

Subject: Avian Gastric Yeast (formerly known as Megabacteria)
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Study Location: Broome WA
Period of Study: August 2005 – January 2006

Avian Gastric Yeast (AGY) is a deadly condition in birds which once a bird is physically affected, in my experience, causes death in all untreated cases. The data in this review is gleaned from a study of 67 wild Northern Rainbow Lorikeets (*Trichoglossus haematodus rubritorquatus*) and 1 Eastern Rainbow Lorikeet (*Trichoglossus haematodus moluccanus*).

I have been specializing in bird rehabilitation in Broome for the past 8 years. Over that time I have seen quite a number of cases of AGY, or Megabacteria as it used to be known. In past years, all cases presented late in the wet season but did not seem to occur every year, therefore, it was concluded that weather conditions were a causative factor.

In my experience I have only encountered AGY in wild rainbow lorikeets and red winged parrots (*Aprosmictus erythropterus*), but rarely in both species in any numbers in the same season.

During the 2005-6 Wet Season I did have occasion to examine some local caged budgerigars which had suspicious symptoms. I diagnosed coccidiosis, treated them accordingly, and they survived, therefore, it is reasonable to conclude that they did not have AGY; although the symptoms are similar and it can be difficult to determine which is present. Faecal examination will confirm what is present. Most of the AGY patients treated carried both.

The patients which form the basis of this study came into rehabilitation between August 2005 and January 2006, however, of the 68 birds studied 12 were admitted in November 2005 and 37 were admitted in January 2006. During this season I had two red winged parrots present with AGY, both survived. The reason I have included the reference to the one eastern lorikeet species is to draw attention to differences in his recovery, documented in the following text.

- In August 2005 8 birds were admitted suffering from suspected *Coccidia*. All were treated with Amprolium, 6 survived, 2 died.
- In September 2005 4 birds were admitted suffering from suspected *Coccidia*. All were treated with Amprolium, all 4 died.

Samples were harvested from 2 of these dead birds and sent for histopathology, the results suggested the presence of megabacteria.

- In October 2005, 5 x Rainbow Lorikeets were admitted
- In November 2005, 12 x Rainbow Lorikeets were admitted
- In December 2005, 2 x Rainbow Lorikeets were admitted
- In January 2006, 37 x Rainbow Lorikeets were admitted

All birds admitted between October 2005 and January 2006 were treated for both AGY and *Coccidia*. Whilst it is advisable to confirm your suspicions with faecal floatation's there may be times when this is not practical in all cases. For instance, during January 2006 when 37 AGY patients were admitted they were only a subset of a total of 91 patients admitted to Chelonia in the month. It was simply not

practical to test every bird's droppings. Many of the birds treated were extremely anorexic and collection of viable faecal samples was not possible. An assumption was made based on the symptoms, the species, and the total number of birds admitted that AGY was involved.

Of these 56 patients 2 were euthanased, 19 died, 35 survived. Of the 19 which died, 11 were classified as DOAs, that is, birds which were either dead upon delivery, died before treatment could be administered, or died between the first and second dose of drugs. It was considered that these patients were too far gone to be positively affected by either the medication or the treatment regimen. All birds classified as DOA's died within the first 4 hours, all other birds which died did so in the first 72 hours, and all birds which progressed to the self feeding stage within the first 4-5 days of admission survived.

All birds were found on the ground unable to fly. They were in various stages of debility. As previously mentioned many were severely anorexic, some were suffering from secondary problems caused by their weak state and their inability to fly, and some died as a result of being held by their rescuers for one reason or another. For instance, one man wanted to hold a bird for several more hours after reporting until his children came home from school to say goodbye to it, they had found it the previous day. Others died due to administration of fluids which were inhaled. Water, or water and honey, were the liquids administered to them by rescuers prior to admission into rehab.

I concluded that it did not seem to matter what condition the bird was in on admission, some individuals survived and some died, it seemed to come down to the will to live in each individual. Some birds which were quite plump and alert and still able to flutter about died in spite of prompt treatment, and some other individuals which were chronically anorexic and unable to lift their heads on admission survived.

Although I do not have any sound evidence to support this theory, it seemed to me upon questioning of the rescuers, that birds which had been handled minimally and had been brought straight into rehab had a greater chance of survival than those held for a day or two and treated as pets by the family prior to being placed in care.

I conclude from this observation that once a bird has contracted AGY, stress is a determining factor in subsequent death.

I should comment on some observations made on the behaviour of Rainbow Lorikeets in captivity. Rainbow Lorikeets are extremely gregarious birds. I noted that a bird alone was less likely to survive than birds kept in pairs. I noted that placing two birds into a cage together resulted in those birds forming a bond and snuggling together on a perch at night and staying close to each other by day, performing mutual preening as they gained strength.

If a third bird was introduced it generally stayed separate from the other birds until a fourth was introduced, at which time it would repeat the pairing behaviour. Birds with a buddy were definitely more likely to pull through.

Some of these pairings became very strong. There were instances of a bird being released and refusing to leave the property until its buddy was also released. I had one touching instance of a tail end bird which was unable to fly strongly for months following recovery. I felt that I had to release its buddy. This was obviously not a

popular decision. The buddy flew about in trees and fed itself, but kept returning to the aviary and hopping about in shrubs at the side near its friend for several weeks, often spending long periods just sitting near it. Eventually this bird flew back into the aviary one day as I was entering and I let it stay with its partner until it was ready for release some months later.

The observation I made of the eastern lorikeet, Ringer, which was an escaped pet which had not been claimed and had been with me for at least two years, was that it went down very hard, very quickly, and took much longer to recover than the wild birds.

I have no idea how Ringer contracted AGY. He was quite separate to the sick birds. It is possible that he picked it up from my person, although I do not handle him. It is possible that the yeast organism clung to a food container in spite of cleaning. Or it is possible that as it is airborne he contracted it that way. I make the assumption that he was harder hit, and had a longer recovery period, due to not having built up any natural resistance to the organism by being exposed to it in the wild. I have observed AGY organisms present in faeces from birds which had not 'come down' with it. I should also comment that in the samples I did look at, the AGY organisms were scant and not present in large numbers.

Within a 12 hour period Ringer went from being visually less frisky than normal, but still moving about and eating, to being totally incapacitated and unable to sit up or show any interest in food or water.

I treated him for 15 days with Amphotericin B, rather than the normal 10 days, as he was clearly not well enough to come off it, and it took him many months to recover the strength to fly again.

TREATMENT: The main drug used to treat the AGY affected birds was Amphotericin B 10 mg (Fungilin Lozenges). Whilst being treated with the antifungal drug all patients were also administered a rehydration fluid which contained an avian vitamin and electrolyte mix, calcium, and Amprolium for Coccidia. Once the Amphotericin B course was completed a probiotic was added to food.

The patients were treated with Amphotericin B at the rate of 0.5ml–1ml/100 grams per dose twice per day for 10 days, with a double dose administered twice on the first day. Due to the large numbers of birds being treated I did not take into account minor variations in the bird's weight and give each of them a tailored dose. As they were all depleted adults, I gave the same dose to all patients based on an assumed average weight of 100 grams, which was 1 ml BID on the first day, and 0.5 ml BID thereafter for a minimum of 10 days total treatment.

Initial doses were administered via a crop needle. As the surviving birds began to respond to the treatment they showed interest in eating again and, thereafter, the drugs were administered in food. Once again, due to the number of birds being treated at any one time, I assumed that once they were eating, each bird was eating about the same amount as the others and that they would, therefore, receive roughly the same dose each day. At the time I was being inundated with AGY patients I was also receiving many other orphaned, injured, or ill patients of other species such as snakes, lizards, sea turtles, possums and flying foxes, and of course other birds.

As all of the birds which had improved to the point where they were self feeding recovered, I concluded that this approach was satisfactory. I did catch a couple of birds which appeared to slip back. These birds were crop fed for an additional couple of days then put back with the self feeders.

The alternative would have been, due to the workload associated with other patients, to sacrifice the AGY birds in order to be able to save as many of the other patients as possible. Fortunately this was not necessary.

The birds which came into rehab at the end of 2005 seemed to recover quite quickly and were able to be released after around 4 week's recovery in an aviary following the initial 10 day treatment regimen. I noted that the later admissions took much longer to recover the ability to fly strongly, and most of these birds required from 6-8 weeks in recovery. At least two birds took several months to resume strong flight. This was also the case with the one eastern lorikeet as previously mentioned.

It was difficult to keep a truly accurate track of every bird, and on a few occasions birds which had been released were not quite ready. I set up feeding stations outside the aviary for them. They hung around the aviary and allowed themselves to be retrieved. Every such case was eventually successfully released, generally within about a week of return. No bird which reached the self feeding stage died.

In Broome, coccidia is always a problem in the wet season, however, all through 2005 I was receiving large numbers of cases. This was probably due to two unseasonal bouts of rain during the dry season

I have had a lot of experience treating all manner of species of both wild and domestic birds suffering from Coccidia. My experience tells me that it takes a minimum of 5 days, sometimes up to 8 days, for birds suffering from Coccidia to stand up when treated with Amprolium.

Once AGY had been diagnosed I was confident that most of these birds were actually suffering from AGY as they picked up noticeably within 3-5 days.

TREATMENT PROTOCOL: Upon admission each patient was kept in an ICU box for at least 24 hours, some longer, ability to sit on a perch being the determining factor for progression to the next stage. These ICU patients were administered Amphotericin B via crop needle at the prescribed dose twice daily, morning and evening. They were also given Chelonia Rehydration Fluids with Amprolium added, via crop needle, at roughly four hour periods.

Once a patient was able to perch it was placed in a cage and the rehydration fluid was replaced by a liquid food mix. This food was made up of a nectar mix, plus pureed fruit, made into a thick liquid with the rehydration fluid. This food was introduced via crop needle at least four times per day. Once the birds were self feeding an insectivore mix was added. A Rainbow Lorikeet can safely tolerate up to 3 mls of food per crop needle feed.

The decision was made to add the medications to the liquid food rather than to the water supply as I was able to pretty accurately predict how much food a bird was going to consume in a day, whereas, water consumption was a much less measured entity. Once self feeding, each patient would consume around 50-80mls of food per day.

Identification of each individual patient is a vital ingredient of successful treatment. I made marks with liquid paper on the heads of patients as they were admitted. The first bird may get one stripe, the second two stripes, and the third three. Three was about the limit for this marking so a bar may be added to a fourth bird, or a series of dots etc. The fact that Lorikeets preen and groom each other meant that the markings often needed refreshing.

Chelonia records all admissions but, due to the large number of Lorikeets being admitted, I found it necessary to keep a separate register of AGY patients. These markings were recorded against the patient's record on the AGY register. In this way accurate records of deceased birds, or birds which were ready to progress to a self feeding environment in a separate cage were kept.

Rainbow Lorikeets love to bathe, so a bath was provided in the self feeding cages in order to bolster self esteem whilst in recovery. At the end of the 10 day treatment program all birds were self feeding, and by 14 days most were ready to be moved into an aviary. By this stage the head markings had generally been washed off. Rainbow Lorikeets also like to lie down to sleep, sleeping ledges were provided in the aviary.

During the thick of the epidemic I had a series of ICU boxes on the go, housing from 1-4 birds each. For the next phase I used medium sized cages to facilitate easy handling whilst crop needle feeding liquid food plus medications. The third stage, self feeding and medicating, saw the patients progress to large cocky cages. Finally, after the 10 day Amphotericin B treatment was ended, as patients were ready they were placed in an aviary until they were strong enough to be released.

Once the medication program was complete a probiotic powder was added to the liquid food at the prescribed dose. This was to assist in reestablishment of natural gut flora, and to aid digestion. A fine seed mix and quick oats were also offered as food. I also tried offering chopped fruit, but the wild birds did not take to it so, in the interest of workload considerations, I dropped it from the menu.

I know that the treatment program adopted was very successful. What I cannot comment on, of course, is the long term survival rate of the recovered, released patients. Does exposure to AGY, and recovery from it, provide any future resistance to the organism? Does exposure to AGY, and the chronic debility it induces, leave the recovered patients with any long term negative effect on organs such as kidneys or liver? These are questions which will be difficult to answer.

Although the exercise which is the subject of this paper was an extremely interesting one, I truly hope that I never get such a high volume of birds being admitted with AGY again. Good luck as you treat AGY affected patients.

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APPENDIX

DRUGS:

Amphotericin B (Fungilin – Bristol Myers Squib) 10 mg lozenges –

- Lozenges were crushed and dissolved - 1 in 5mls of water. As admissions increased dramatically I had to make up 20ml batches. The lozenges take some time to dissolve so were placed in the fridge, at least overnight, preferably for 24 hours, before use. In the thick of the epidemic I generally had two bottles of preparation on the go at any one time.

I found that Fungilin Lozenges kept for long periods once dissolved, up to 30 days.

I assumed a weight of between 100 – 150 grams per patient. Each patient was administered 1 ml of Amphotericin B solution twice daily, morning and evening, for the first day and 0.5ml twice daily thereafter for a further 9 days.

Amprolium (Coccivet - Vetafarm) 80g/l Amprolium, 5.1g/l Ethoparbate

- The recommended dose of amprolium is 1.5ml/litre, or 0.15ml/100ml. I use this as my therapeutic dose for birds at risk which are not already sick and are still drinking. In already affected birds I administer at double the recommended dose, which is at 0.3ml/100ml for 5-7 days.

I expect the fluid intake of recovering and healthy birds to be around 5ml per 100 grams per day.

FOOD:

Wet Nectar Mix – per bird per day

- 1 tablespoon Wombaroo Lorikeet & Honeyeater Food
- 1 tablespoon pureed baby fruit (Commercial brands available at Supermarkets)
- 2 grams Vetafarm Insecta-Pro (only added to food in containers once birds are self feeding as it will block a crop needle)
- 2 tablespoons Chelonia rehydration fluid
- Pinch Vetafarm Probiotic (only added after medications have ceased)
- MAKES 80 ml WET FOOD

Dry Food

- 50/50 Good quality budgie seed/quick oats

CHELONIA Rehydration Fluids

- 600ml water
- 1 ½ 4 gram scoops Vetafarm Soluvet Plus
- 1 tablespoon Vetafarm Calcivet