



Published on dvm360.com

[Home](#) > Common parasitic diseases of reptiles & amphibians (Proceedings)

Common parasitic diseases of reptiles & amphibians (Proceedings)

May 01, 2011

By [Byron de la Navarre, DVM](#)

Goal of presentation

In this presentation we will discuss the various groupings of parasites seen infesting reptiles & amphibians, how to identify them and thoughts on proper treatment to rid the hosts of these parasites.

It is believed that most if not all reptiles and amphibians living in the wild harbor parasites. The delicate balance between parasite and host in the wild tends to vary dramatically from the relationship between parasite and host in captivity. In the wild, where an animal is not confined within a small space, the environmental concentration of parasites is not high. As a result, the parasite burden to any given host is usually low. However, in captivity, especially in poor sanitary conditions, the concentration of parasites may be much higher, and therefore more dangerous. Couple this higher parasite concentration with the stress from poor husbandry (i.e. Improper: temperature, nutrition, light exposure, overcrowding, etc.) and these stressed captive animals with heavy parasite loads are more likely to succumb to the parasite infestation.

Parasites affect their hosts in many different ways. The parasites can be external (e.g. ticks and mites) or internal (e.g. gastro-intestinal worms). Parasites appear to have an effect on all aspects of captive rearing. In general parasitized reptiles and amphibians have a shorter life span, tend to be more susceptible to disease, and have a generally unthrifty appearance. Also, studies have demonstrated that heavily parasitized reptiles have poor to no ability to reproduce. And, of those that do succeed in producing offspring, the offspring may die at a young age, can be stunted, or have very slow growth rates.

As will be presented there is a wide range of protozoal and metazoan organisms found in close association with reptiles, and the relationship between reptiles and such organisms is often unclear. Many are parasites and their presence in or on reptiles is to the detriment of the host. Other may be commensals or symbionts that are adapted to the host and not associated with known pathology. The line between commensalism and parasitism may be a fine one, and captivity may easily alter the dynamics between such organisms and their host. A captive setting may provide an environment that would allow for usually benign commensals to reach a high enough burden as to become harmful. It behooves the clinician to objectively assess each case individually and determine whether treatment is warranted, or at least justified. Further, pseudoparasites are commonly seen in the feces of reptiles and may be mistaken for true parasites. So it is for these reasons that it is strongly recommended to accurately diagnose and treat for all observed parasites in captive reptiles and amphibians. Concerning proper treatment of reptiles and amphibians, each animal has to be treated on a case by case basis. In the literature and formularies there are several different doses as well as different treatment schedules listed – again, it behooves the veterinarian to evaluate each dose and regimen individually for each particular animal.

Enteric parasites:

Protozoa

Protozoans that infect reptiles can be roughly assigned to one of the following: amoebas (Sarcodina), flagellates (Sarcomastigophora), ciliates (Ciliata), and coccidian (Apicomplexa). Microsporidians were once considered protists, but are now believed to be fungi, or a sister group to the fungi, and will not be addressed in this text. The numbers and genera of protozoa present in an amphibian or reptile are very often influenced by the individual animal differences in the physiological parameters that effect the intestinal tract. Such differences, i.e. hydration status, pH, and the passage of digesta can have a profound effect on the make up of the enteric protozoal community. Other factors can include natural antagonism between the different species of parasite and predation. Protozoa can also effect the bacterial flora due to substrate competition and predation and thus can have secondary effects on the homeostasis of the intestinal tract.

Flagellates

Thus far at least 6 genera of flagellates have been identified, and these have probably been transmitted by infective cysts or by copulation. The organism most likely to cause problems in captivity is *Hexamita*, which has been known to affect the urinary bladder and kidneys of aquatic turtles (renal hexamitosis) and is often a fatal infection. *Chilomastix* frequently found in the intestine of salamanders, frogs and toads. *Trichomonas* and *Trichomonas*, typically identified by their well developed undulating membrane, are widely distributed among amphibians and reptiles. *Giardia* are also frequently seen in amphibians and reptiles. Retortamonad and diplomonad flagellates have also been reported in poison dart frogs.

Ciliates

Balantidium species are common in herbivorous turtles and lizards. It is thought that unless this ciliate is present in large numbers, that it is unlikely to be causing any pathogenic effect. But again, considering the other possible stresses placed on the animals in captivity – I usually recommend treating for these parasites. *Nyctotherus*, another very large ciliate, can be found in turtles and the green iguana (*Iguana, iguana, iguana*). The cyst of this "commensal" can easily be mistaken for a trematode egg. *Nyctotheroides* has been observed in anurans.

Opalinids

These organisms resemble flagellates and ciliates. However, opalinids lack a cell mouth and have only one type of nuclei. *Zelleriella* were observed in dendrobatid frogs.

Amoeba

In reptiles and amphibians, clinical signs of anorexia, weight loss, blood or mucus in the feces, vomiting, green discoloration to the urates, or midbody to caudal swellings of the body may be suggestive of infection with *Entamoeba invadans*. This is a highly pathogenic parasite in lizards and snakes. The trophozoites may be observed in a direct smear of the fecal material. Amoeba may be commensal symbionts in turtles and crocodilians, frequently making them responsible for infection of exposed snakes and lizards. Several other species of pathogenic amoeba exist, of which *Acanthamoeba* has been implicated in fatal infections. Star gazing is thought to be a sign of central nervous system involvement with this organism.

Treatment for amoebae, flagellates and ciliates is typically with metronidazole (100 mg/kg PO repeated in 2 weeks / or 50 mg/kg PO q 24h x 3-5 days +/- repeat PRN) [As is the case with all medications used in reptiles and amphibians, each animal has to be treated on a case by case basis – for all medications, in the literature there are several different doses as well as treatment schedules listed – it behooves the veterinarian to evaluate each dose and regimen individually for each particular animal]

Coccidia

Isospora and *Eimeria* are the coccidia most recognized in the fecal specimens of infected amphibians and reptiles. Listlessness, anorexia, regurgitation and intestinal hemorrhage and at times intussusception are the typical signs of intestinal or gall bladder infection with coccidia. *Isospora* have two sporozoites and have not been reported in turtles. *Eimeria* have four sporozoites and it is considered the primary coccidian of reptiles. Oocysts are ingested from contaminated soil or feces, and I am concerned with the possible vector transmission of insects that have ingested contaminated matter. *Sarcocystis* and *Toxoplasma* are occasionally found in reptiles. Typically it is believed that the affected reptiles if the intermediate host, though reports exist for snakes and lizards serving as the definitive hosts.

Effective treatment for coccidia resulting in complete cure of the infestation can be difficult. I typically use sulfamethoxine and sulfamethazine at 75 mg/kg once daily for 7 days. Proper husbandry and hydration of the patient as well as sanitation is very important to try and achieve best success with treatment.

Cryptosporidium has frequently been seen in BIODS. Typical presenting complaints by the owner is of regurgitation, lethargy, depression and frequently a midbody swelling may be palpated in advanced cases. The organism causes a proliferative gastritis for which there is presently no known cure or effective treatment. The transmission is via the ingestion of sporulated oocysts, infected mice, snakes, lizards or other prey items. A definitive diagnosis can be made on the basis of a direct smear or an acid fast stain preparation of: the feces, the slime coat from a regurgitated meal, or an aspirate/stomach wash that reveals multiple round organisms, 2 to 5 microns in diameter, staining bright red. Sometimes the organisms will not retain the red dye but will leave a "ghost image" against the counter stain. Careful identification must be made in male snakes as to not mistake tailless spermatozoa, which will also take up the red stain, for coccidian oocysts. Oocysts may be shed intermittently and therefore repeated fecal evaluations of a biopsy may be required to arrive at the definitive diagnosis. Infected animals should be completely isolated from the collection and due to the potential for zoonotic threat, and due to the fact that effective treatment for cryptosporidia is typically unsuccessful at the present time, it is often recommended that they be humanely euthanized and destroyed. An option to attempt treatment as reported by Dr. Elliot Jacobson is SMZ-TMP at 30-60 mg/kg PO SID for 60 days, or Paromomycin (300-800 mg/kg PO q 24-48h X 7-14 days/or/PRN).

Helminths:

Nematodes

A plethora of nematodes live within reptiles. They can be found in the blood, body cavities and membranes, and lungs but the very vast majority are found in the digestive tract. Nematodes in the Rhabditidae, Strongylidae, Capillariidae, Heterakidae, Oxyuridae, Spiruridae, Filariidae, Cosmocercidae, and Kathlaniidae, among others, are found in reptiles. Among those, lungworms (*Rhabdias* spp) and hookworms (*Kalicephalus* spp) are probably the most pathogenic. Diagnosis relies on the presence of larvated egg or free larvae in feces (*Rhabdias*) or typical morulated ova (hookworms). The presence of thin-walled embryonated eggs or rhabditiform larvae in a fecal sample are indicative of Strongyloides or *Rhabdias* infestation. *Rhabdias* inhabits the host's lungs and may cause respiratory distress. Strongyloides can produce diarrhea and respiratory distress as infective larvae migrate through the host's lungs. Both parasites may cause anorexia, weight loss and debilitation. The life cycle is direct and the parasite can be transmitted by ingestion of eggs, larvae, or possibly by direct skin penetration. These parasites can exist as a free-living form, making proper and complete cage sanitation a necessity. Oxyurid eggs are frequently encountered during fecal examinations of lizards and chelonians. In snakes, care must be taken not to mistake rodent pinworm eggs for those parasitic for reptiles. Pinworms are considered by many as non-pathogenic, though I typically treat to avoid any possible problems associated with their presence. Oxyurids have a direct life cycle and can exist in insignificant numbers within the colon, especially of tortoises, putting them at possible risk for impaction. Anorexia may occur in animals coming out of hibernation and may be attributed to heavy oxyurid infestation. Two genera of hookworms, *Kalicephalus* and *Oswaldocruzia*, occur in reptiles throughout the world, and usually appear similar in appearance. Fecal examination will demonstrate the presence of typical "strongyle type" eggs. Transmission is by ingestion of ova, infective larvae, or possibly by skin penetration. The drinking of contaminated water is another means of oral transmission. Infestations may cause lethargy, anorexia, general debilitation, anemia, ulceration, intestinal obstruction and peritonitis. *Capillaria* is the only known trichurid genera affecting reptiles. These nematodes primarily infect the intestine but have been found in other organs, such as the liver and gonads. They have a direct life cycle. Diagnosis is based on the presence of eggs with opercula at either end. Ascarid eggs are recognized by their thick shells. Adult worms may be found embedded in the stomach, esophagus, or small intestine where their effect may range from no apparent signs of illness to anorexia and regurgitation. Diarrhea and purulent pneumonia may also be attributable to heavy worm infestations. The most likely source for transmission is through the ingestion of intermediate hosts, such as amphibians and rodents. Spirurids are parasites of the mouth and gastro-intestinal system. Reptiles may act as

either intermediate or definitive hosts. For terrestrial reptiles and amphibians, ants are a common source for infection. In aquatic animals, Copepods are a common source for transmission. Diagnosis is by detection of the characteristic eggs. On microscopic exam, the larva are curled within giving the egg the appearance of containing a paper clip. Adult worms are easily removed from the mouth. Filariae can be found within lymph vessels, the eye, subcutis or within the coelomic cavity. The microfilaria produced by the adults may circulate in the blood or may be found in the skin, where they may cause dermal tumors. Pathology due to filariae is rare.

Treatment of nematode infestation can be accomplished using a variety of anthelmintics. For example: thiabendazole (50-100 mg/kg PO), levamisole (5-10 mg/kg PO), fenbendazole (50-100 mg/kg PO) Piperazine (40-60 mg/kg PO) ivermectin (0.2 mg/kg PO, IM or SC)[Do Not Use Ivermectin In Chelonians, Indigo Snakes & Skinks] Milbemycin (0.5 – 1.0 mg/kg PO) can also be used in reptiles and has been injected in several species of turtles with no ill effects. All treatments are repeated in two weeks, followed by a fecal examination 14 days after the second dose. If positive for parasites, a third dose is given, and the cycle continued until the parasites are cleared from the animal. Care must be taken with all treatment as treatment of any and all worms or of microfilaremic reptiles may result in overwhelming antigenic load from dying worms.

Cestodes

The tapeworms that affect reptiles are hermaphroditic and non-host specific. Transmission is by ingestion of an intermediate host. Reptiles are definitive hosts for many tapeworms. Pathogenicity is usually minimal, especially with adult intestinal tapeworms, but large numbers may result in luminal stenosis or intestinal motility disorders. Diagnosis is through finding cestode ova in fecal specimens. Gravid proglottids do not float. Reptiles may also act as intermediate host, especially for pseudophyllid cestodes, although this is less common. Diagnosis may be difficult, but recurrent multifocal cutaneous nodular or pustular eruptions are sometimes seen. Treatment for plerocercoids is more problematic as the death of the worms may result in morbidity. Diagnosis of an intestine dwelling cestode is by detection of proglottids or eggs in the stool. Plerocercoids of Diphyllbothrium are frequently found in tadpoles feeding on crustaceans. Niclosamide (150-300 mg/kg PO), bunamidine HCl (50 mg/kg PO), and praziquantel (7-8 mg/kg IM,PO,SC), each repeated in two weeks are all reported to be effective in treating adult tapeworms.

Trematodes

Flukes are found in the digestive tract of reptiles, but some species inhabit the lungs, or the urinary system, and others are found in the blood (Spirorchids). Small flukes, collectively called renifers, are a common finding in the mouth and lungs of frog- or fish-eating snakes. Except for blood flukes in sea turtles, trematodes seldom cause morbidity. Diagnosis is through finding typical brownish operculated ova in feces. Many fluke eggs are dense and will sink rather than float so that sedimentation is a much more sensitive technique. The operculated eggs in the fecal sample or oral mucosa are diagnostic for trematodes. Some monogenea are external or urinary bladder parasites of frogs, tadpoles and newts. Digenean trematodes often form metacercariae in the skin, eye or various organs. The renifer group of digenetic flukes are common in the mouth, pharynx, esophagus, trachea, and lung of indigo snakes. This fluke requires an amphibian intermediate host therefore elimination of this food source or freezing/preparing the prey item to kill potential parasites is required to prevent reinfestation. The infected animals are often presented for anorexia or profuse salivation, due to the large number of organisms present in the oral cavity. Praziquantel (7-8 mg/kg IM,PO,SC) or fenbendazole (100 mg/kg PO) repeated in two weeks will control this and other metazoans.

Acanthocephalans

The thorny-headed worms or acanthocephalans are common in aquatic turtles, frogs and toads. They may be found in the stomach or intestine. Clinical signs may include blood or mucus in the stools, anemia, and weight loss. The eggs are typically dark, thick-shelled and tapered at the ends, with fecal materials frequently adhering to the shell. As stated, thorny-headed worms are found in the intestinal tract of reptiles. Their presence is almost always associated with inflammation as the worm's proboscis embeds in the mucosa. Intestinal perforation is not uncommon. Treatment is always warranted, but efficacy of avermectins or imidazoles is typically poor. Loperamide has been used with success in pigs and fish and warrants consideration. Levamisole at 5-10 mg/kg PO,SC,ICe repeated in two weeks has been used successfully for treatment.

Pentastomes

Pentastomids are considered to be a degenerative crustacean that parasitizes the lung and airsac distal to the lung. Larvae and nymphs may be found in the stomach wall. Transmission occurs by the ingestion of an intermediate mammalian host. Symptoms may include lethargy, anorexia, dyspnea, and blood tinged saliva. Affected animals frequently harbor these parasites with no ill effects. Diagnosis is based on observations of the characteristic eggs which contain a primary larva, which is oval, tailed, and has four stumpy legs each bearing one or two retractable pincer claws. Humans can be an accidental host, so care must be taken when handling infected animals and their feces. The vast majority of species of these unusual parasites, related to crustaceans, inhabit the lungs of insectivorous/piscivorous/carnivorous reptiles. Snakes and lizards, crocodylians, and piscivorous chelonians may harbor pentastomes. Infection is usually subclinical and diagnosed through the finding of round ova containing a primary larva. Zoonotic potential has only been demonstrated for *Armillifer* species, parasites of African and Asian snakes. The overwhelming majority of human pentastome infections are due to *Linguatula serrata*, a parasite in the nasal passage of dogs and other canids that does not cycle through reptiles. Successful treatment of pentastomiasis with high doses of ivermectin has been documented, usually in geckos with *Raillietiella*, though there is no known completely effective treatment, and levamisole (5 mg/kg PO, SC, ICE) or one of the avermectins (Ivermectin or Milbemycin) may be effective.

Hemoparasites

At this time, only the most common blood parasites will be discussed, as the number of described species is extensive and the literature is often not helpful in determining the pathogenicity of certain species. Hemoparasites are found within the cells or free in the plasma. Their development may involve other organ systems. Often, with blood parasites, there is little or no clinical disease. Clinical signs that may develop with hemoparasites include anemia, thrombocytopenia or purpura. There is little or no data on the efficacy, but hemoprotozoa are often treated with tetracycline (10 mg/kg PO q24h) and/or chloroquine phosphate-primaquine phosphate (125 mg/kg PO q 48h X 3 treatments) or Quinacrine (19-100 mg/kg PO q48h X 2-3 wk).

Hemogregarines

A single schizont typically attacks a RBC, where replication occurs intracytoplasmically. Hemogregarines are the dominant and characteristic hemoparasites of snakes but affect all classes of reptiles including the Tuatara and sea snakes. *Hemogregarina* is found in aquatic reptiles and relies on leeches for sexual reproduction. *Hepatoozoa* is found in terrestrial arthropods or leeches. Typically there is little pathology.

Hemoproteus

These are also found within the erythrocyte cytoplasm and vary from one to several per cell. Turtles and lizards are the usual hosts. Typically there is little pathology.

Leishmania

With this hemoparasite, only the pro- and amastigote stages are observed. Promastigotes are found in the blood, amastigotes are intracellular. Transmission is probably by the sandfly. This is a benign infection, with lizards as the hosts.

Plasmodium

There are 68 species known that have been identified in turtles, lizards and snakes. Depending on the species, different stages of the organism may be found within the cytoplasm of the RBC's, mononuclear leukocytes or endothelial cells of visceral organs. Some species may cause anemia or thrombocytopenia. An insect vector is required for transmission.

Lankesterella

This protozoan hemoparasite may be transmitted by leeches. They penetrate and destroy RBC's potentially resulting in anemia.

Trypanosomes

These affect crocodylians, turtles, lizards, snakes, frogs and newts. Biting flies and leeches are responsible for transmission. Affected animals may demonstrate listlessness, refuse food, and potentially die due to heavy parasitism, however pathology is usually rare.

Microfilaria

The presence of microfilaria in the blood suggests the presence of a pair of adults in the animal, i.e. the eye, subcutis or coelomic cavity. Typically pathology is rare with the exception being the presence of adults in the eye.

Flukes

Spirorchis is found in the blood of semiaquatic turtles.

Pirhemocytion

This organism has been included under hemoparasites because when it was first described, it was believed to be a protozoal of erythrocytes. Presently it is thought to be an iridovirus. It is responsible for RBC destruction and anemia. If the affected animal also has a concomitant infection with Plasmodium, death often results.

Ectoparasites

Acariasis,

Which is an infestation with ticks and mites, can be both a nuisance and a costly problem for any animal collection. Both hard and soft shelled ticks attack reptiles and are usually seen on newly imported snakes. One must pay careful attention to the labial pits in boids, as this is a common site for infestation. The ticks can cause anemia and are responsible for the transmission of blood parasites or allowing bacteria to invade the wounds they produce. Treatment is their identification and removal. Ophionyssus mites are the most common and most pathogenic of the mites that attack reptiles. Without proper treatment, mite numbers can increase at such a rate, that even moderately sized animals can be exsanguinated. Mites can also transmit blood parasites and are also believed to transmit the virus responsible for boid encephalitis. Treatment is with ivermectin (Not in Chelonians) or milbemycin, warm water soaks, Fipronil [0.25%] {Beware of Reaction to alcohol carrier/use with caution/extra-label use – need further evaluation} (spray/wipe over q 7-10d), DDVP fly strips (i.e. Shell No Pest Strips or Vapona, are hard to find), or the careful application of pyrethroid {Permethran} [safe than Pyrethrins] insecticide, or Carbaryl powder {5%}. Silica gel may also be used as it desiccates the mite by scratching the cuticle of the mite. However it can also desiccate small reptiles so close monitoring is required. Most reptile breeders have their own combination, i.e. olive oil + garlic + etc... and depending on the number of mites being treated these topical concoctions may be effective for treating the mites on the animals, but will not help with the treatment of the environment. One must always properly treat the cage, cage furniture, feed dishes, etc... if complete eradication of the mite infestation is to be achieved.

Myiasis

Turtles are particularly prone to infestation by fly larvae. While there are several species of the true bot fly, most cases of myiasis are by opportunistic species which exploit pre-existing wounds. Proper treatment consists of removing the maggots by flushing with dilute chlorhexadine solution and treating the wound both topically and often treating the animal systemically with appropriate antibiotic therapy. The toad fly, *Bufo lucilia*, invades the nasal orifice of toads, and infestation is usually fatal.

Leeches

These are commonly found in certain reptiles, such as aquatic turtles as well as in amphibians. The dorsal lymph sac, body wall or body cavity may be invaded in certain species of frogs. Hirudineans are commonly found on aquatic reptiles and sea turtles and on crocodylians. They may transmit trypanosomes to other blood parasites. They are best removed manually. Surgical removal may be required for those more deeply attached parasites. Leeches have also been associated with cutaneous fibroepitheliomas in green sea turtles.

Crustaceans

Barnacles are sessile, cirriped crustaceans common on the shell and skin of sea turtles. Morbidity is unclear, but osteolysis may occur at sites of attachment. Freshwater immersion helps removal.

In conclusion, parasites whether internal or external are a real threat to captive amphibians and reptiles. Whether your client's animals are pets or commercial breeders, an effective parasite prevention/treatment program is essential. Parasitized amphibians and reptiles often have poor growth rates, are unthrifty, commonly have reproductive problems, and are in general more susceptible to disease than those same animals not infested with parasites. Since complete avoidance of parasites is difficult, especially in those animals that eat live food, I recommend at least yearly evaluations for external and internal parasites and appropriate treatment as indicated.

References & suggested reading:

- Mader, D.R. (1996). Reptile Medicine and Surgery. Saunders Co., Phil., PA. p. 185 – 203, 341, 379-381.
- Frye, F.L. 1991. Biomedical and Surgical Aspects of Captive Reptile Husbandry, 2nd edition, vol. 1. Krieger Publishing Co., Malabar, FL.
- Bodri, M.S., (1994) Common Parasitic Diseases of Reptiles and Amphibians. Proc. 1st ARAV Conference, Pittsburgh, PA. p. 11-17.
- Klingenberg, R.J. (2000) Reptile Parasites. Proc. 2000 ARAV Conference, Reno NV. p. 193-194.
- Cooper, J.E. (2001) Host:Parasite relations in reptiles and Amphibians. Proc. 2001 ARAV Conference, Orlando, Fl. p. 249-250.
- Bruederle, J.A. (1998). CVMA Exotics Formulary. Chicago, IL. p. 16 - 29.
- Carpenter, J.W., Mashima, T.Y. and Rupiper, D.J., 2001. Exotic Animal Formulary, 2ndedition.W.B. Saunders Company. Philadelphia, PA.

© 2019 MultiMedia Animal Care LLC. All rights reserved. Reproduction in whole or in part is prohibited. Please send any technical comments or questions to our [webmasters](#).

Source URL: <http://veterinarycalendar.dvm360.com/common-parasitic-diseases-reptiles-amphibians-proceedings>