

Psittacosis Update

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In an effort to bring to light the current thinking on an age old problem, I have combined a number of aspects concerning the disease known as psittacosis, or more commonly referred to as parrot fever. This has been a traditional subject for aviculturists and avian practitioners, not only as a disease requiring treatment in birds, but also as a tremendous diagnostic challenge at times, a fearful social subject among breeders and brokers, a legal issue and as a human health concern.

At present, there is a current shift in the thinking of avian veterinarians in trying to best reduce and control this persistent and ubiquitous organism. Most progressive vets have changed from the "fireman" mentality of chasing down the hottest fire going underfoot at the current time, to a more time and cost effective effort of routine testing, identification and prevention programs.

Like all preventive medical programs (like for us stubborn humans) there is a natural resistance to the investment of time and energy into something you can't see. However, it is a proven fact that prevention has every advantage over not doing so and with most of the avian species having reduced reproductive activity in the winter months, this is the ideal season to start an annual psittacosis prevention program.

Causative Agent

Chlamydia psittaci

Synonyms

Parrot Fever, Ornithosis, Chlamydiosis, A. C. (Avian Chlamydiosis).

Description

An obligate, intracellular bacterium capable of living in or infecting all warm blooded animals including man. Lives and reproduces in the cytoplasm of cells in various organs. A member of the class of organism called Rickettsiae (not a true bacteria).

History

Discovered as the cause of parrot fever in humans in 1929. Responsible for epidemics in humans in 1929-1930 and 1954. Over 50% of budgies in California were diagnosed positive in

1929 in back yard breeder flocks. The incidents dramatically dropped when restrictions on importation were imposed until 1953. The official U.S.D.A. quarantine initiated in 1972 also decreased the incidents. The incidence rate is on the increase in the past five to ten years due to the increase in pet ownership of imported birds and better veterinary care, leading to an increased diagnosis rate in psittacines in particular.

Organism Morphology

Originally described as a "Large Virus." Actually has properties of both bacteria (size, method of replication, etc.) and viruses (dependent on intracellular support for producing disease and method of maturation between phases). Is different from *Chlamydia Trachomatis* of humans, which is the agent of *C. Lymphogranuloma Venerum-Trachoma* group seen in A.I.D.S. victims.

Transmission

This organism is primarily passed from bird to bird (or man) in the fecal dust or by fecal contamination of food or the mouth. Infected cells are then shed from the intestinal lining and protect the organism until the droppings dry and air movement, especially flapping of wings, stirs up the dried feces. The organisms are inhaled and produce clinical disease in five days to two weeks by reproducing in the lining of the intestinal tract. Some birds may become infected but not ill and develop resistance either to eliminate the organisms or to become carriers. Carriers may or may not shed (pass) the organism at different times. Periods of stress may start the shedding process in a carrier bird. Carriers are thought to exist for life, but may not always be a danger to other birds. Humans are not considered to be carriers or infective to others at this time.

Necropsys (autopsys) and laboratory samples are also a source of possible infection to humans.

Immunity

Protection against reinfection after recovery was once thought to be life long. The length of protection time is

now considered to be variable in both birds and man and probably not long lived based on the pathogenecity (severity) of the strain (specific type) involved, and persistence of the organism. It is well documented that recovered birds can harbor the organism for long periods of time, but are resistant during that time. Antibodies cannot always be found and frequently are not in high levels or do not remain high even though the resistance to reinfection may remain strong. Birds and man may become infected more than once.

Prevalence

It was once commonly thought to be only found with obvious clinical disease, but now new testing studies have shown that the incidence may be very high. Testing surveys are done by fecal culture (actual recovery of the organism) or serology (evidence of body exposure) or a combination of both and do not indicate an actual sickness rate.

Surveys from various sources report:

50-95%	in wild (feral) pigeons
30%	in imported Amazons
50%	in cockatiels and budgies
100%	of some psittacine zoo collections
25%	positive recovery rate in pet stores
43%	seropositive pet shop employees (antibody titer levels)
6.5-7.5%	in some avian pathology labs on necropsy tissue analysis

Pathogenicity and Resistance

Different strains have different capabilities of causing disease. *NOT ALL C. PSITTACI ARE ALIKE*. Distinctly different strains have been isolated from turkeys, pigeons, cattle (3) and lambs (2) and can lead to a wide range of signs from no disease to death in different types of birds. Each species of bird can react to each various strain in different ways.

It has become widely recognized that cockatiels and cockatoos are fairly resistant to the effects of the disease as a general rule and will remain alert and

active during prolonged illnesses while South American parrots, rosellas, and lorries tend to succumb very quickly, and conures, macaws and budgies tend to fall in between. Passerines (finches, canaries, tanagers, etc.) tend to be fairly resistant to the organism, but have been known to acquire the illness. Strangely though, the passerines also tend not to have high serum antibody levels as a group, even though they have high resistance. *The presence of a positive sick psittacosis bird in a group is no guarantee that the other birds will or will not become ill also. One bird in an aviary may be all that is ever affected after testing other cage mates.

Gross Necropsy Findings

The following are the classic necropsy findings but are by no means necessarily the only ones seen;

- Markedly swollen livers
- Markedly swollen (reactive) spleens
- Bile stained intestines with diarrhea
- Opaque, thickened air sacs
- Poor body weight
- Green (bile) stained vents
- Thickened pericardial sac

Some cadavers will show any number of combinations or variations of these signs. It is also possible to have *several* diseases present at one time and other disease damage signs may be evident and not show a classic condition or mask it.

Diagnosis

Definitive diagnosis is based on the isolation and recovery of the organism in either chick embryos or cell cultures in a laboratory. Technically, an irrefutable diagnosis cannot be made without this being done.

1. Fecal swabs are frequently used but a single swab is *NOT* recommended as being highly accurate due to the intermittent passing of the organism. Five days of fecal samples combined in a single tube of isolation media (liquid) is recommended but not necessarily a solid guarantee.

2. Serology (blood testing) is frequently used in live birds due to its ease, speed and relative low cost. The test determines the amount of antibodies present which are formed *after exposure* to the disease, and after several weeks time to allow for antibodies to be made by the body. It *does not* necessarily confirm active disease but can be very supportive of the diagnosis with clinical signs. It is generally recommended to run a second sample (a paried serum titer) two to three weeks later to see if the levels are higher (possible active infection) or lower (dis-

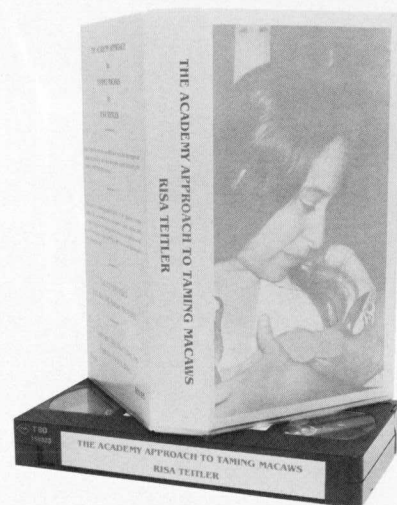
appearing levels in a recovered bird). Some birds are not as reliable at producing antibodies such as passerines and for some reason, African grey parrots, cockatoos and cockatiels, especially babies or juveniles.

Several commercial labs are available for rapid assay of the serum antibody levels in the U.S. The labs will generally report the findings as L.A. (latex agglutination) of C.F. (compliment fixation) values. At current the L.A. method is the preferred test for reliability, but questions still arise as to whether different avian species should use different test types, whether the C.F. is too sensitive or actually more accurate. An interpretation of the test value should accompany the report to allow the best course of action to be taken.

3. Hematology (red and white blood cell counts) can be of value for a quick office call situation for the *actively sick bird*. Classically the bird will show a very high white blood cell count (one of the few diseases which can consistently produce a WBC of up to or over 50,000/cu.m.m.) anemia and a high serum protein (high antibody levels). This is *not* a diagnosis but *highly supportive* for the presumption until a confirmed diagnosis is made. The great advantage being speed to initiate the proper treatment immediately without a delay of several days to weeks time which the patient obviously does not have to waste.

Certain lab stains can be done on biopsy and/or necropsy tissues to demonstrate the organisms* in the cells. *Certain drugs can interfere with the testing procedure both by fecal culturing and serology. These include many pet store type drugs including tetracyclines (Ornacyl), erythromycin (Ornamycin), chloramphenicol, penicillins, and tylan. They inhibit the life cycle of the organism, but unless the right form is used at the dose, for the right length of time in the proper manner, it will not cure the bird. These stains are not fool proof. There are different stages of organisms (especially Mycoplasmas) can mimic them and different lab stains produce different results. It can be a quick method for supporting a presumption. Giminez; Giemsa or machiaveli's stains are the preferred types.

At this time there is no guaranteed test in the live bird for psittacosis. A positive test is certain. A negative test is not conclusive. Repetition of negative tests is not a guarantee. Economics and common sense plus the clinical and lab



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Fecal sample for psittacosis isolation testing.

values are the best method at this time for deciding if a bird is a good candidate for being free of Chlamydia.

Treatment

The only currently accepted, legal form of treatment is with government approved tetracycline formulated mash and pellets such as SF-66 and Bird Life™ medicated feed. However, poor acceptance by some birds can make this choice ineffective in many cases.

Tetracycline comes in many forms and following these suggestions has been found to be very helpful in treatment;

- Water Treatment: Very limited aid — may prolong or at best slow down the disease process. Tetracycline powder in the water supply has been shown repeatedly clinically to stop the spread of the epidemic in aviary situations, even though it has been proven not to be effective for curing active and ongoing sick birds. This is due to the fact that sick birds tend to drink less water, are less competitive in group feeding/drinking arrangements and water borne drugs, especially tetracycline, never reach an effective concentration in the blood stream to kill off the Chlamydia.
- SF-66: A soybean based powder is generally not accepted well by birds and

can create starvation stress. Bird Life™, Ziegler's medicated pellets, Lafebers medicated pellets, etc.

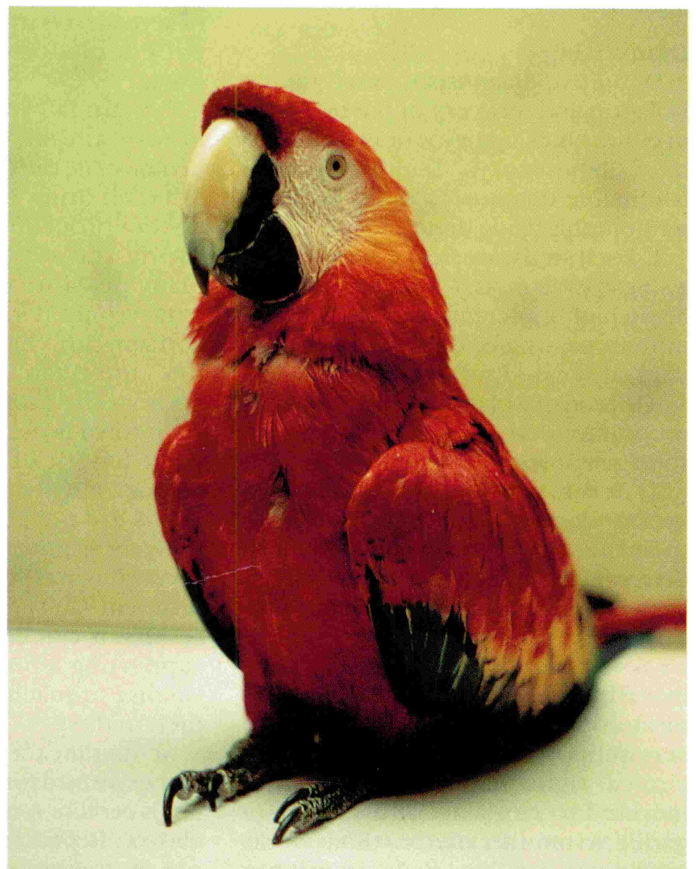
- Pellets: Well accepted by some large psittacines, especially macaws and parrots. Cockatoos have poor acceptability rate overall. Lead-in feeding techniques by top dressing or mixing regular feed items into the medicated pellets will greatly improve acceptance and most aviaries can be switched over to full medicated feeds within one to two weeks. Pellet quality, nutritional value and palatability has improved markedly since its inception and the manufacturers make great efforts to improve these aspects on a continuing basis. *This method is the preferred manner to treat flocks at this time especially when doxycycline type feeds are used. Be aware this does not meet Federal requirements for treatment.*

- Cooked Mash: Rice/beans/corn or rice/hen scratch with pediatric tetracycline syrup or SF-66 powder will be accepted by many large psittacines especially if shelled peanuts or sunflower seeds are mixed in with it.

- Medicated Seed: Keetlife™ (Hartz Mountain) a tetracycline soaked hulled millet product, generally taken well by small psittacines after a short adjustment period.



Classic bile stained psittacosis diarrhea.



"Atypical," a positive psittacosis patient.

- Oral Medications: Most effective for an actively sick bird, but impractical for large groups or aviaries. Doxycycline (a semi-synthetic new generation tetracycline drug) is preferred over the tetracyclines. DO NOT USE medicated water or tetracycline capsules for individual bird treatment.

- Injections: Tetracycline by injection in the breast muscle twice daily to four times daily for thirty days is very caustic to muscle and will lead to massive breast destruction and is therefore not recommended. Tetracycline given intravenously has a severe limitation of only very few usable veins available, generally for a few days at most. *Intravenous* doxycycline is an excellent drug, but has the limitations of high cost, short stability (less than 48 hours unfrozen) and dependency on fragile veins. An intravenous form of doxycycline manufactured in Europe has been used muscularly and appears, at least experimentally, to be very effective. The great appeal for this drug is its extended activity period of up to one week. The great draw back is that it is not approved for sale or use in the U.S. and, *once again, does not meet Federal guidelines for approved therapy methods.*

- Duration: A source of substantial debate. Minimum for routine prevention is thirty days AFTER initial adjustment and feed change over. Official government recommendations is for 45 days. Some veterinarians recommend 60, 90, or 120 days as relapses have been documented after treatments on tetracyclines, etc. These reoccurrences of the disease can be traced back to many known reasons and some mysteries including:

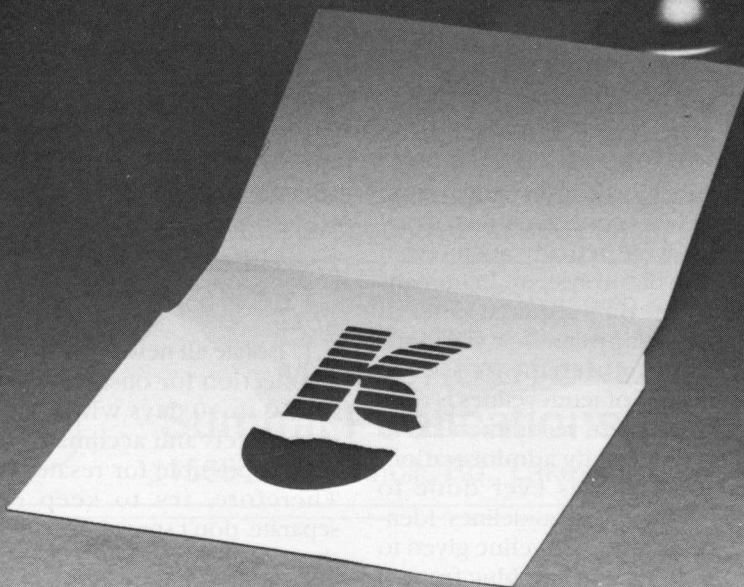
- Not all birds were treated
- Flock was not treated long enough (relapses after 60 days have been seen)
- Some birds refused the medication or consumed less than effective amounts (it's hard to monitor every bird's actual daily intake)
- Resistant Chlamydia organisms (?)
- Calcium supplements or diet levels tied up the tetracyclines and rendered them useless
- Infective fecal material and environmental contamination was not cleaned up
- An improper disinfectant was used on the premises

None of these times are expected to bring a cure or the elimination of the organisms; only prevention or recovery from *disease conditions.*

Non Tetracycline Treatment

Other drugs will affect Chlamydia besides tetracyclines:

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1. Doxycycline — the drug of choice. Not as available. By prescription only and more costly. Tremendously more effective. Requires less treatments daily and does not bind up with dietary calcium (food), does not aggravate or depend on liver function, does not depend on kidney function for elimination from the body, and does not cause upset stomach. Does not tend to wipe out the normal intestinal flora. Some species, especially macaws and lovebirds, may regurgitate and therefore lower doses are used in these groups.

Some new research data has been presented in the past year by Dr. Kevin Flammer after substantial efforts to analyze the actual pharmacokinetic of doxycycline in conjunction with his work on psittacosis and avian drug utilization.

Dr. Flammer's research centered on establishing what concentrations of oral doxycycline were actually achieved in the psittacine blood system. In humans the half life (the time required for 1/2 of the drug to disappear — a standard pharmacology measurement) is 18-22 hours while that of tetracyclines is only 8 hours. The current recommendation for birds is twice daily administration, but no research was ever done to accurately define these guidelines. Identical oral doses of doxycycline given to orange wing Amazon and blue fronted Amazons showed that the orange wings maintained a level nearly twice that of the blue fronts over a 24-hour period. Another experiment involving cockatiels, orange wing Amazon and green wing macaws revealed significant differences in the blood values. The cockatiels and orange wing Amazons had approximately the same concentrations at the end of 24 hours but the disappearance rate was different. The green wing macaw revealed blood levels approximately three times higher and maintained significant concentrations for several days. Dr. Flammer emphasizes that even though these findings are highly suggestive, that tremendous differences between species may exist. He emphasizes that these are experimental results on relatively small numbers of birds.

This highlights the possibility that each species (not just *genus*) of psittacine may require substantially different treatment programs when final pharmacology studies are done *for each species*. Until then, the recommended doses should be used as prescribed by your avian veterinarian.

No effective dose of doxycycline for the treatment of psittacosis has ever

been established through approved testing methods.

2. Erythromycin (Ornamycin and Ornamycin Plus) will marginally treat sick birds, may prevent the spread to healthy birds, will frequently prolong the life of sick birds without the probability of recovery. Used in humans with known sensitivity or allergies to tetracyclines. This drug can interfere with testing and diagnostics.

3. Chloramphenicol — this can initially depress the disease signs and treat concurrent bacterial infections. It requires good liver function (liver damage is severe and common with this disease). Not recommended to depend on this drug but it has its use in very special circumstances.

4. Penicillins — Ampicillin, amoxicillin, etc., can cause temporary relief and interfere with the testing for psittacosis in some cases.

Prevention

COMMON SENSE IS THE BEST RULE.

1. Isolate all new birds to be added to a collection for observation purposes for 30 to 40 days while they reduce stress levels and acclimate. This is not always possible for resale businesses. Therefore, try to keep each load separate, don't spread out stock through the older birds.

2. Test any suspicious birds with loose runny stools, persistent weight loss, persistent and non-responsive respiratory disease or general signs of unthriftiness. It is highly recommended to routinely test new loads on arrival.

3. Treat all incoming birds for 30 days (to 90 days?) with tetracycline, etc., if *feasible and safe for birds*.

4. Treat all breeding colonies or aviaries for 30 days with tetracyclines if an open (birds added to collection) system was used prior to setting up. Especially, treat all budgies and cockatiel breeders regardless if it is an open or closed aviary. Production increases will offset any cost and babies generally do not seem to be bothered by poorer quality diet if the situation demands it.

No vaccines are available that are commercially marketed and effective.

PRACTICAL SIGNIFICANCE OF CURRENT THINKING

The information presented here will cause you to draw several solid, but conflicting conclusions;

1. Chlamydiae is assumed to be nearly everywhere in quarantine, broker depots, pet stores and aviaries. Chlamydiae (psittacosis) is not. However, no bird owner is free of the possibility.

2. No conclusive, foolproof test is available yet for the live bird. More tests do not guarantee more information. Positive tests do.

3. Chlamydiae (the presence of Chlamydia) may not be 100% curable. Chlamydiae (the visible disease of the bird) can be eliminated. This is due to the fact that Chlamydiae reside within the cell where the levels of tetracyclines, etc., cannot be as accurately predicted. Chlamydiae drugs also happen to be bacteriostatic and *therefore only STOP reproduction of the organism, they DO NOT DIRECTLY KILL THE CHLAMYDIA*.

4. Not all birds will become sick just by contact with another bird, but *may* become an infected carrier.

5. Not all human exposure leads to human illness.

6. Psittacosis need not be a dreaded "killer" disease if addressed properly. This is a treatable disease and when properly diagnosed, preventable.

7. Many cheap, available pet product drugs can mask psittacosis signs until the bird is exhausted beyond recovery if used improperly.


8. Improper treatment of a psittacosis bird and subsequent human health involvement can place the prescriber in a legal predicament if they do not possess a valid license for veterinary medicine, since it is a reportable disease.

9. Less is understood about psittacosis than what was *thought* to be known before.

10. *Stress* is a major factor in producing the disease since it upsets the balance of the immune system of the bird.

Therefore, the decision to test, isolate, treat, sell, or investigate possible sources for psittacosis depends on the specific type of birds, history of bird, or human health and economics. There are no absolutes at this time, except for one; failing to look for psittacosis under the proper circumstances may result in needless loss of stock, genetic stock pools, financial hardship and unwarranted suffering by both humans and avians.

I know of few other diseases that can be removed by so little cost and effort and only a handful of others (viruses in particular) that will cause so much work or anxiety.

I encourage you to put this new information to work for you. This effort is an ongoing process and this current knowledge is by no means all that will be forthcoming to aid you in your efforts to conquer the Dark Forces of Bird Evil that lurks among them. 

Know more about your birds.

Do you know:

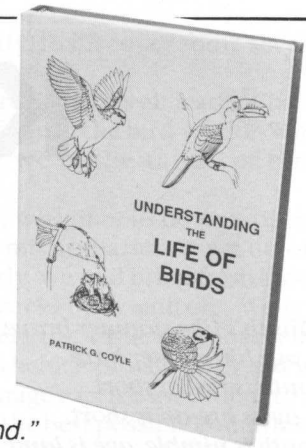
- How an egg is formed?
- If birds do need exercise?
- If grit is necessary in the diet?
- Why the birds mut turn their eggs?
- Why the air space in the egg is important?
- Why young birds are more prone to sickness?
- How birds adapt to the changes in the weather?
- If learned behaviors can be passed on to offspring?
- Why birds don't fall off their perches when sleeping?

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