

PREVENTING GUT STASIS IN HAND-FED PALM COCKATOOS

by Katy McElroy

It was November 2008. The two-week old Palm cockatoo chick was crying loudly, begging to be fed. His crop was nearly full of formula, the same as it had been the night before. His gut function had begun to slow a few days ago and in that short time he had changed from a rapidly growing, plump, pink, contented baby to a thin, anxious, pale little creature who could no longer digest anything I fed him. My heart sank. I knew I would lose this baby as I had lost several others if I couldn't stimulate his sluggish digestive tract before it stalled completely.

Most psittacine breeders eventually deal with the occasional "slow crop". Causes range from incorrect brooder temperature to bacterial and fungal infections, but it is rarely fatal if recognized and treated promptly. In 30 years of breeding white cockatoos I had never seen anything like this. It seemed as though every Palm baby developed some degree of gut stasis or constriction after a few days of hand-feeding.

The Palm breeders I talked to were an innovative lot and most agreed that what worked for one chick didn't necessarily work for another. I learned that most used a variation of the diet recommended by the Avicultural Breeding and Research Center (ABRC) which consists of a commercial formula supplemented with broccoli, apples and macadamia nut paste. Some suggested alternating feedings of thicker formula with water or Pedialyte. Other babies did better on tiny amounts of thin formula fed every two or three hours around the clock for the first week or two. Food movement through the gut of Palm neonates is typically much slower than that of white cockatoos. Weight gain is often painfully slow and fungal and bacterial infections are common. With much luck and attention, the baby survives and eventually thrives once it begins eating on its own.

Unfortunately, many chicks never make it that far. Their digestive systems continue to slow regardless of what they are fed. Even plain water stops moving through them, and enzymes and probiotics are of little help. Once the gut shuts down and weight gains stop, they quickly weaken and die. Grams stains and cultures are usually normal unless the chick lives long



Photo by Shane Hancock

enough to acquire infections as a result of slow digestion. Necropsy results are inconclusive. No doubt many breeders and their veterinarians have lain awake nights puzzling over the mystery ingredient that would solve the problem of gut stasis in Palm chicks.

How It All Started

My adventure with Palm cockatoos began in 2004 when two physicians, Scott Karlene and Kevin Gaffney, asked whether I would be interested in breeding a group of Palms belonging to their non-profit foundation, Lahser Interspecies Research Foundation. LIRF is dedicated to endangered species preservation, disease research and prevention, and nutritional and dietary investigation. The doctors were intrigued by the difficulties inherent in Palm husbandry and decided to take up the challenge. I was thrilled at the opportunity to work with a species I had only dreamed of. I knew Palms were considered one of the most difficult psittacines to breed, but I had many years experience with white cockatoos including three generations of *Galerita galerita*. How hard could they be?

During the first two years working with the LIRF Palms, I found them to be active, hardy birds, able to spend much of the



A young Palm hatchling waits to be fed / By Katie McElroy



A nourishing diet of seeds, nuts, pellets, sprouts and fresh veggies keeps a young Palm chick healthy / By Katie McElroy

year outdoors in our harsh midwestern climate. As I observed their behavior and compared my thoughts with Dr. Karlene's, I grew to love these beautiful, independent and somewhat solitary birds that were so different from my gregarious white cockatoos. I also began to understand how they got the reputation for being difficult.

Palms are perfectly content living one to a flight. If two birds don't show a strong and obvious attraction for each other, there's no point trying to change their minds. Unlike a white cockatoo that might initiate a romance with the bird next door because it doesn't want to be alone, a Palm has no need for closeness with a bird that is not its mate. We have a lovely mature hen who so far has turned her back on every male who displays and calls to her. I have no idea whether she doesn't want a mate or if I haven't found one who meets her standards, but I keep trying.

Mated pairs obviously enjoy each other's company and often display and call to each other, but they do little allopreening or cuddling and often sleep at opposite ends of their flights. I quickly discovered that few things make an adult Palm more grumpy than having to share a sleeping perch with another bird.

It took two years to get six birds paired up and busy filling their open-topped boxes with finely shredded branches. I thought the hard part was over. I had no idea how difficult the next stage of this project would be.

Our First Palm Egg

Our first Palm egg pipped under a broody Silkie bantam hen, because I had more confidence in birds than machines. My Grumbach ran constantly throughout the breeding season but was only used in emergencies, because most of my white cockatoos were excellent parents. Our Palm parents-to-be seemed more interested in sitting in their outdoor flight than incubating their egg (Palms only lay one egg per clutch), so I exchanged it with an infertile Silkie egg. This way, if the birds eventually decided to sit, I could give them back their egg.

The baby was strong and healthy and hatched without assistance. He digested formula normally for four days and then began slowing down. He was fed thin formula around the clock for several weeks until he gradually outgrew the problem.

The Next Two Chicks Died

Dr. Karlene has a long history with large hookbills, and that combined with his background in human medicine made him my most trusted resource as well as a friend whose patience and encouragement I counted on, although I knew he was as disheartened as I was over the loss of each chick. We spent many hours on the phone discussing possible solutions.

My homemade formula had been patterned after the commercial version and was as smooth as I could mill it. Many

years ago when I was experimenting with hand feeding formulas for my white cockatoos, I bought the best grain mill I could find, a Diamant, a rugged, cast iron machine from Denmark that was capable of grinding oily seeds and nuts. I even bought special extra-fine burrs for it in case the standard ones for milling flour couldn't be adjusted finely enough. I liked the idea of buying whole grains fresh at the health food store and grinding them myself. As commercial hand-feeding formulas improved over the years I often thought about switching, but never did.

Dr. Karlene had the formula analyzed and made several adjustments including increasing the fat content for the Palms. My white cockatoos thrived but the Palms still struggled. There seemed no point in switching to a commercial formula when their track record was no better.

Dr. Karlene wondered whether formula texture might be the problem and suggested adding particulates such as chopped nuts. I added chopped walnuts to the formula and was surprised to find that our next chicks went much longer before digestion began to slow. The bigger a chick was before gut stasis set in, the better my chance of pulling it through. This was definitely a step in the right direction. The drawback with chopped nuts was determining how much to add. Too many accelerated digestion, but diluted the nutrient content of the formula and resulted in slower weight gains. Too few, and the chick's weight would increase until its digestion began to slow again and it showed signs of distress. Each chick had different tolerances, so a careful balance between particulates and formula was necessary. It wasn't a perfect solution but I was relieved that we were no longer losing baby Palms.

In 2009 we had our big breakthrough. Barney and Stella were an elderly pair of imported Citrons that had never produced eggs of their own. Each spring I gave them an egg from another pair of cockatoos so they could raise a chick. This year they started nesting at the same time one of our Palm hens laid an egg. I called Dr. Karlene and he agreed that it would be interesting to see how Barney and Stella managed the problem, so I presented my geriatric pair of Citrons with a fertile Palm egg.

We have used nest box cameras for many years, so we knew when the chick hatched and could see that both parents were attentive. All went well until a spider built its web across the top half of the box which kept us from seeing much of the baby. It sounded strong and healthy and these two birds were great parents, so I tried not to worry. Finally after 24 days Barney and Stella left the box to play outdoors in a warm spring rain shower and I was able to check the Palm chick. I was amazed at its size and weight, but mostly at its crop which was packed full of whole hulled seeds and chunks of almond. When I pushed my finger gently into the crop it left an indentation as if in wet gravel. The baby weighed 249 grams, much more than



The first Palm cackatoo at 6 years old / By Katie McElroy



A group of young Palm cockatoos wait to be fed. As an adult, their powerful bill will enable them to eat very hard nuts and seeds
By Katie McElroy

any Palm chick I had raised, but more important it looked and acted like a healthy, contented cockatoo baby should. I weighed it, snapped some pictures and returned it to the nest box.

I emailed the photos to Dr. Karlene, and we agreed that this might be what we had been looking for. Barney and Stella's diet consisted of seeds, nuts, pellets, sprouts and fresh veggies. What if there wasn't a mystery ingredient? What if Palm chicks simply require extremely coarse food?

My white cockatoo pairs are encouraged to rear their chicks and have access to large, walk-in planted flights. I know they feed their babies gravel, dirt, leaves, roots, bark, bugs, whole seeds and probably other things I'm not aware of, and their chicks always look amazing. Biologists studying the crop contents of wild Macaw chicks have long known that parent birds



A mixture of dried corn, nuts, seeds and other grains can be made from scratch, using fresh ingredients from the grocery store, to feed young chicks / By Katie McElroy

feed coarse foods and roughage that in no way resemble the smooth formulas designed for syringe-feeding. Most psittacine babies do well enough on commercial formulas, but everyone has the occasional chick that doesn't empty as quickly as it should. What if there were benefits to coarse food that we weren't aware of?

I adjusted the grinding burrs on the Diamant until it was just cracking the seeds and grains rather than making a fine meal. I cooked it exactly as before and began spoon-feeding it to every cockatoo in the nursery, black and white. The results were startling. Palm chicks began digesting food at a much faster rate. Daily weight gains nearly doubled, and there was a noticeable improvement in skin color. While there was less improvement in the growth rate of the white cockatoos, babies seemed more content with less crying and restlessness between feedings. Not a single chick regardless of age had a problem digesting the coarse formula.

Conclusion

We lost five Palm cockatoo chicks to gut stasis between 2006 and 2008. We have raised fifteen youngsters with no losses since converting to a coarse formula. Although they take longer to wean, baby Palms are as easy to raise as white cockatoos when fed a coarse diet.

Our first chick is now a stunning 7 year old male who recently began displaying for the young female who shares his flight. I am hoping that the magnificent Palms hatched and raised here in our indoor-outdoor breeding facility will be as successful as our white cockatoos in raising and weaning their

chicks. If so, Lahser Interspecies Research Foundation will have accomplished what it set out to do.

LIRF Palm Cockatoo Hand-Feeding Formula

Since manufacturers aren't likely to produce chunky commercial formulas any time soon, the only alternative is to add coarsely chopped nuts and veggies to existing formulas or make your own from scratch. I have included the recipe that we are currently using with the LIRF Palms. It isn't necessary to buy an expensive grain mill if you will only be feeding the occasional chick. A small hand-cranked unit with adjustable grinding plates works well.

The ingredients are readily available in grocery and health food stores. Whole, dried field corn is available from feed stores. Be sure it is bright and clean with no mold or musty odor.

Kefir is an ancient cultured milk product similar to yogurt and is the single most important formula ingredient, supplying calcium, natural vitamins and probiotics. It is available in grocery stores and health food stores but can easily be made at home. Kefir starter, also known as "grains" will convert a quart jar of whole milk to kefir in approximately 24 hours at room temperature. The starter is then transferred to another jar of milk and the kefir is refrigerated. The starter grains can be frozen when not needed. Kefir looks and tastes like thin yogurt and can be used the same way. Yogurt would be an acceptable substitute except that most commercial varieties are artificially thickened and don't thin the formula sufficiently. Buttermilk with live cultures and no thickeners or additives works in a pinch.

Ingredients

- 2 1/2 cups lentils
- 2 cups raw hulled sunflower seed
- 2 cups dried field corn
- 2 cups plain brown rice (not the quick cooking kind)
- 1/2 cup raw almonds
- 1/2 cup whole flax seed
- 2 cups raw wheat germ

Coarsely chopped or grated fresh dark green or orange vegetables such as carrots, sweet potatoes, broccoli, kale, collards or chard - whatever looks most fresh at the market.

Whole milk kefir

Coconut oil

Calcionate syrup (Calcium Glubionate, 1.8 g/5 ml.)

Mix the first six ingredients and grind coarsely in a grain mill. The corn and almonds should be broken up, and the other grains should be crushed or broken in half. Don't worry if some of the smaller seeds, particularly flax, are left whole. (See photo.) Add the raw wheat germ and mix well. This meal should be tightly sealed and stored in the freezer.

Preparation

When ready to use, mix 1/2 cup firmly packed meal, 1 1/2 cups water, 1/2 cup vegetables, and a small pinch of salt in a microwaveable container. Don't fill the container more than half full or it will boil over. Microwave at full power for 12 to 15 minutes or until very thick, stirring once or twice. Stir in 1 teaspoon coconut oil. Cool, cover and store in the refrigerator for up to three days. The mixture will solidify when chilled.

Feeding

Scoop out enough cold, cooked formula for one feeding. Thin with kefir to the desired consistency and warm to feeding temperature. It will take roughly two parts formula and one part kefir to achieve the correct consistency, but this will vary according to the thickness of the cooked formula.

Supplement with Calcionate Syrup, 0.1 ml per 100 grams body weight three times a week. Do not use a calcium supplement containing Vitamin D unless advised by a veterinarian.

This can be fed to Palm chicks from day one to weaning by avoiding the largest particles when spoon feeding very young babies. I use half kefir and half water to thin the formula for the first 24 hours after hatching.

Feed Palm chicks every two hours around the clock for the first 24 hours to get them off to a good start, then every 3 hours from 6 a.m. to 11 p.m. At two or three weeks they are usually ready to be fed 4 times a day.

The following weight chart shows the difference between our first two Aterrimus Palm chicks, HB141, a male hatched in 2005 and HB142, a female hatched in 2006, both fed smooth formula, and a male, HB149, hatched in 2009 that was fed coarsely ground formula. What the numbers don't reflect is the huge difference in time, effort and round the clock feedings that were necessary to raise the first two chicks.

Day	Palm HB141 (smooth formula)	Palm HB142 (smooth formula)	Palm HB149 (coarse formula)
0	15 grams	14 grams	16 grams
1	16	15	19
2	19	17	22
3	21	19	26
4	23	22	29
5	26	24	32
6	28	26	36
7	31	28	40
8	34	29	45
9	37	31	50
10	39	31	56
11	44	32	60
12	47	32	66
13	50	33	72
14	53	33	81
15	60	34	88
16	64	34	97
17	69	37	107
18	80	40	111
19	94	44	122
20	105	46	130
21	117	51	139
4 weeks	178	83	259
5 weeks	239	118	349
6 weeks	260	190	357
7 weeks	433	228	510



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