As has already been mentioned, dietary habits are taught, usually at an early age. A change in dietary behaviour requires re-education (often of the owner as well as the bird) and this can take a period of time.

There are a number of ways in which conversion can be helped; one is to wean baby and young birds onto a formulated diet as soon as possible while their dietary tastes are still being fashioned, others ideas are listed on pages 26-27.
Summary

Despite many advances in avian medicine over the last 50 years or so, malnutrition remains the most common underlying disease encountered by veterinarians in pet parrots. It represents the greatest threat to their lives and yet should be a preventable condition.

The challenge of providing a diet balanced in both macro- and micro-nutrients based on seeds and the other commonly available foods is highly problematic. Dietary habits and the nutritional limitations of seeds, with or without the use of supplements, combine to drive the unfortunate birds towards malnutrition. Whilst there will probably never be fully documented nutritional requirements for all the species of psittacine birds, practical diets scientifically formulated and based on the considerable data that is known, are available.

With Harrison’s at the forefront, formulated diets are improving the welfare and longevity of captive parrots more than anything else. Embracing the use of formulated diets with our pet birds is the practical and healthiest option available.

Malnutrition is a preventable disease. Correction may take many months to achieve, but the improved health of your pet and the pets in your care repays the effort and, cliché or not, prevention is always better than cure because sometimes, for some conditions, there is no cure.

The nutritional concepts discussed in the previous pages of this booklet are based on information acquired from a large and diverse array of scientific papers and text books and over 30 years’ experience as an avian clinician. The facts are not in dispute; however, the interpretation of these facts may vary between experts, and those views expressed here are mine.

As has been explained nutritional disease is multifactorial in its expression and the text and photographs in this booklet are not intended as either a comprehensive review of all the manifestations of avian nutritional disease nor as a ‘diagnostic guide’ to the presenting signs. Owners who believe they have birds presenting symptoms of avian malnutrition should not assume that that is all that is wrong and are strongly encouraged to seek experienced professional veterinary advice for a complete health check, and assistance in addressing the problems and their concerns.

Brian Stockdale BVM&S MRCVS
Having read the preceding part of this booklet, I hope that you are convinced that feeding a formulated diet is the nutritionally optimal way to ensure that pet parrots receive the best diet we can provide. There are a number of formulated diets on the market, so why choose Harrison’s? What makes Harrison’s Foods stand out from the others?

By drawing on the combined expertise of veterinarians, nutritionists and aviculturists, Harrison’s have produced a premium range of scientifically formulated diets that provide pet birds with the levels of macro- and micro-nutrients they require for good health. Manufactured using a low-temperature extrusion process, the food’s natural qualities are preserved and digestibility is improved.

Harrison’s Bird Foods are made with premium-quality, human-grade cereals and are certified* organic. By using organically sourced ingredients, Harrison’s have eliminated the risk of pet parrots ingesting exogenous toxins often associated with the growing, storage and manufacturing processes. As they are organic, potentially harmful herbicides, pesticides, preservatives and synthetic colourings are eliminated from the Harrison’s Bird Food range.

As Harrison’s Bird foods are nutritionally complete they eliminate the need for supplementation and avoid the problems that result from ‘buffet feeding’.

Harrison’s Bird Foods are used and recommended by leading avian vets both UK and worldwide, as they believe they are the best diets for pet birds.

Please see pages 26-27 for tips on conversion from a seed based diet.

* Certified organic in the USA by the Department of Agriculture and in the UK and Europe by the Organic Food Federation
Which Harrison’s food to choose

All Harrison’s Bird Foods are formulated to provide pet birds with the nutrition needed for good health.

There are two main types of diet: High Potency and Adult Lifetime. The formulations differ slightly in nutritional content – mainly the fat and protein levels (influencing the calorific value) - making them appropriate for use in a variety of different nutritional and clinical situations. These are outlined below.

Thereafter the main difference between the Harrison’s foods is the size of the food nugget. Which size you choose is down the preference of your bird and how they usually eat their food. The foods most commonly fed to each type of bird are shown opposite, but this is just a guide – if a bird prefers a different size of piece to ‘the norm’ then feed them this as they will still receive the same balanced nutritional benefit.

The Harrison’s range also includes treats and hand-feeding foods for all pet birds (and these are outlined on the following page). For a full analysis of the ingredients and nutritional content please visit our website: www.hbf-uk.co.uk

**HIGH POTENCY DIETS**

High Potency diets provide the correct balance of essential vitamins and minerals, whilst having a slightly higher calorific value, making them most suitable for birds:

- which are converting from a seed based diet
- which have higher metabolic rates and benefit from higher energy diets, e.g. African Grey, large macaws, or palm/moluccan cockatoos
- which are still young and developing
- which are moulting or have poor feathers
- which are recovering from illness
- you wish to bring into breeding condition

**ADULT LIFETIME DIETS**

Adult Lifetime diets provide the correct balance of essential vitamins and minerals, whilst having a slightly lower calorific value, making them most suitable for birds:

- which may be diabetic
- needing help preventing chronic egg laying (typically cockatiels), or which are showing signs of undesired breeding behaviour
- which have problems controlling their weight (e.g. Amazons, galahs).
SIZE OF PIECE

<table>
<thead>
<tr>
<th>Coarse</th>
<th>Larger pieces that bigger parrots can pick up and eat from their feet</th>
<th>e.g. Cockatoos African Greys Macaws Amazons Eclectus Pionus...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine</td>
<td>Smaller pieces for smaller parrots who pick them up in their beak directly from the bowl</td>
<td>e.g. Senegals Quakers Parakeets Cockatiels Conures Lories...</td>
</tr>
<tr>
<td>Superfine</td>
<td>The smallest pieces, for small birds which peck directly from the bowl</td>
<td>e.g. Canaries Budgies Finches Doves...</td>
</tr>
<tr>
<td>Mash</td>
<td>A ‘coarse’ powder. Suitable for all birds, it can be moistened, or sprinkled onto fruit or vegetables, or served dry to birds which peck directly from the bowl.</td>
<td></td>
</tr>
</tbody>
</table>

OTHER FLAVOURS AND TREATS

- **The Adult Lifetime Formula with added chili peppers.** Some birds love the spicy flavour and it can be served as a staple diet, as a healthy treat or as a conversion food.

- **A tasty, toasted treat with a sweeter, nuttier flavour,** which acts as a good conversion tool, or as a healthy treat. It contains sustainable organic Palm Fruit Oil which benefits the skin, feathers and immune system.

- **A mix based on Harrison’s Bird Foods** which you can use to bake your birds a ‘cake’. Available in three flavours it is ideal as a conversion food, a healthy treat, for birds that enjoy human food, or as a way of introducing fruit and vegetables as they can be baked into the bread.

Which food should I use for hand-feeding?

<table>
<thead>
<tr>
<th>Composition</th>
<th>Hatching to 7 days</th>
<th>7 to 21 days</th>
<th>21 days to weaning</th>
<th>Other uses</th>
</tr>
</thead>
</table>
| **Recovery Formula** | Protein 35% (min)  
Fat 19% (min)  
Fibre 1% (max)  
Moisture 10% (max) | For debilitated or injured birds. The high protein content aids the recovery in ‘critical care’ situations.  
A hand rearing food for small insectivoros birds with apparent inability to digest cornstarch. | For medical and surgical patients recovering from pansystemic failure and as a dietary transition for recovering patients.  
In instances of anorexia with slowed gastrointestinal emptying time. |

| Neonate Formula | | |
|----------------|-----------|-----------|----------|----------|
| Protein 26% (min)  
Fat 14% (min)  
Fibre 1% (max)  
Moisture 10% (max) | Passerines  
Cockatiels  
Parrots | Baby Macaws, Cockatoos, African Greys, Amazons, Conures, Pionus from day 1  
Other parrots to weaning  
Cockatiels | Hospitalised birds that require supplemental feeding.  
Birds with a beak injury. |

<table>
<thead>
<tr>
<th>Juvenile Formula</th>
<th></th>
</tr>
</thead>
</table>
| Protein 18% (min)  
Fat 11% (min)  
Fibre 4% (max)  
Moisture 10% (max) | |
**Tips for converting parrots onto Harrison’s formulated diets**

Many birds enjoy the food immediately and the owners can switch them to a Harrison’s Bird Food diet straightaway. To increase the likelihood of this happening it is best to feed the new diet in the bird’s usual feeding bowl in place of its regular food. If the bird is reluctant to try the food then the following tips may be helpful:

1. **Reduce food availability.** For about 7-10 days prior to conversion to Harrison’s, limit the volume of ‘regular’ food that is provided at any one time to approximately one third of the usual daily serving. This prevents the bird from buffet feeding and encourages it to eat the food that is available. Food is only replenished when all has been eaten.

   For medium and larger parrots a small amount of vegetables and fruit should also be provided even if the bird is not generally keen to eat them.

   The use of a water soluble mineral mix (including iodine to assist thyroid function) such as Harrison’s Bird Builder, should be used to help replenish depleted body levels. Re-establishing more normal levels potentially helps stimulate appetite. This can be discontinued once the bird is eating a formulated diet as at least 80% of its daily diet.

2. **Weaning the bird off its old diet.** Offer a small amount of their usual food in the morning and then remove this from the bowl either once it has all been eaten or after about an hour. Serve, in their usual feeding bowl, some Harrison's Bird Food (either High Potency Coarse, High Potency Fine or High Potency Superfine, whichever is most appropriate for the size of bird) giving less than will cover the bottom of their bowl, and make this the only food that is available to them during the main part of the day. If the food is eaten then give additional Harrison's in small amounts throughout the day and then in the evening offer some fresh fruit and vegetables. If the Harrison’s has not been eaten during the day then in the evening offer a small amount of their regular food with some fresh fruit and vegetables. Over subsequent days reduce the amount of seed offered in the morning and evening until such time as only formulated diet is offered from the start of the day and you can stop feeding their previous diet.

   Pet parrots are generally habituated to eating from the same place in the cage and the same bowl. By placing ‘novel’ food elsewhere the bird may tend to either ignore it or treat it as a toy. Limiting the amount of formulated diet to a few pieces at a time helps prevent the bird from removing the food from the bowl hoping to uncover its normal food (it can see the bottom of the bowl) or generally wasting it.

   By offering the bird its normal diet for limited periods during the day the owner can be reassured that the bird will not starve during the conversion period, and by having Harrison’s diet available during the majority of the day, quality food is available, should the bird become hungry.

3. **Add fruit juice to the food.** Many birds can be encouraged to taste the food, and will readily consume it, if a small amount of fruit juice is added. Try moistening the pieces (but do not soak them or some of the essential nutrients may be lost) with the juice of their favourite fruit or vegetables so that they have a flavour that they know, recognise as food and enjoy. Over time the amount of juice can be reduced until the Harrison’s food is served dry.

4. **Heat the food. Spoon-feed.** Heating the food slightly can stimulate the bird to accept it. This can be also adapted with tip 5. If the bird is hand-reared then accepting warm moist food from a spoon (the size of the pieces may initially need to be reduced) may still be second nature and conversion can be achieved this way. The size of pieces offered can then be gradually increased.

   This method may work by potentially fooling the bird into thinking that this food has come from some desirable avian source - either a parent or potential mate, or associate it with a hand-rearer. The younger the bird, the more likely it is to remember being fed this way and the more readily this will work.
5. **Mix the pieces with fruit or vegetables.** Whilst some birds will take to eating formulated diets if they are mixed in with their normal seed, this is generally not recommended. Crumbling the Harrison’s diet (or using the crumbs made by the bird crushing but not eating the whole nugget), however and mixing it with pieces of fruit and vegetable that the bird is known to eat and enjoy, will encourage it to taste the food and become accustomed to it.

The problems with providing a formulated diet mixed with the bird’s basic seed mix should be self-explanatory. The bird is likely to reject the ‘foreign objects’ in the food bowl in preference for its known ‘favourite’ seeds. This (non-) method of conversion often results in the new food being left/wasted and is one of the factors that can often discourage owners from not continuing to feed a formulated diet. It may be thought that the bird ‘would not eat it’, however due to the manner in which it has been introduced, the bird simply has had no reason to consider eating it.

6. **Eat it yourself. Feed your bird at mealtimes.** Many pet parrots are used to eating at meal times with their owners so make use of this feeding time for conversion. Place the food on a plate, move it around with a finger or a spoon and eat (or pretend to eat it) in front of the bird.

Whilst Harrison’s formulated diets can be a little bland for the human palate (humans have about 30 times more taste buds than parrots), they are palatable, organic and made from human quality food, and many birds are encouraged to try the food if they see their owners eating and ‘enjoying’ it.

7. **Use a converted bird as a role model.** If you already have a converted bird then house the new bird near the one that is already eating a formulated diet. If compatible, then place the birds in the same cage and use the converted bird as a “trainer bird”.

8. **Change the bird’s environment.** For small psittacine birds, moving the bird into a new home such as a light box, aquarium or even a new cage can work. Remove all the toys, perches and bowls and offer the formulated diet loose on the floor. In addition, sprinkling food on a mirror or sheet of white paper placed on the bottom of the cage can work especially well for budgies. A bird old enough to be socialized may eat the food in order to compete with the “rival” bird in the mirror, whereas white paper draws attention to the food.

9. **Use Power Treats, Bird Bread or the red palm fruit oil products.** Harrison’s Booster and Sunshine Factor may also be used to encourage the bird away from a seed diet and onto Harrison’s. The beneficial oil content of these products will often assist with converting birds habituated onto high (detrimental) fat seeds.

10. **Veterinary supervised conversion.** In some cases birds do not convert readily. Occasionally the owner’s emotional attachment to their pet may lead to ‘lapses’ in a conversion protocol or owners fear that they are starving their bird into dietary submission to the detriment of its health. Veterinary supervised conversion within the vet’s clinic may often succeed. By removing the bird from an emotional home environment and placing it in a clinic where regular monitoring can be undertaken will often help the bird (and owner) through the conversion process.

Monitoring of the volume and consistency of the bird’s droppings during the conversion process will assist in establishing the amount of food being eaten. Regular weight checks should be made over the conversion period (daily in small birds and twice weekly in larger birds) to ensure that there is no undue weight loss. Assuming the bird was not initially obese a weight loss of >5% in small birds and >10% should not be exceeded in the first week of conversion.

‘**Failure’ to convert easily.** Perhaps the biggest stumbling block to efficient conversion are the owners themselves either giving in to ‘parrot pressure’ early in the conversion process or not persisting for long enough. Allowing a parrot to dictate its eating habits is the surest way of establishing malnutrition.

It is important to ensure the bird is eating sufficient food. If the bird has not converted to the food then after a few weeks the owner can revert to feeding familiar foods for a short period of time (whilst instigating tip 1) and then try again.

The effort is undoubtedly worth the long term health benefits for the bird.
For more information about Harrison’s Bird Foods or other products featured in this booklet please contact us

Alternatively please visit our websites:

www.hbf-uk.co.uk

www.meadowsah.com

Point of sale information and client advice literature is available
Please contact us to request copies

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