NEMATODE PARASITES OF IGUANINE LIZARDS

Lara K Maxwell, DVM*
Department of Physiological Sciences, College of Veterinary Medicine
University of Florida
Gainesville, FL 32610
USA

Ellis C Greiner, PhD
Department of Pathobiology, College of Veterinary Medicine, University of Florida
Gainesville, FL 32610
USA

Abstract: The subfamily Iguaninae is an informally recognized division of the family Iguanidae2. There are currently 31 iguanine species in 9 genera3: Amblyrhynchus, Brachylophus, Conolophus, Ctenosaura, Cyclura, Dipsosaurus, Enyaliosauros, Iguana, and Sauromalus. Oxyuroid nematodes occur commonly in iguanines, with 27 species reported in 15 iguanine species. The filariid Oswaldofilaria brevicaudata has also been described in several iguanines. While anecdotal reports of iguanine infections with other helminth parasites exist, only oxyuroids and the filariid are reported in wild iguanines.

Key words: parasites, iguanas

Several iguanine species, such as the Fiji banded iguana (Brachylophus fasciatus) and the Galapagos land iguana (Conolophus subcristatus), are parasitized by unique species of pinworms, occurring only in one host species, while other iguanines, such as the green iguana (Iguana iguana), spiny-tailed iguanas (Ctenosaura spp., and Enyaliosauros spp.), ground iguanas (Cyclura spp.), desert iguana (Dipsosaurus dorsalis), and chuckwalla (Sauromalus obesus) share parasite species. Several possible explanations may account for this trend. The insular location of these uniquely parasitized species and subsequent tendency towards geographic isolation may cultivate unique gut fauna in these lizards. Geographic proximity and insular location may determine whether nematode species of iguanine lizards are shared or are unique. The ground iguanas are insular, yet share oxyuroid parasites with mainland species, somewhat refuting this theory. However, ground iguanas also tend to inhabit islands that are closer to mainland than are the Galapagos and Fiji islands, possibly allowing some contact with mainland species and their parasites.

Another possible explanation for the occurrence of unique and shared iguanine parasites may relate to iguanine phylogeny. Gambino suggested that the presence of some highly specific pinworms might clarify iguanid phylogeny4. As the insular iguanids carrying unique parasites are highly isolated from both the mainland and from each other, genetic isolation would be expected and may account for both the presence of unique parasites and the lack of parasitic diversity. Only one pinworm species has been described in Brachylophus spp., which are the most geographically isolated iguanines. The Galapagos land iguana also carries unique species of oxyuroids. The Galapagos marine iguana (Amblyrhynchus cristatus) which is also geographically isolated on the Galapagos Islands, has had no nematode species reported from it. The Galapagos marine iguana is also unique in its ability to exploit a marine environment and in its consumption of algae1. It might therefore be considered to be a specialized and genetically isolated iguanid.

1997 PROCEEDINGS ASSOCIATION OF REPTILIAN AND AMPHIBIAN VETERINARIANS
A phylogenetic relationship between iguanids and their parasites might also explain the presence of shared parasites in ground and green iguanas, as the green iguana is probably the mainland lizard most closely related to the insular ground iguanas. Both iguanine genera share two nematodes—an oxyuroid and a filariid. Additionally, spiny-tailed iguanas, which seem to be related to the green and ground iguanas by a common ancestor, also share these two nematode parasites. In contrast, an apparently distantly related iguanine pair, the desert and the spiny-tailed iguanas, also share an oxyuroid species. However, while not close phylogenetically, they are close geographically, which may account for the presence of the same oxyuroid species in both genera.

Hindgut morphology may also play an important role in determining the number of oxyuroid species that are present. Most iguanines share similar gut morphology, with the large intestine expanded into a large, sacculated organ suitable for fermentation. Circular and semilunar valves are usually present in the hindgut, probably functioning to increase surface area for fermentation, increase microhabitats available to the intestinal flora and fauna, and slow gut transit time. These valves may serve as differing microenvironments for pinworms, which may serve to break up cellulose and chitin in addition to possibly secreting enzymes, vitamins, or volatile fatty acids. Adult body size of iguanine lizards is significantly correlated to number of colic valves, which in turn are positively correlated to number of nematode species found in one host. The green iguana, the iguanine with the largest diversity of oxyuroid species found in the colon, also has the largest number of colonic valves present. The Galapagos marine iguana is the only iguanine that reportedly has no colonic valves. The absence of both valves and pinworms in this species may indicate a relationship between these structures and maintenance of pinworm populations.

Iverson found that high intensities of pinworms, greater than 10,000 worms per adult animal, are common in healthy, adult iguanines and therefore hypothesized that a commensalistic or mutualistic relationship exists between herbivorous reptiles and their oxyuroid parasites. Telford also speculated that pinworms are commensalistic, serving to mechanically break up masses of cellulose and chitin. If iguanine oxyuroids are commensalistic or mutualistic parasites, then colonic valves may function partly to maintain large populations of pinworms. Co-evolution of the iguanine hindgut and oxyuroid physiology may have produced colonic valves in association with beneficial pinworms.

Despite the high prevalence of pinworm infections and high worm intensity in these iguanines, a single report has described pathology attributed to oxyuroid infections. An impaction was associated with a mass of Alaeuris brachylophi in a captive Fiji banded iguana. However, the affected iguana was wild caught and its history included a failure to thrive. The iguana's death after 1 yr in captivity followed chronic anorexia and may have been more closely associated with the stress of captivity that wild, adult iguanines often experience than with the presence of hindgut parasites. As captive green iguanas are popular and widespread in both North America and Europe, the absence of any reports of pathology attributed to oxyuroid parasites in this lizard may also indicate the benign nature of infection. We examined the gastrointestinal tract of ten captive iguanas for the presence of metazoan parasites. Only oxyuroids were found. No gross lesions were present in association with these nematodes.

The distributional patterns of the nematode parasites of iguanine lizards may reflect the geographic, phylogenetic, or physiologic relationships between iguanines. The presence of large numbers of oxyuroid parasites in the large intestine of apparently healthy lizards and the correlation between number of lizard colonic valves and number of oxyuroid species suggest that pinworms are not harmful or are beneficial to iguanines. They could play a mechanical or enzymatic role in maintenance of normal gut function.
LITERATURE CITED


1997 PROCEEDINGS ASSOCIATION OF REPTILIAN AND AMPHIBIAN VETERINARIANS 59