

# LIZARD LETTERS

Dear Robert,

With great interest I've read "*Salmonellosis: will it pose a problem for iguana husbandry?*" by Gregory Z. Scott (IGUANA TIMES 1 (5): 16-17) and I feel compelled to make some comments and supplements.

For continuous success in iguana husbandry and breeding it is extremely important to carry out some measurements of preventative medicine. This is particularly true for newly acquired specimens. A quarantine period of at least two months is essential in preventing infectious diseases from spreading in a collection. Ideally the quarantine facility should be located at a site distant from the long term animals. During the quarantine period fecal examinations for endoparasites need to be performed. Depending on the results the iguanas should be treated against potential pathogenic parasites, namely *flagellates*, *amoebas*, *strongylids/ascarids*, *Capillaria sp.*, *Strongyloides sp.*, and *cestodes*. However, the treatment of the commonly found oxyurids and ciliates is usually not necessary. The feces of the long term animals should be re-examined for parasites at least annually.

Force-feeding a dying iguana with a liquified mixture of romaine, banana and carambola is not a good idea. The additional stress of food in the stomach presents yet another burden for the severely depressed system of the iguana, and bears the risk of aspiration of food during regurgitation, resulting in fatal foreign-body-pneumonia. The initial treatment for dehydrated and depressed animals consist of the administration of parenteral fluids, either subcutaneously or intracoelomically (20-25 ml lactated Ringer's solution per kg body weight). The animal should be presented as soon as possible to a veterinarian who has experience with iguanas for an accurate diagnosis and further treatments.

Every iguana that dies in captivity should undergo a thorough postmortem examination including at least histopathology. I assume that the mentioned yellow granular necrotic lesions in the liver should be called *pyogranulomas* rather than *pyrogranulomas*, since the former term has been established for these kind of lesions.

As described in the report one should always try to isolate the causative agent(s). However, the proper han-

dling of the samples is essential in gaining any reliable results. Placing tissue sections in 10% formalin results in safely killing of all pathogens, making isolation attempts impossible. Tissue samples must be taken out of the specimen using sterile techniques and should be immediately placed in a sterile petri dish. A specimen for microbiology can be taken using a sterile cotton swab which then is placed in a suitable transport medium and sent on ice as quickly as possible to a diagnostic laboratory.

Cultures taken from the cloaca or gut always yield a variety of different organisms, making interpretation of results almost impossible. Several organisms besides *Pseudomonas*, *Aeromonas*, and *Salmonella* have been incriminated being the cause of septicemia in reptiles such as *Serratia*, *Corynebacterium*, *Streptococcus*, *Staphylococcus*, *Klebsiella*, and *Echerischia coli*.

Identifying *Salmonella sp.* by examining a blood smear appears very questionable. The diagnostic method of choice is culturing them and identifying the cultured bacteria by testing their metabolic abilities and by using serological techniques. Several new strains of *Salmonella sp.* has been found since 1982, speaking of approximately 2000 different strains nowadays (Silliker and Gabis, 1988).

Septicemia is more likely to occur in reptiles which are immunological depressed. Moving an iguana from one locality to another results in stress due to dramatic environmental changes such as terrarium, cage mates, keeper, climate, diet, and differences in quality and quantity of microbes (bacteria, fungi, and viruses). These stress factors can lead to a serious depression of the iguana's immune system resulting in fatal infections with normally non-pathogenic agents which occur in the environment or even in the intestine of the animals themselves.

A high percentage of healthy reptiles are carriers of *Salmonella*. The same is true for *Pseudomonas*, *Aeromonas*, *Klebsiella*, *Staphylococcus*, *Streptococcus*, and several other potential pathogenic bacteria. The problem is not the prevalence of these bacteria itself, but rather the above mentioned factors which decrease the resistance of these animals against opportunistic microbes. Good husbandry especially proper nutrition and terrarium climate as well as the prevention of social

and handling stress is the best way of preventing these kind of diseases.

Yours sincerely,

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6450 Hanau 9  
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#### References

Silliker, J.H. & D.A. Gabis (1988): *Salmonellosis*; In: Balowsf A, W.J. Hausler, jr., M. Ohashi & A. Turana (eds.): Laboratory Diagnosis of Infectious Diseases. Vol. 1. pp. 448-465

...treatment of laboratory specimens...

Needham, J.R. (1981): Microbiology and laboratory techniques. In: Cooper, J.E. & D.F. Jackson (eds.): Diseases of the Reptilia. - Academic Press (London, New York, Toronto, Sydney, San Francisco): 93-132

...pyogranuloma...

Frye, F.L. (191): Biomedical and Surgical aspects of captive reptile husbandry. - 2nd edition. Krieger Publishing Company (Malabar, Florida): 637 pp.

...bacteria that produce septicemia in reptiles...

Boever, W.L. (1975): Arizona septicemia in three boa constrictors. - Vet. Med. Small Anim. Clin. 70: 1357-1359

Bonney, Ch.H., D.A. Hartfel & R.E. Schmidt (1979): Klebsiella pneumoniae infection with secondary hypopyon in Tockay gecko lizards. - J. Am. Vet. Med. Assoc. 173 (9): 1115-1116

Hoff, G.L., F.L. Frye, E.R. Jacobson (1984): Diseases of amphibians and reptiles. - Plenum Press (New York & London): 784 pp.

Novac, S.S. & R.A. Seigel (1986): Gram-negative septicemia in American alligators (*Alligator mississippiensis*). - J. Wildl. Dis. 22 (4): 484-487

Plowman, C.A., R.J. Montali, L.G. Phillips jr., L.K. Schlater & L.J. Lowenstine (1987): Septicemia and chronic abscesses in iguanas (*Cyclura cornuta* and *Iguana iguana*) associated with a Neisseria species. - J. Zoo Anim. Med. 18 (2-3): 86-93



Sir,

I found your article on the captive husbandry of the Cuban Rock Iguana to be very interesting. I would, however, caution on the use of cat food in the diet. Cat food has a very high fat and liposoluble vitamin content (A and D) and could result in kidney damage and difficulty in digestion. Dog food would be more acceptable. You might also mention that iceberg lettuce, celery, watercress, etc., are nutritionally useless.

Keep up the good work. I enjoyed this article and the rest of the Iguana Times.

Sincerely,

Thomas Ryan, D.V.M.  
30 West Green Street  
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Dear Bob,

I just received Vol. 1, #5 of Iguana Times. I was struck by your article on diet of iguanas. I have been working on diet and nutrition of herbivorous reptiles for more than a decade, and I become impressed yearly about the importance of feeding too much protein. I think your reported diet may be dangerously high in protein, and the consequences could be kidney damage and/or infertility. Of course, you are giving protein in all of the plant components of the diet that you listed; particularly in the legumes. Additional animal protein may be adding more protein than a good herbivore can handle. We have been working with the Vet School here (indeed, one of my graduate students is a V.M./Ph.D. student) on problems associated with subsidizing with too much protein in desert tortoises, desert iguanas, chuckwallas, and green iguanas. It is very difficult to give a diet that is too low in protein as long as animals get a balanced "salad" of food, and also get plenty of UV radiation. Of course, more protein often means faster growth, but consider the problems faced by the sea turtle culturists who now find many turtles sterile because of too much protein.

Best regards,

C. Richard Tracy  
Professor  
Department of Biology  
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## LIZARD LETTERS (CONT.)

Dear Mr. Ehrig

I happened upon the June 1992 issue of *Iguana Times* – the first I've seen. Your article on diet and feeding of the Cuban Rock Iguana was of great interest to me.

As a veterinarian that specializes in nutrition, I work with many different species. I don't care for the current recommendations (mostly from vets, it seems) in the U.S. regarding protein intakes (mostly for Green Iguanas). It just doesn't make sense nutritionally, given the gastrointestinal anatomy, nutritional heritage, and food preferences of these animals.

I am interested in learning more about your work. Would it be possible to send me reprints of any further work that you've published? For example, are there any nutrient analysis for the plant lists you completed for the Bahamian Cays?

Sincerely,

*Susan Donoghue, VMD, DipACVN  
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Shortly after publication of the *Basic Iguana Diet* (I.T., Vol. 1, No. 5) IIS member, Phillipe de Vosjoli asked for permission to reprint it in his new book, *The Green Iguana Manual* in the feeding section. As a result of appreciated input from Dr. Tracy and Dr. Ryan, we lowered the amount of the supplemental protein in the diet (2-7% to 1-5%). We also have eliminated cat food from the diet. Gravid and post gravid females, and actively growing younger animals receive the highest amounts of supplemental protein. Underweight animals being rehabilitated also may benefit from the extra calories of the higher percentages, but on a temporary basis. The bulk of any diet should consist primarily of generous amounts of fibrous plant material provided on a daily basis. Our diet is very much lower in supplemental protein than nearly all traditional iguana diets. Recent evidence suggests that we best serve our animals with a diet more closely approximating what they eat in the wild.

R.W.E. 

