SALMONELLA

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FDA Bans Iguanas and Monitor Lizards From Pet Trade

No, the Food and Drug Administration didn't really ban iguanas and monitors... yet. But there has been an alarming number of news reports and health alerts warning that these lizards carry *Salmonella* and it wouldn't surprise me if a ban was suggested in the near future. Reports of lizard-associated salmonellosis are varied and increasingly frequent:

- 22 February 1995: The Utah Department of Health announced that there have been a few cases of salmonellosis in which lizards were involved.
- January 1995: The State of New York issues health alert to reptile owners about *Salmonella* after infant's death (Anonymous, 1995a).
- October 1994: Several cases of salmonellosis involving reptiles are reported in Ohio (Anonymous, 1995b).
- Winter 1994: State of California Health and Welfare Agency issues memo entitled, "*Salmonella* and Reptiles," which discusses 22 cases of salmonellosis attributed to reptiles (Jackson, 1994).
- September 1992: Utah Department of Health publishes report entitled, "Lizard-associated Salmonellosis—Utah," in the Journal of the American Medical Association (Lanser et al., 1992).
- February 1992: Indiana Center for Disease Control publishes report of iguana-associated salmonellosis in the Journal of the American Medical Association (Anonymous, 1992).
- 1992-1995: Herpetoculture magazines and regional societies increasingly report on *Salmonella* and health concerns for the herpetoculturist.

These are just the reports I am aware of; certainly many more exist. But why am I concerned? *Salmonella* is known to be carried by most reptiles (as well as many other animals) and can *potentially* cause serious health problems for humans and rarely even death. Shouldn't people be aware that their animals could transmit *Salmonella* to humans? The answer is of course they should know this, however, the way we are spreading the word is what worries me.

Thirty years ago baby turtles were the pet trade fad. People could buy hatchling turtles at most department stores and virtually all pet stores for literally pennies (<$2). Turtles were so cheap and cute that millions were sold every year to people who really didn't know the first thing about caring for reptiles. Many of these turtles were purchased for children, a few of whom eventually got salmonellosis. Reports of turtle-associated salmonellosis became relatively common. The media, with their usual concern for the public's well-being, jumped on the story causing people to panic. Baby turtles were flushed or released by the thousands, not only because of the *Salmonella* threat, but because their owners didn't expect the turtles to grow up, or they tired of them. In 1968 the State of Washington prohibited the sale of turtles that were not certified "*Salmonella* free." By 1975 the sale of any turtle under four inches carapace length was prohibited by federal law, with a few exceptions, and Maryland, New York and New Jersey banned the sale of all turtles! Many of these bans are still in place.

All in all, the four inch ban seemed to work. Its premise was that children couldn't put large turtles into their mouths, thus reducing the transfer of *Salmonella.* The actual reason the ban worked, however, was more likely because it halted the mass sale of turtles to uninformed pet owners.

In more recent times, reptiles and amphibians have become very popular in the pet trade once again. Instead of just baby turtles, many other animals are fashionable, including iguanas and monitor lizards. Like the baby turtle fad, baby iguanas, and to a lesser extent monitors, are relatively inexpensive, cute, and readily available. Many of the people purchasing these lizards are uninformed about proper care and maintenance, and thus are at a higher risk of getting salmonellosis. Unlike thirty years ago, there are now several magazines available to help educate the many budding herpetoculturists. Unfortunately, some of these magazines have recently resorted to tabloid style articles designed to excite rather than educate (e.g., Anonymous, 1995a). Also, some individuals, in the interest of getting attention, admittedly lie and purposely mislead the public as to the proper care and husbandry of iguanas (Richards, 1994). So once again we find ourselves in the same position we were in thirty years ago: reptiles are *too* popular, too many reptile owners are uninformed, and in an effort to "inform" the public about potential health problems the media is creating a panic situation. Hopefully it is still early in the cycle of things and if we begin working now we might be able to prevent unnecessary bans on iguanas and other reptiles.

Green Iguana, *Iguana iguana.*

In order to calm the imminent hysteria we must be well informed as to what the actual threat is. *Salmonella* is a type of gram-negative bacteria with over 2,000 serotypes (strains). It is commonly found in amphibians, reptiles, birds, mammals, food, etc. Over 200 serotypes have been reported from reptiles, many of which are rarely found in other North American hosts. Just like snakes, only a small fraction of the serotypes are considered dangerous to humans. And just like snakes, all serotypes are given a bad rap. The few dangerous serotypes can cause a disease called salmonellosis in both reptiles and humans as well as many other animals. Salmonellosis is characterized by gastroenteritis and diarrhea, and is often misdiagnosed as the flu. Many people have had salmonellosis without ever knowing it, and still more people carry *Salmonella.* Although *Salmonella* may cause salmonellosis, it usually doesn't result in a noticeable disease in otherwise healthy animals. Chances are that if you have many reptiles, some of them are carrying some type of *Salmonella.* The same is true for birds and farm animals. Transmission can occur via a number of ways, but virtually all involve gastrointestinal tract fluids/ excrement in some manner.

Salmonella has some resistance to dehydration and freezing and can survive for long periods outside of a host animal. An example of this resilience and the mode of transmission is the case of an eight- week old infant that got salmonellosis from a monitor lizard. Lanser et al. (1992) reported:

"One month before onset of illness, the family pet had been a 2-foot-long savannah monitor lizard (*Varanus exanthemapicius* [sic]), which the parents reported had loose stools for the 8 months it was in their possession. In March, they returned

the lizard to the pet store and traded it for a python. Specimens obtained from the snake and its plastic cage did not yield *Salmonella.* However, *S. poano* was recovered from fecal specimens left by the lizard nearly 3 months earlier.

"The infant had not had contact with either reptile; they were handled only by the father. Because of the height of the cage, the father had to climb in it to handle the lizard and clean the cage. He did this with bare feet, a potential means of spreading contamination in the home. Heat rocks from the cage were washed in the kitchen sink, and may have been a source of household contamination."

Green Iguana, *Iguana iguana.*

Exactly how the baby came in contact with the *Salmonella* will never be known, but a number of possibilities exist. One aspect of this report that is particularly disturbing is that monitor feces were still available for testing after three months!

With this basic information about *Salmonella* we can come to several common sense conclusions to help prevent salmonellosis from becoming a problem. Probably the most important thing to do is to practice good hygiene! Most people wash their hands after cleaning cages for obvious reasons. But many people fail to wash their hands after holding an animal. Think about it. The animal lives in a cage where it defecates. You may remove the feces, but is the animal clean? *Salmonella* has been found in shed skins, even several months after molting (Grier et al., 1993). Sure, reptiles are "clean" animals, but they're not sterile. Therefore, always wash your hands after handling any animals, cage accessories, etc.

Cages should be kept clean. Get into a routine of checking each cage every day. Clean cages as they become soiled. Periodically disinfect cages and all accessories with a 10% solution of chlorine bleach (note: do not use chlorine bleach for amphibian cages). Thoroughly rinse cage and all accessories to remove bleach solution. Chlorine bleach is one of the most effective disinfectants available, but prolonged use can damage some materials. Always wear gloves when using bleach and never mix bleach with anything except water. Although most bacteria and viruses are destroyed after a short contact with bleach, ten minutes has been found to be optimal for disinfecting purposes. Don't use the kitchen for anything related to animal husbandry. Washing cage accessories in the sink can promote the spread of pathogens. Bathroom sinks and tubs should be disinfected after use for cleaning or soaking animals and their cages.

Individuals with weak immune systems, such as small children, the elderly, and immune-suppressed individuals should be careful when handling animals. Only healthy animals should be handled, if any are handled at all.

When giving a presentation using animals,

only use healthy animals. Animals that are under stress or otherwise unhealthy are more susceptible to salmonellosis than healthy animals. *Salmonella* is more likely to be shed (and transferred) by animals when they have salmonellosis or are unhealthy. Do not allow animals or shed skins to be handled unless facilities are readily available for participants to wash their hands.

Don't eat, smoke, or put things in your mouth while working with animals. Dedicate certain equipment (e.g., pens and pencils) exclusively to handling areas.

Certainly the list could go on, but everything relates to good hygiene. The question of what to do if your animal has salmonellosis is a tricky one. Some veterinarians recommend euthanasia, others will treat the disease. There are many problems with both options and neither will be discussed here. See the suggested reading (below) for a discussion of what to do if your animal has salmonellosis. I would recommend trying to avoid the situation by purchasing only healthy animals (no matter how good of a bargain the sick one is) and keeping your animals healthy. Cages should provide a low stress environment and animals should not be allowed to roam free in the house.

In conclusion, *Salmonella* is potentially serious, however, reptiles are only a minor source for the bacteria. You have a much greater risk of getting *Salmonella* from other sources than from your pet reptile. Nonetheless, reptiles are an appealing target for the media and much hype will be generated around this topic. As herpetologists/herpetoculturists we should be careful not to fuel the fire. Rather than emphasize the fact that reptiles carry *Salmonella,* we should focus on good hygiene and husbandry. It is my opinion that the popularity of reptiles is at the root of the problem. Uninformed pet owners are often careless and allow their animals to deteriorate, thus increasing their risk of getting *Salmonella* from their pets. We need to make a point of contacting these people and educating them. Unfortunately, we must also educate pet store owners and employees. The task is not an easy one, but we should begin work now rather than wait until it is too late!

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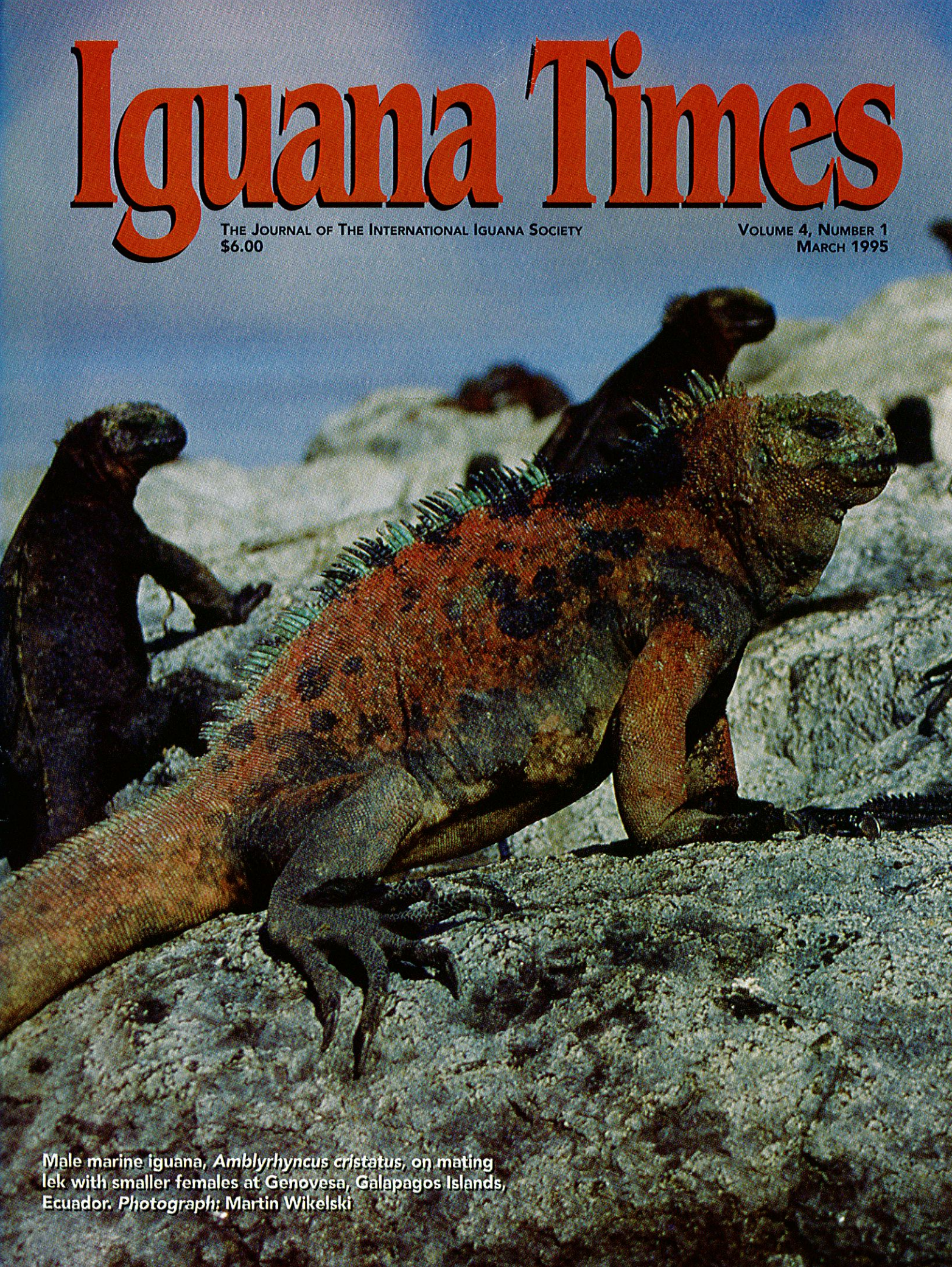

Male marine iguana, *Amblyrhyncus cristatus*, on mating lek with smaller females at Genovesa, Galapagos Islands, Ecuador. *Photograph:* Martin Wikelski