HEXAMETRA TRANSMISSION BETWEEN WILD CAUGHT PANTHER CHAMELEONS (Chamaeleo pardalis) AND CAPTIVE BORN VEILED CHAMELEONS (Chamaeleo calyptratus): A CASE REPORT

Rob L Coke, DVM
Copperfield Animal Clinic
Houston, TX 77095
USA

Key words: Hexametra, chameleon, parasite, Chamaeleo pardalis, Chamaeleo calyptratus, Madagascar

INTRODUCTION

For many years, parasitism of chameleons has been identified as potential contributor to disease, especially due to the increase in importation. Since wild caught chameleons in the current reptile market are still often less expensive than their captive born counterparts, herpetoculturists sometimes allow economics to dictate how their collections are formed. Captive bred chameleons are becoming more readily available due to recent advances in herpetoculture. The ready availability of both wild caught and captive bred chameleons often results in mixed collections, which can lead to disease problems, such as the following case report.

CASE REPORT

Reptile Collection History

The original reptile collection includes three to five dozen animals consisting of lizards, snakes, and tortoises. Chameleons in the breeding group includes five captive bred veiled chameleons (Chamaeleo calyptratus), two captive bred Jackson's chameleons (Chamaeleo jacksonii), and two captive bred and four wild caught panther chameleons (Chamaeleo pardalis). Juvenile chameleons are housed in small aquaria in another part of the house. Adult chameleons are kept in individual screen cages. Direct physical contact between the adults is limited to breeding attempts.

In the spring of 1996, the breeder added a group of wild caught panther chameleons to the collection. The importer de-parasitized the chameleons twice, 2 wk apart, with oral febendazole paste at 100 mg/kg (Panacur, Hoechst-Roussel, Somerville, NJ, 08876-1258, USA) and with liquid metronidazole at 50 mg/kg (Flagyl, Rhone-Poulenc Rorer, Mexico). Two weeks later, he also treated with one oral dose of ivermectin at 200 µg/kg (Ivomec, Merck, Rahway, NJ, 07065-0912, USA). After shipping, these chameleons were hydrated and re-treated with febendazole (100 mg/kg) and liquid metronidazole (50 mg/kg). These animals were quarantined in a separate room for 6 wk. After the quarantine period, the breeder kept two pair of adults for breeding stock and sold the others. During the summer, one panther chameleon female died acutely and no cause of death was determined. The other panther chameleon female died 1 mo later, after laying a clutch of eggs. Upon necropsy, several nematodes were found in the stomach and small intestine. These parasites were identified as mature Hexametra angusticaecoides.

1997 PROCEEDINGS ASSOCIATION OF REPTILIAN AND AMPHIBIAN VETERINARIANS 25
Veiled Chameleon Case History

In the summer of 1996, a 1-year-old pet veiled chameleon was presented to another veterinarian for extreme lethargy and respiratory distress. Due to its poor condition, the owner elected for euthanasia. During the necropsy, the referring veterinarian found 20-30 nematodes in the coelomic cavity. No worms were found within the intestinal tract. Fecal exams of the colonic contents were negative for any parasites. The chameleon was preserved in 10% formalin and sent to me for further necropsy and analysis. The worms were placed in formalin for later identification. The previous necropsy findings were corroborated and additional worms were found in the liver, lungs, abdominal fat bodies, subcutaneous space, both conjunctival sacs, and within one eyelid. Other lesions noted during the necropsy included fibrous tags on the liver, mottled liver pattern, and steatitis. An investigation of the chameleon's history revealed that the owner had purchased the chameleon 2 wk prior at a local pet store. The pet store had purchased the chameleon 6 wk prior from the local chameleon breeder previously mentioned. The intracoelomic worms were identified as immature Hexametra spp. The worms were too immature for correct species identification, but were thought to be H. angusticaecoides.

DISCUSSION

The genus Hexametra is found in two orders of reptiles including lizards and snakes. Hexametra is classified as an ascaridoid nematode with more than two uterine branches. Several species of Hexametra are found in reptiles from Africa and Southern Asia. In 1960, Chabaud and Brygoo described Hexametra angusticaecoides in chameleons from the island of Madagascar. In 1968, Caballero Rodriguez found this parasite in Malagasy chameleons with the type host, the Oustalet's chameleon (Chamaeleo oustaleti) in Maroantsetra, Madagascar. Hexametra angusticaecoides has been identified in other chameleons such as: C. pardalis, C. lateralis, C. boettgeri, C. brevicornis, C. rhinoceratus, and C. verrucosus. In 1968, Ghadirian described H. angusticaecoides in several snake species from Madagascar including Sanzinia madagascariensis (tree boa), Acrantophis dumerili (Dumeril's ground boa), Lioheterodon madagascariensis (hognose), Ithycyphus miniatus, and Madagascarophis colubrina.

Chabaud et. al., (1962), observed the larvated (L2) eggs of Hexametra angusticaecoides spontaneously hatch in water. The nematode larvae were then ingested by either tadpoles, larval mosquitoes, or sandflies. The larvae remained dormant in the tissues of the intermediate host until eaten by chameleons (Chamaeleo pardalis). Further development occurred in the body cavity and subcutaneous tissues of the chameleons with the first molt occurring 4 mo following ingestion of the intermediate host. The adult worms reached the intestine after migrating through the lungs. Larval development of H. angusticaecoides occurred in chameleons fed larvated eggs, but they did not develop to the adult stage.

Although the mode of transmission of Hexametra has been determined experimentally, the mode of transmission in this case report has not been definitively determined. The breeder keeps all chameleons and food items separated. The breeder did note free flying fruit flies, houseflies, and the occasional escaped cricket within the reptile room. One of these insects may be the intermediate host. An insect might have ingested the feces of one chameleon and was subsequently eaten by another chameleon. The larvae then leave the digested insect to penetrate the walls of the chameleon's intestines to begin their normal migratory cycle. The other possibility is the environmental contamination of accidental ingestion of the infective, larvated eggs. The larvae would grow in the coelomic cavity and subcutaneous tissues but not molt and continue their life cycle.
With the slow growth rate of the larvae in the subcutaneous tissues and coelomic cavity (up to 7 mo), performing fecal exams on newly imported animals may only detect a small portion of the total worm burden in these animals. *Hexametra* nematodes pass larvated eggs in the feces. These eggs can be detected with saline fecal floatation media. Deworming these animals on arrival, though appropriate, needs to be followed up with serial fecal exams and with additional de-worming as needed for the first 6-12 mo of captivity.

Febendazole should remove this ascaridoid parasite. High dose febendazole (100-250 mg/kg q 7 d X 3) and sustained dose febendazole (50-100 mg/kg s.i.d. X 3, then repeated in 2 wk) has been used to remove nematode parasites in reptiles. Febendazole does not appear to be completely effective against the stages of the life cycle in the tissues, but febendazole does appear to be effective against the nematodes in the digestive tract.

**CASE FOLLOW-UP**

Since the confirmation of the parasite in the veiled chameleon, the breeder has de-parasitized the chameleon colony as outlined above and has performed serial fecal examinations. Two other wild caught panther chameleons were positive for round, thick-walled eggs in the feces when testing began. After treatment, no eggs were seen on follow-up fecal exams. During this time, one male veiled chameleon that was housed next to the veiled chameleon described above, died from an unrelated diffuse mycobacterial coelomitis. On necropsy, about one dozen *Hexametra* nematodes were discovered in its coelomic cavity and subcutaneous tissues. All other chameleons were negative on follow-up fecal exams.

**LITERATURE CITED**

5. Craig, Tom, DVM, PhD. Department of Veterinary Pathobiology, College of Veterinary Medicine, Texas A&M University, College Station, Texas 77843. Personal Communication. 1996.