

Zinc Toxicity in Companion and Breeding Parrots

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An ever increasing amount of information has been discovered through research and case studies involving the heavy metal toxicity caused by ingestion of excess environmental zinc. This brief article attempts to review case literature, discuss sources of environmental zinc, toxic levels and strategies to prevent this life threatening illness.

Zinc, a trace element essential for life, can be deadly if present in higher levels in many pet and captive breeding birds. Monopoly game pieces, pennies minted after 1982, galvanized wire and hardware (including nuts, bolts, nails, etc.), some ceramic dishes, staples, fertilizers, and some paints and shampoos can contain enough zinc to induce zinc toxicity in captive birds. Parrots by nature are curious and will often chew on objects that can be toxic. Often, x-rays fail to provide definitive identification of the object that induced zinc toxicity, especially if no solid zinc object was ingested. Bird-proofing a home is imperative to minimize the probability of your pet contacting and ingesting potentially deadly amounts of heavy metals.

Birds suffering from zinc toxicity may exhibit a wide range of clinical signs including, but not limited to, lethargy, weakness, anorexia, weight loss, anemia, feather picking, and neurological disorders including seizures and behavioral changes. Complicating the diagnosis of this disease, many avian diseases cause similar nonspecific clinical signs as zinc toxicity. CBC and blood chemistry panels are often unremarkable or may indicate mild anemia which may be a finding in any chronic disease process.

Further complicating the diagnosis, radiographs may not be indicative

of toxicity as in many cases no metallic densities are observed in birds with high zinc levels in the blood. Consequently, the doctor may not investigate zinc as a possible causative agent for the observed clinical signs. Chronic ingestion of small amounts of zinc and radiographically visible zinc objects can result in zinc toxicosis. Since radiography, CBC and blood chemistry panels can yield false negatives in patients suffering from zinc toxicosis, many cases go undiagnosed and, therefore, untreated.

Another caveat to consider during the diagnosis of this malady is that many birds with high serum levels of zinc do not show clinical signs. Less obvious problems such as decreased fertility may be incorrectly attributed to factors other than environmental zinc toxicosis with potentially disastrous financial consequences for the breeder. Successful chelation therapy for zinc toxicity and removal of continued exposure to zinc sources have demonstrated increased fertility rates in breeding pairs. Aggression can be caused by high blood zinc levels and may prove to be very problematic for the pet owner. In some cases it may even result in relocation of the affected bird.

In some cases, apparently healthy birds have died without ever exhibiting any signs of disease or injury. Some of these cases may have been caused by zinc induced neurologic dysfunction resulting in fatal head trauma from flying into a cage wall enclosure. It is often difficult to definitively diagnose head trauma as a cause of death post mortem. In a study of a group of 77 Orange-bellied parrots (*Neophema chrysogaster*) that were found to have died from zinc toxicity over a period of time in a single aviary, the majority had

neither prior clinical illness nor exhibited poor body condition. The histologic lesions characteristic of zinc toxicity were absent during necropsy, suggesting an acute toxicity, since research has revealed a one to two week time lapse between zinc ingestion and appearance of characteristic lesions. In this particular case, blood zinc levels were overlooked resulting in the inability to determine the cause of death.

Until a few cases with characteristic lesions in the kidneys and other organs were discovered, researchers had not considered zinc as a possible cause for the unexplained deaths. When the cage enclosures were changed from galvanized steel wire to nylon mesh, the incidence of sudden death induced by zinc toxicosis disappeared. Also, the fertility of the birds increased from 54% to 86% in four months.

Zinc blood levels are accurately determined with a blood sample and appropriate analysis. Since zinc can leach into a rubber syringe or vial stopper, the sample must be collected in a special vial using a syringe that does not have a rubber stopper. This procedure prevents inaccurately low levels of zinc in the blood analysis. Your avian veterinarian can easily take the sample and refer it to a laboratory that is equipped for testing zinc levels. Typically, levels should be less than 2.0 ppm (200µg/dl), but this can vary from species to species.

Ingested zinc is absorbed via the gastrointestinal tract and distributed to tissues and organs including the liver, kidneys, pancreas, reproductive organs, and blood plasma. Since zinc interferes with pancreatic cellular protein synthesis, the pancreas is the most probable target organ and cell necrosis can result.

Fortunately, various treatment methodologies for zinc toxicity exist. Chelation therapy using calcium EDTA, d-penicillamine, 2,3 dimercaptosuccinic (DMSA), and dimercaprol (BAL) may be successful in lowering blood zinc to acceptable levels.

Endoscopy, proventricular flushing, and lactulose may be employed to physically remove metal fragments from the gastrointestinal tract.

Prevention is the key to success with heavy metal toxicities. Consideration must be given to the captive environment and a risk assessment strategy applied. Although appealing, it is unreasonable to expect that every bird can be housed in a completely zinc-free enclosure. Galvanized wire flight cages are very common indoor and outdoor aviaries. Alternatives to galvanized steel include stainless steel and powder coated steel, but in many cases can be cost prohibitive. It may be helpful to regularly wash the galvanized wire with an acidic solution to remove white zinc precipitate. This strategy can reduce but may not eliminate problems associated with zinc toxicity, especially if the birds are ingesting water that has collected on the wire mesh.

Armed with the knowledge of the potentially life-threatening condition caused by zinc toxicity, avian enthusiasts can increase their awareness and take steps to keep their birds healthy, happy and productive.

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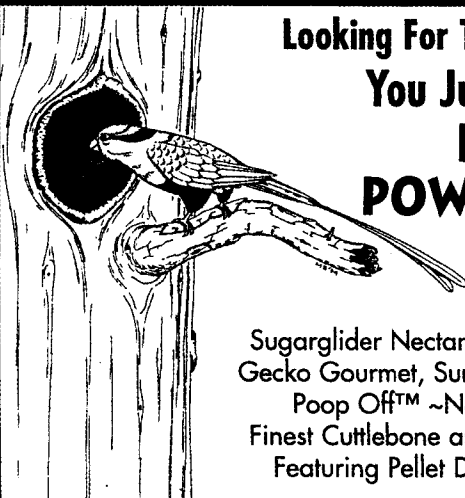
The membership of the Michiana Bird Society is pleased to present this award to the American Federation of Aviculture. These proceeds come from a fund supported through the efforts of the entire membership at our Michiana Bird Society Annual Bird Fair, held in Mishawaka, Indiana.

We appreciate the tireless efforts of the A.F.A., and we hope you continue the wonderful work. Our current A.F.A. representative is Mary Fuller of South Bend, Indiana. She is avian knowledgeable and very involved in our club; she is an outstanding example of the people involved in the A.F.A.

The Michiana Bird Society is an active club with over 60 members and countless pet birds. We thank you for your continued work on the legal issues surrounding pet bird ownership in this country.

Keep up the good work!

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