

# Pediatric Preventive Health Care

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## Items to Help Your Babies at Home

Due to the recent increase in the new ownership of available handfed babies and the improved success that bird owners are enjoying in breeding their own birds, our pediatric medicine selection has enlarged at a tremendous rate. Unfortunately, not all of the questions or requests for assistance we receive are happy ones, and many of the problems incurred are a result of improper equipment or insufficient information to properly raise these little fellows. Other situations in the area of pediatric health support are due to true medical conditions which are unpredictable and, in some cases, poorly understood at this time. The fact stands though that probably a great majority of the health concerns discovered by bird owners are preventable, given the right tools and supplies.

This presentation is to help you better prepare for this coming spring's challenges. These recommendations are merely that. They have all been highly successful for myself and my clients but the statement of "A fact merely marks the point where we have agreed to let our investigations cease" probably does not apply to everything covered here. We all should continue to strive for new ways of improving the quality of life for our birds and thereby the quality of our own lives.

### I. Equipment and Supplies

These items are inexpensive and contribute a great deal toward your bird's comfort and your personal time savings. These items are available through a local bird shop, hardware outlet or one of the major advertisers in the bird magazines. These products have been time tested on thousands of patients and healthy individuals alike.

**Thermometers:** This is a simple item, frequently overlooked and impossible to duplicate using the human body. Thermometers have two very important uses in a nursery. First as a guide for incubator temperatures, whether it is for eggs or for a

chick brooder. Overheating eggs will cause embryonic death and/or the premature hatching of weak chicks with a high risk of dehydrated egg membranes and the accompanying sticking, which can be a cause of fetal hemorrhaging. Overheated babies also dehydrate and are being subjected to a constant and extreme form of stress.

Temperatures lower than ideal will subject chicks to chilling, which frequently leads to respiratory disease and/or other stress related infectious disease. Cold chicks also tend to not digest their food properly as the chilled gut does not propel the food through the body at a normal rate (decreased peristalsis). Chilled eggs tend to expire very quickly, as they produce no heat source of their own.

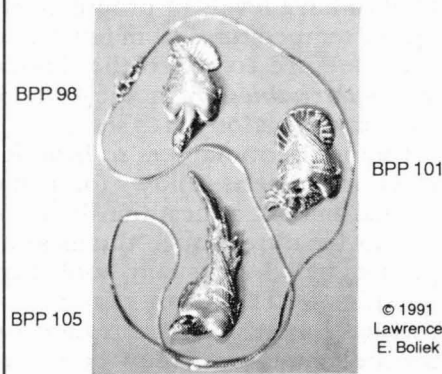
The second strategic use of thermometers is for baby formula preparation. Cold food leads to the same result as cold chicks. Food fed too hot (over approximately 108°F) tends to exceed the body tissue temperatures, which causes the crop, esophagus and oral tissues to sustain thermal burns. The end result can be the classic "crop burn" condition which frequently requires surgical repair. Burns of sufficient severity can be fatal.

Baby formula should be fed between 100°F to 105°F. Food offered below 96°F will be refused, and formula over 108°F is dangerously hot. Give yourself a buffer zone on each end for an unexpected delay in feeding time or a faulty thermometer. Aquarium, cooking or lab type thermometers are a good choice. High quality thermometers may cost a few dollars more but are worth their weight in babies.

House type (outdoor) thermometers inside the brooder work well for babies. More sophisticated laboratory thermometers should be used for the more delicate demands of egg incubators. Saving a few dollars by purchasing a cheap device can cause the loss of hundreds or thousands of birds at some point in the future if a thermometer fails in its accuracy.

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Placement of the thermometer is also important. Incubators with no air movement (still air brooders, etc.) tend to have levels of progressively higher temperatures from bottom to top. Be sure to place the device *where the babies are*, not just where it is convenient for you to see.

Taping thermometers to brooder glass or plexiglass allows for a substantial amount of heat transfer from the device out through the glass or plastic, which is usually cooled by outside air. This is an example of thermal conduction. The reading on the thermometer will now be a combination of the inside air and the cooler glass wall. This is an inaccurate reading. Use a bracket or an insulated pad between the thermometer and the chamber walls.

These two simple steps cannot be replaced by human hands, lips or elbows. I have never seen anyone stick a finger into a cup of formula or into a brooder and tell the difference between 102°F and 104°F. A thermometer will *every* time, every day, and for the cost of about \$5 to \$20.

**Feeding Devices:** The traditional tool is a spoon, either an infant size or a teaspoon; sometimes with the edges of the bowl turned up to fit the mouth and eliminate spillage by means of forcibly bending the spoon handle.

Two other instruments have been gaining popularity in the past two years and are even sold commercially through various magazines. These are catheter tipped type syringes and thermotreated glass bulb syringes (i.e. Pyrex).

Catheter tipped syringes are available in 12, 35 and 60 cc sizes in a variety of hand grip styles. The most popular one is made by Monoject™ due to its durability for repeated use. These syringes fit more deeply into the mouth than spoons, tend to keep little faces cleaner and allow for the very accurate measurements of food prepared and the amount actually consumed. These syringes tolerate cleaning and disinfection in most types of disinfectants for repeat use. Hint: the use of Teflon™ pipe tape around the rubber plunger of syringes may prolong this useful life for *years*.

Pyrex™ type bulb syringes are glass barrelled with rubber squeeze bulbs. They are used in a fashion similar to the catheter tipped syringes, but the rubber bulb can be removed for the purpose of boiling the glass barrel to disinfect them. I believe cold dis-

infectants of certain types (i.e. Wavicide-01™) are just as effective at present.

**Crop Eliminator:** Many babies will require that the crop (ingluvies) be emptied or cleaned out for a number of reasons, such as gut shutdown ("sour crop"), cold food, or the improper formula being fed. Aviculturists have used a number of instruments to accomplish this. This instrument can cause great damage in untrained hands. **DO NOT ATTEMPT** this procedure the first few times without expert coaching by an experienced person.

My favorites are the use of "crop tubes", which can be either stainless steel or French rubber catheters. Both of these will remove the crop contents via vacuum action and are safer than the "squeeze and belch" method used in the past. This traditional approach places the bird at some risk for inhaling any fluid or food left in the oropharynx, but on occasion must be resorted to if the particle size is too large to enter the vacuum tube diameter. Forcing the food contents of the crop out through the nose may also be the source of sinus infection in many birds later on.

It is frequently recommended to first add some warm water to the crop contents and massage the bulk to soften its consistency.

**Brooder Bedding:** Baby bedding materials can be as varied as the owners that raise them. There is no "right" bedding but the qualities it should possess include good absorbancy, lack of dust, good footing, high cost efficiency and ready availability. Types frequently used include paper toweling, disposable diapers, corn cob crumbles, vermiculite, crushed walnut shells, compressed corn cob powder, crumpled oats and various seed grains.

One preference is for the compressed corn cob pellet (Bed-O-Cob pellets and Pellecel™) for several reasons. This rabbit pellet shaped bedding dissolves easily in the crop and does not tend to obstruct the digestive tract as in the case of indissoluble types like nut shells. It has excellent absorbant qualities (I have seen babies kept dry and clean for three weeks on the same sample of Pellecel) and requires much less work and time than disposables such as diapers or paper. The initial cost is higher but the end cost is equal to or lower than diapers due to less waste. These

products may also be responsible for the swollen toe syndrome seen in African Greys, macaws, Eclectus, etc. and therefore I recommend reusable diapers as being my favorite choice.

As an avian vet, I dread the amount of risk and effort required to unplug a baby packed internally with large volumes of immobile bedding material. These two have not been a source for this problem in my practice to date. Crimped barley or oats can make for an acceptable substitute for many babies. This can be purchased from your local feed store.

**Wound Control:** Baby skin is especially delicate, even for birds, and when babies are learning to walk, flap and fly, there can be a long list of cuts and scrapes or bite wounds due to sibling squabbles. Most of these cuts heal themselves quickly, but on occasion it is necessary to assist in stemming the flow of blood and to close a wound. Two excellent products include:

The traditional aid, styptic powder. This is a powdered form of Ferric subsulfate and is sold as **Quik-Stop™**, **Hemostat™**, among others. This acts as a blood coagulator and should be pressed into the wound. Some babies will complain and I can personally vouch for its moderate stinging reaction!

The newer product is a medical grade of an adhesive similar to Superglue™. It is methylmethacrylate and is related to Superglue (cyanomethacrylate). This fast drying, surgical glue is continually gaining more acceptance with avian vets as they find more uses for it. It makes an excellent seal against bleeding, tissue trauma and subsequent infection. It is an invaluable first-aid item when punctures keep bleeding or enough skin has been broken to create a life-threatening situation. Wounds of this size will probably require additional medical aid such as antibiotics, dressings and/or sutures. However, if some small effort at home can help to keep a bird going in the face of imminent death or severe tissue damage, I think this first-aid item should be kept handy. Many of my clients keep it next to the Quik-Stop. This product is available under the commercial names of Vet Bond™ (3M Co), Nexaband™ and Nexaband Avian™ (CRX Medical, Inc.).

**Naval Pads:** Newly hatched chicks have an umbilicus where the yolk sac and accompanying tissues fed nutri-

tion into the body during its development. There usually is some evidence of this structure in the "belly button" area. Occasionally this spot actually involves a large amount of tissue in the form of a partially unabsorbed yolk sac and this has been a chronic challenge for bird owners. This membrane is all that stands between the outside environment and the inside of the baby's abdominal cavity. Any rupture is a direct pathway for infection and/or hemorrhage. These yolk sac remnants are usually absorbed in about two to three days but until then it tends to stick to newspaper, diapers, paper towels and brooder bedding. The efforts to pick this foreign material off, or unstick the baby without tearing the membrane can be nerve-racking.

I have found the use of a small (2" to 4") square of a non-stick wound pad (i.e. Telfa™ by Kendall Co.) with a coating of a wound ointment, such as Furacin™ or Betadine™, completely eliminates the problem. The padding protects this thin bubble and the sac is allowed to contract without sticking. When the absorption process is finished, simply peel off the square and the navel area is already medicated. One pad should provide enough material for at least five to ten babies and will save you stress and the potential loss of a successfully hatched chick.

## II. Pediatric Diets:

"We are what we eat" and so are our birds' bodies. Growth is the end result of the transformation of nutrition into cells and their subsequent tissue formation. A diet short in nutrition leads to defective growth or, more properly, malnutrition.

Baby diets are probably one of the most heated, controversial subjects in pediatric practice today. Everyone has both experience and opinions, but rarely does anyone have irrefutable proof of the nutritional analysis and documented records of the results of a favored diet. Unfortunately, many of us will feed babies what sounds good to us. I like peanut butter and you might also, but can you tell me what the fat content, protein level and amino acid analysis is? How about after you add applesauce, ground sunflower seed meal, cornmeal or strained carrots? How much did you add, and do you add the same amount of each ingredient every time? All of these factors will have a

profound influence on the end product of the diet fed.

I have found one diet to be thoroughly analyzed by a nutritional analysis lab at the University of California, Davis.

This formula was created by and field tested by Mr. Dale Thompson and Kevin Flammer, D.V.M. at the Avicultural Institute of Newhall, California (no longer in existence) and fed to an extremely wide variety of both psittacine and soft billed species with excellent results in the categories of vigor and consistent weight gain. It was named Behavior Studies Handfeeding Diet #7 due to its placement in a series of diets tested by A.I. This diet meets the requirements of birds for the proper ratios of fat to protein content. It has been shown that a diet deficient in protein does not allow for proper growth and produces poor tissue quality (i.e. children in Third World Countries). Protein utilization is further regulated by the fat content of the diet in that a diet too low in fat will limit the amount of protein absorbed from the small intestine, regardless of the amount of protein available. Therefore, the fat content is a limiting factor. On the opposite end of the scale is a diet too high in fat. High fat diets slow down the digestive transit time. If the gut is slowed down to a point where the bird is not absorbing nutrition at a rate compatible with life, then it is academic as to how good the diet is in the box.

Behavioral Studies Diet #7 is as follows:

### Analysis (Dry Weight)

Protein	18-20%
Fat	05-07%
Carbohydrate	40-50%

### Adult Formula

	Volume	Weight
Dry Mixture	2 parts	26%
Water	3 parts	74%

It is formulated in a dry form in the following manner:

	Volume	Weight
Ground Primate Biscuit *	2 cups	400 gm
Roudybush Handfeeding Diet **	1 cup	180 gm
Gerber's Oatmeal Flake Cereal	1 cup	50 gm

This mix is then diluted with warm water at 110-120°F (preferably distilled) and mixed to an applesauce consistency (thinner than hot oatmeal and thicker than split pea soup) and allowed to cool to 104-108°F before feeding. A half teaspoon of creamed corn or oatmeal with banana and apple by Gerber's can be added to each three ounces of mix before feeding if extra carbohydrates are desired in the diet.

This mix must be further diluted by an additional 6% water by weight for babies 1-3 days old. It has been proven that babies of this age need reduced food solids to thrive, due to the nutrition the chick is receiving from the absorbing yolk sac present. The formula should be changed to:

Formula 1-3 only	Volume	Weight
Dry Mixture	1 part	17%
Water	5 parts	83%

\* Hills Pet Product Inc., Topeka, Kansas 66601, Zu-Precm (Monkey Biscuit)

\*\* Roudybush, P.O. Box 331, Davis, California 95617

Consistency should be approximately like fine quality applesauce with a texture thicker than pea soup and thinner than hot oatmeal. Use this mix within one-half hour of mixing to prevent any bacterial overgrowth. **Do not refrigerate and/or use baby formula over. EVER!** The few pennies saved is not worth the constant risk taken. Our clinic cul-



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ture surveys have shown that bacterial growth accelerates massively after 30 minutes of mixing.

I have successfully raised both healthy and sick babies with this diet for several years. The Behavioral Studies nursery crew estimated they had raised 1200 to 1300 babies on this diet.

It may not replace every diet, but it certainly has done a great deal for those patients who are showing signs of malnutrition and are in need of proper support diet.

**Formula Diluent:** I made mention of distilled water. This is primarily for quality control, as everyone's water cannot only vary in degree of hardness, salinity, bacterial contamination level and potential toxin concentration, but can also vary from month to month according to the original water source being purchased by the water district serving your home. Distilled water is the same from bottle to bottle, month to month, by law. It can only contain water, purified by the steam distillation of commercial water which includes no other minerals or chemicals. Bottled water is just that, and spring water is any water that comes out of a spring (by definition and label requirements). Tap water can also be contaminated by bacteria which propagate within the spout, house lines and hardware as it sits for several hours between uses. If you use tap water, let it run for a few minutes before use. Home distillery devices for water are also available (Kenmore by Sears, etc.). In either case, the cost of distilled water every year is probably less expensive than one trip to the vet for a gut slowdown problem. Note: Public Health Departments are only charged with controlling coliform counts (i.e. *E. Coli*). The presence of *Pseudomonas* or *Klebsiella* does not alter these legal requirements for you or your birds.

### III. Dietary Supplements

These are reserved for those babies not thriving on their current diet and are used to improve the quality of the diet or enhance the utilization of their current one.

**Rice Cereal:** This is a low fat, low-protein cereal that is made for human babies by Gerber but offers excellent support for avian babies with slow gut transit time. This is frequently referred to as "sour crop" syndrome. Rarely do crops affect gut transit time in comparison to condi-

tions farther down in the digestive tract. It is much like a stopped-up sink, where the problem usually is deeper in the plumbing and the visible part of the problem is at the top in the sink bowl. True crop diseases do exist, but are not the rule.

Rice cereal provides for a quick energy source in the form of carbohydrates without slowing down the gut passage time due to a high level of fat placing heavy demands on the accessory digestive organs (stomach glands, pancreas and liver) to process high levels of protein. Rice in itself is a very unbalanced diet, but can be very helpful in easing the stomach and/or intestine back into normal function. This will create *severe* nutritional deficiencies if fed for too long. Normal formula should be replacing the rice cereal as the bird improves. If your bird's intestine is completely shut down and/or not improving, get him to a qualified avian vet A.S.A.P. The rule of thumb for psittacine babies is, *if gut problems occur for one day in the form of no weight gain and/or a poor digestion rate, you have approximately two days to get the problem corrected* or prepare to face serious health problems.

**Corn Syrup:** White Karo™ syrup (corn syrup) can be added at the rate of 1/2 tablespoon per cup of food as an extra energy boost for weak babies. This is a sterile, processed form of sugar as opposed to the traditional suggestion of honey. Honey has been proven to carry bacterial spores (*Clostridium* spp) in about 30% of the samples tested and may be responsible for serious enteritis conditions. It is no longer recommended by most human pediatricians. Dark Karo is said to be slightly laxative and may be of some additional value in some cases. White table sugar makes for more acceptable replacement than honey, if necessary but is inferior to corn syrup. Too much sugar can lead to dehydration.

**Nutri-Cal:** This is a caramel colored high energy paste which can be used for weak or energy starved babies, either plain or in food. Be aware that this paste is also very high in both vegetable oils and cod liver oil to provide calories. This product should not be used in babies with any indication of crop or intestinal "slowdown" or for those with a diet relatively high in fat already. The results can be very detrimental under these conditions. This is not a replacement

for a balanced diet, as cod liver oil is very high in its Vitamin A content.

**Stat™:** This is a very concentrated high carbohydrate (20%) and high fat (50%) liquid with some vitamin and amino acid components. This product is manufactured by PRN Pharmacal, Inc. in Pensacola, Florida and is an excellent supplement for babies on fat deficient diets or those not following the weight gain curves published (Clinical Avian Medicine and Surgery by Harrison and Harrison, appendix 6, pages 664-666). This supplement has produced excellent results for us, but some caution is made here as well. Overdosing babies by as few as two or three drops per feeding has caused crop emptying rates to go from the ideal three of four hours up to eight and even twelve hours in a single feeding. Be conservative in your use, it is very concentrated.

**Calcium Supplements:** The previously described hand-feeding diet is adequately fortified in calcium, but many diets are not. Folded leg bones, weak beaks and soft skeletons can result. It is important to provide both usable calcium sources and sufficient vitamin D3, its hormonal "taxi-cab", to carry it into the blood system from the small intestine.

Two commercial forms are of great value here. D-Ca-Phos™ powder by Fort Dodge Labs is a well-formulated powder and Neo Calglucagon™ by SanDoz Pharmaceutical Corporation is a syrup form. Both of these are available to the public through feed supply stores and human pharmacies. Be aware that some other good forms are available, but these can be found easily and are reliable. Note that an incorrect calcium/phosphorus ratio such as in inexpensive bone meal or those without a vitamin D3 helper are of limited value. Also, be aware that certain species, such as African Grey Parrots, are much more likely to sustain a calcium deficiency than other psittacines. This is currently thought to be due to a specific species difference in the gut absorption rate for calcium. Again, the use of these supplements in the proper dose is cheap insurance against a life-long deformity. Be aware also of overdoses of Vitamin D3 which can lead to total kidney disease and excessive calcium deposition (Exostosis) especially in young macaws.

### IV. Digestive System Support

These items can be used with good

health, but are specifically designed and prescribed for babies with *digestive tract problems*. They are added to the standard programs of proper diet, environmental temperature control, etc. This is one step up from the preventive items in Section III.

**Electrolyte Replacement:** These essential body minerals become charged (positive or negative) ions when dissolved in water or body fluids. Many of these ions are critical for normal cell function, especially in the case of heart muscle, kidneys and nerve tissues. A deficiency of Na (sodium), K (potassium), Cl (chloride), HCO<sub>3</sub> (bicarbonate) cannot only lead to serious physiological consequences, but outwardly the patient can show depression, vomiting, muscular weakness and a refusal to eat. The supplementation of these critical ions cannot only speed recovery from these signs, but can be added to diets that are in question as to their content or as extra insurance as a "super support" item. Baby food can be mixed with an electrolyte fortified solution such as Lactated Ringer's Solution™ (L.R.S.) or Pedialyte™ (L.R.S.) can be obtained from a medical supply such as your veterinarian, but some states will limit its purchase to clients with patients who are under direct, current veterinary care. Pedialyte is available in most supermarkets next to the infant foods and is far superior in its composition than the sports type electrolyte drinks (Gatorade™ or Super Socco™), or fruit juices. These fluids are relatively inexpensive, but can produce dramatic benefits in the general attitude of a weak or poorly digesting baby.

**Bacterial Replacement Therapy:** This is primarily associated with the use of *Lactobacillus acidophilus* lyophilized products (see *Bird Talk*, November 1987). The theory here is that these harmless, natural bacteria occupy the microscopic surface spaces of the intestinal tract of birds and prevent disease causing bacteria, yeast and other pathogens from gaining a physical attachment site on the intestinal wall.

These bacteria (and others such as *Streptococcus faecalis*) probably work to a certain degree on a temporary basis due to their non-avian origins, especially in the case of the readily available bovine forms. These bacteria are probably swept out of the intestine on a daily basis and must

be re-introduced daily to maintain a level of bacteria sufficient to influence the intestinal environment. The most recent research data after statistical analysis indicates it is probably most helpful in babies up to a couple of weeks in age. I highly recommend investigating the use of Probios™ provided by Pioneer due to its wide spread of replacer bacteria.

**Crop Inoculation:** This involves the transfer of the fluid, bacteria and other contents with or without food material from one bird to another.

This is accomplishing what the *Lactobacillus acidophilus* powders are attempting to do only in part. The normal gastro-intestinal tract flora of a psittacine bird contains at least 40 natural organisms which are integrally linked with normal health. Lack of parent or parent-fed sibling contact, over-zealous use of certain antibiotics, and gastrointestinal tract disturbances can lead to an abnormally functioning digestive system when these natural micro-organisms are absent or in numbers.

A small amount of digestive material retrieved from a normal, healthy baby's crop and passed to a disrupted or incompletely inoculated baby's system is a more effective manner of balancing this delicate ecosystem than by means of drugs, powders or feed supplements. Even mouth-to-mouth contact with healthy babies (mutual mouth pumping) is sufficient for an adequate transfer of these micro-organisms. This arrangement is *not* recommended unless the health of all babies involved is known in great detail.

This material must be used immediately (while still body temperature warm) and does not survive the current technology available for freezing and lyophilization (freeze drying).

This produces the results spoken of when aviculturists discuss the enzymes that parents pass to their offspring to make them healthy.

**Crop Brace:** Some babies, in particular cockatoos and macaws, have a problem in emptying their crop fully or at an expedient rate. They have droopy crops and are said to have *pendulous crops*. The cause is not known but suspected to be due to overstretching this esophageal dilatation or a weak muscular layer around the crop itself, which does not allow for the proper contraction necessary to force the feed downward on its normal pathway.

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brace or "crop bra" is very helpful in compensating these baggy ingluvies. This can be made from an athletic tube sock for infants, surgical Stockinette or Vetrap™ material.

In smaller species, they can be fashioned from non-static dryer sheets (Cling Free™) after the chemicals are washed out, tee-shirt material strips or horse leg wrap material (Vet-Wrap, by 3M Company). Larger species adapt very nicely to human infant tube socks with the heel cut off and two slots opened for wings on opposite sides. This forces the crop up and on top of the breast into the proper position and aids in the contraction of the crop.

The bra should be snug enough to prevent the crop from slipping out from the bottom edge, but not so snug as to prevent a finger's width of stretch, or it will lead to the forced regurgitation of food. These should be changed as they become soiled with formula and as the baby grows in size.

#### V. Maldigestion and "Crop Shutdown" Aids:

This category of tips is offered primarily for the large scale aviculturist who may possess a good fundamental working knowledge of avian medicine, thanks to a close association with an avian vet, or for those bird owners who do not enjoy the availability of a qualified avian vet due to their location . . . or just the timing of an emergency. I have clients in rural areas of Idaho, New Mexico and other states who need just as much help as those down the block.

These aids are suggested to buy time, prolong lives and possibly eliminate a serious condition by the time a qualified avian vet can evaluate the problem personally.

Once a bird is in the state of maldigestion, malabsorption or complete gut stasis, the penalties for incorrect actions go up markedly. This is a complex and dangerous condition.

**Digestive Enzymes:** These are usually manufactured as a tablet or powder using a combination of the three major digestive enzymes produced naturally by the pancreas. These are lipase (for fats), trypsin (for protein) and amylase (for starches).

These enzymes, when added to infant formula, predigest the food and substantially liquify the bulk of the material. This renders the food to

a tomato soup type consistency, and will reduce the amount of physiological work required by the stomach and intestines to process the food. This in turn speeds up the digestive rate and also makes the food more readily absorbable by reducing it chemically to a simpler form.

This is a tremendous advantage over the traditional technique of reducing food bulk by adding great amounts of water. Digestive enzymes obliterate the fibrous and bulky nature of the food (microscopically) without sacrificing any nutritional quality. Increasing water percentages in formulas will significantly drop the other nutrient levels. Food is like a pie, where each component is a slice. When you increase one section, you are automatically reducing the other components accordingly.

**Yeast Retardants:** An upset gastrointestinal tract, be it from chills, antibiotic therapy or disease, frequently will produce a yeast overgrowth. One type is *Candida*, but other unidentified yeasts are also seen. These micro-organisms cause gut tract damage and some can actually inhabit the gut wall itself.

Three different anti-fungal products are available for use. The first is the old standard, nystatin suspension. This has been used for years by aviculturists and avian vets alike. Nystatin powder, which is a yeast retardant for poultry feed, can also be used similarly.

These are both prescription drugs and must be dispensed by a licensed vet, but many aviculturists are supplied with an adequate supply for unexpected digestive problems.

The third drug is ketoconazole and is sold as Nizoral™. This small tablet is relatively newer than nystatin, and is publicized to be more effective, especially in the case of deep seated gut or crop wall yeasts that are beyond the reach of nystatin, which is contained entirely within the organ system. Other drugs such as Ancoban™ and Gentian Violet stain are also utilized in resistant cases on occasion.

There has always been some controversy over the relative effectiveness of each drug and some claims are made as to the resistance by yeast and fungi to them. However, I have not seen this to be the case and use both of them in patients as indicated by crop and fecal swab examinations. The concerns voiced are a potential reality and therefore the indiscrimi-

nant use of prescription drugs must be controlled so that our birds can continue to enjoy their benefits for many years to come.

#### VI. Sanitation and Disinfection

These two practices are probably the single best defense against the incidence of disease and reduce the challenge to the health of your birds. There are a myriad of choices to accomplish these goals and the entire subject is beyond the scope of this article. I will point out the items of greatest success for my clients and my patients.

**Chlorhexidine Solution:** This is most common purchased as Nolvasan™ (Fort Dodge Labs) and used as an all-purpose disinfectant. It has some severe limitations such as the lack of ability to kill some viruses (non-enveloped) and *Pseudomonas* bacteria. However, it has a very low potential for toxicity, is pleasant smelling, does not cause damage to hands and is an excellent anti-fungal agent. I recommend that all aviculturists using open water pans as a humidity source in incubators (as most do), use this to prevent yeast, molds, and fungi from accumulating in these pans. Babies are very susceptible to the inhalation of fungal spores, especially those of *Aspergillus*. The usual recommendation is about 1 cc per pint of water, depending on how often the pan is scrubbed and other environmental factors, such as the outdoor (ambient) humidity level. Veterinary schools are beginning to strongly recommend chlorhexidine solutions for surgical preparation.

**Chlorine Bleaches:** Bleach is an excellent all-around disinfectant, but also has a few chemical limitations in its ability to kill infectious micro-organisms. It has similar abilities as methyl alcohol and high concentration hydrogen peroxide. Unfortunately, it also has the same usage problems as these other two chemicals; namely that it is very caustic to living tissues and many non-living items, such as wire cages and plastics. It also tends to dissipate quickly into the atmosphere, particularly under the influence of sunlight and heat. It can also suffer great decreases in chemical activity while in storage in its container, leaving the final concentration upon use in question.

Chlorine bleach at 1:8 to 1:16 dilution (one to two cups per gallon of water) will have an excellent effect

on nearly all micro-organisms of concern, as long as the solution is changed daily, used indoors and kept relatively free of dirt and debris. Be careful around rubber, polished steel surfaces and living things of value (i.e. birds, eyes and hands). Be sure to keep all indoor areas well ventilated.

**Gluteraldehyde Solution:** Research efforts and discussions with officers of the Public Health Department of Los Angeles leave little doubt as to the effectiveness of this relative newcomer to the disinfectant market. It has excellent abilities to control all the major pathogens of concern (such as *E. Coli*, *Pseudomonas*, *Salmonella*, Tuberculosis, yeasts, fungus and viruses both enveloped and non-enveloped). Most surfaces are considered clean after ten minutes contact with a 1/2% spray. Instruments are generally considered sterile after 30 minutes of submersion in a 1/2% solution. This product has the lowest level of tissue irritation possible, as per E.P.A. ratings for the brand Wavecide 2% (Medical Chemical Corporation of Santa Monica, California and Wave Energy Systems of Cedar Grove, New Jer-

sey), is not degraded by dirt or food, treats rubber, hands and tissues kindly, and has a pleasant odor. The 1:4 dilution is valid for 21 days of continuous use for submersion of equipment, cages, bowls and baby syringes. The full-strength solution is valid for 42 days of continuous use and this makes the final cost very appealing when compared to some of the other popular standards used for many years by bird owners.

This product eliminates the need for two or three different disinfectants when one needs to decide which infectious organism they are going after. Is bird contact a risk? What's the time of surface contact required and can you afford the cost? This disinfectant can be sprayed on counter tops, used as a water bowl soak, handfeeding equipment soak, and as a cage scrub with its excellent detergent qualities. I suggest you look into this product more closely.

**Hand Disinfectants:** After every inch of the bird room, cage and aviary is spotless, remember that the last thing that probably touched them were your own hands. Cleaning cage papers or food bowls, and then rushing off to the kitchen to dice

fruit, mix formula or change the baby's towels is not wise *unless you wash your hands* with an effective disinfectant soap. Field testing, research literature reviews and personal observations indicate that the tamed iodine (iodophor) soaps are probably the best ones available. These soaps are sold as surgical scrubs and available under the names of Betadine™, Prepdyne™, Wescodyne™, etc., and are used to prepare patients for surgery.

They may stain some items and tend to discolor gold jewelry but are very effective against all bacteria, fungi, molds, yeast and many viruses as a hand wash. Excessive use can dry your skin, so keep this in mind if you wash every few minutes.

Disposable gloves may be a viable alternative for some people with sensitive skin.

#### Conclusion

This is not a complete list, nor a medical guide. It does serve as a short piece of information as to how to prepare better for life's uncertainties and to educate you as to how to use appropriate supplies when no one else is around to do so. ●



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