

New Toxin Alert for Aviculture: Cholecalciferol Analog Toxicity

by Robert Clipsham, D.V.M.
Simi Valley, California

Recently, I was presented with the opportunity to treat a relatively new form of chemical poisoning with which our clinic had never had any previous medical experience or any knowledge of the agent involved as aviculturists. The purpose of this brief discussion is to alert our fellow aviculturists of the nature of this commercially available synopsis of what, where, why and how to deal with this challenge should it arise. The information provided here is the result of several weeks' perseverance, to arrive at a fairly conclusive method of dealing with a rather ingenious and insidious rodent agent which can be purchased by anyone at your local hardware store or tack shop.

The chemical of concern is a chemical analog of cholecalciferol and is commercially available in two products sold under the trade name of Rat-B-Gone and Mouse-B-Gone. The reason that this relative newcomer onto

the rodenticide market may sound somewhat familiar is that cholecalciferol is another name for the biologically active form of Vitamin D (D_3). This is a necessary part of the calcium uptake physiology from the intestinal tract and plays an important part in normal health. New evidence strongly suggests that Vitamin D_3 is probably more properly classified as a hormone. The intentional overdosage of this D_3 is the ingenious utilization of this chemical as a toxin, as it drives the body's blood levels of calcium beyond what is compatible with life.

The following information is the best summary of medical information that could be compiled from the manufacturer, the antidote manufacturer, several regional toxicology treatment centers and the National Veterinary Poison Control Center. The depth of the information was not particularly extensive despite the fact that it is available to the general public without a pest control license. Please note that *all of this data is based on research and medical cases in mammals*, as no statistics are available for any avian species. This is intended to be used as a rational guideline.

Commercial form: Rat-B-Gone[®], Mouse-B-Gone[®]

Manufacturer: Chevron Chemical Corporation

Physical Appearance: Blue-gray granules mixed with bird seed and packaged in small plastic or cloth bags.

Classification: Vitamin D_3 analog

Practical significance for aviculturists: Probable exposure through rodent control around aviaries. Attraction for birds through use of bird seed as rodent bait.

Chemical action: (primary) The Vitamin D_3 causes a massive rise in the blood calcium level (primary hypercalcemia) with the result being an interference with the heart's electrical activity (myocardial spasticity).

(secondary) The excess blood calcium level eventually leads to the calcification of soft tissues in the body, especially the kidneys and heart muscle, leading to irreversible mineral deposits.

Patient appearance: The onset is generally around 48 hours but is dose

and possibly species dependent (i.e., cats seem to be more sensitive than dogs). No bird species sensitivity is established yet.

The general appearance is that of excessive tiredness and lethargy. These signs are nonspecific and can be misleading.

There can be a high white blood cell count and, on first impression, a generalized low level infection may be diagnosed incorrectly or is actually present with the toxicity.

Diagnosis: This is based on a history of possible exposure (which most people never do intentionally, but can be recalled upon asking some very specific questions) and a blood calcium level.

Normal blood calcium levels in birds average about 8 to 12 mg/dl. I have seen a blood calcium at 17 mg/dl with this toxin.

Lethal dose (L_{50}): 42 mg/kg body weight.

Treatment program: This is *always a very serious condition to attempt to treat. The patient is always considered to be in a very guarded condition until the blood calcium level is returned to the normal level.*

1. Activated charcoal (Super Char[®] is probably the best) given orally to tie up any remaining poison left in the intestinal system.

2. Intravenous fluids (isotonic saline only) to flush any toxin out through the kidneys and to alleviate any dehydration. No fluids with *any* calcium (i.e., LRS) can be used.

3. Cortisone given intravenously (desamethasone) at low doses (1/4 mg/lb) twice daily to promote calcium loss. Prednisolone given at 2 to 3 mg/kg has been used also.

4. Diuretics given twice daily to promote kidney removal of fluids with the excessive calcium included.

Specific antidotes: Calcitonin (2 forms)

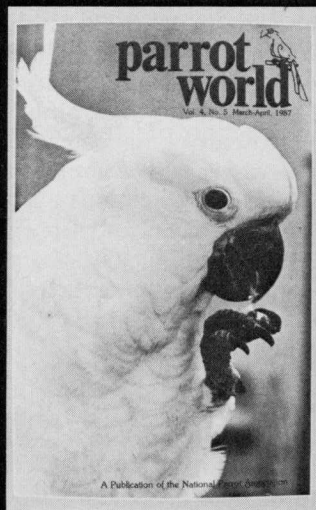
1. Salmon origin (200 I.U./cc) This is fairly expensive but has been located at local pharmacies in our neighborhood.

2. Human origin (0.5 mg per single-use syringe)

These are available for osteoporosis patients in human pharmacies. We have located them at hospital pharmacies in packets of five syringes for approximately \$35.00 per package.

Dose: 4 to 6 I.U. or 0.10 to 0.05 cc (approx.) 1/10 - 1/2 of a human syringe *every two to three hours until the blood calcium level stabilizes.* The effect of this drug is very temporary.

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These are very rough and approximate doses for an average (7 lb.) cat.

3. Sodium E.D.T.A. — from the Lederle Pharmaceutical Co. The estimated dose is 25-75 mg/hr given intravenously in a drip. NOTE: This is to be used *only* when the serum calcium reaches 20 mg/dl and an acute, life-threatening situation exists, as EDTA may lead to severe kidney damage. The response is directly controlled by a number of factors including the length of time since the poison was eaten, the amount of poison eaten and other secondary problems. Many of these patients will be dehydrated, have poor appetites and may be carrying secondary infections.

Duration of treatment: This is the great quality call for both the aviculturist and the vet. It is recommended that treatment be initially started for *two weeks* and followed by an *additional two weeks treatment* if the blood calcium level has not returned to normal. It is recommended to check the blood calcium level every 24 to 48 hours for the purpose of establishing what the future may bring.


This is a very tough condition to treat as the risks and the financial investment will both be high. I have treated a patient which responded in six days and was told by several toxicologists that this was a considerable stroke of luck.

Probably the best advice I can offer is **do not use** these two products in or around aviaries due to their high likelihood of being attractive to birds and the great difficulty in treating any affected birds. I suspect that this chemical may be a novel and effective method of dealing with rodents since their social patterns allow for them to alert fellow rats or mice to become aware of any obvious dangers that exist and the insidious nature of this chemical dispenses with that event very neatly. However, I think that as chemical technology marches on, I would again return to my favorite recommendation of multi-catch traps and other non-chemical rodent control means around valuable pet and aviary birds.

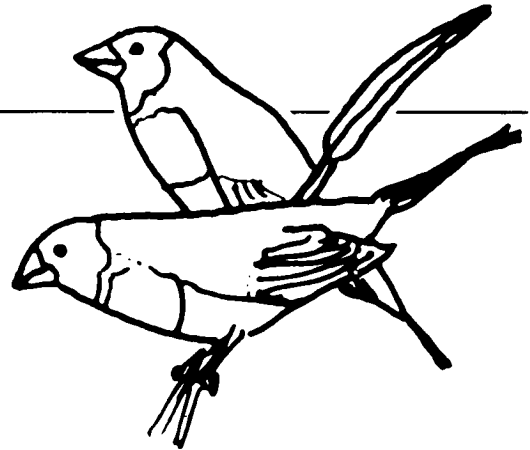
Toxicological assistance:

1. Chevron Chemical Corporation, Jerry Hiatt, Environmental Toxicology (415-233-3737).

2. CIBA Labs (Manufacturer of Human Origin Calcitonin), Dr. Fran Da Pas (201-277-5502), Main Lab Office (201-277-5000).

3. University of Illinois — Poison Vet Center. Contact through your veterinarian. 

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Owner Terry Dunham is author of *The T.F.H. Book of Finches* and has written numerous articles for avicultural publications in the U.S., England and Australia.