Parasit. hung., 26: 51-55, 1993

Studies on internal parasites of tortoises

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(Received 15 July, 1993)

Abstract: Faecal samples were collected from a total of 71 tortoises (53 *Testudo hermanni*, 2 *T. graeca*, 1 *T. marginata*, and 15 *Agrionemys horsfieldi*) three times and processed by flotation, sedimentation and Baermann's technique. Ciliate trophozoites and cysts (*Balantidium* and *Nyctotherus* spp.), oxyurid eggs and larvae; and roundworm eggs were found by flotation and Baermann's technique. According to the results of coprological examinations the tortoises were divided into a mebendazole-treated (2 x 400 mg/kg per os), an albendazole-treated (2 x 100 mg/kg per os) and an untreated control group. Both drugs showed 100% efficacy against oxyurids and ascarids. No toxic effects were observed. The prevalence of the expelled worms was: *Atractis, Mehdiella, Tachygonetria* and *Thaparia* spp. (Oxyuridae, mixed infection) 71.8 %, *Angusticaecum holopterum* (Anisakidae) 8.5 % and Spiruridae sp. 1.4 %. Ciliates and oxyurids seem to be slightly or non-pathogenic despite the rather high intensity of infections. However, *A. holopterum* caused severe symptoms (anorexia, vomitus and exsiccosis) in two tortoises which harboured only two and three large ascarids, respectively. Low level roundworm infections may cause diagnostic problems because the faecal egg output might be moderate.

Key words: reptiles, tortoises, diseases, parasites, ciliates, oxyurids, roundworms, diagnosis, therapy

INTRODUCTION

Free-living reptiles harbour a huge variety of protozoan and metazoan parasites (Telford 1971; Frank 1976). Captivity is stressful, predisposing reptiles to parasitic diseases. Crowding of hosts in captivity, creating an increased risk of reinfection, may lead to heavy parasitism, severe clinical disease and death. In recent years, reptiles

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have attracted increasing interest as pets; however, data concerning their veterinary care and diagnostic techniques are limited at present. The aim of the authors was to collect information on the prevalence, abundance, diagnosis and control of parasites of tortoises.

MATERIALS AND METHODS

The species distribution of 71 captive tortoises involved in this study was: 53 *Testudo hermanni*, 2 *T. graeca*, 1 *T. marginata*, and 15 *Agrionemys horsfieldi*. Fourteen of them were born in captivity, the others were imported to Hungary from their natural habitat more than one year before. Faecal samples were collected individually and processed three times by flotation, sedimentation and Baermann's technique. The tortoises were divided into three groups (two therapeutic and one control) according to the results of coprological examinations, and treated twice with mebendazole (400 mg/kg) or albendazole (100 mg/kg) at a 10 day interval as shown in Table 1. The drugs were administered via stomach tube as described by Holt et al. (1979). The expelled worms were collected individually, counted, and identified using the keys of Petter and Quentin (1976) and Sprent (1984). The efficiency of treatments was checked by three faecal examinations.

Table 1

Scheme of the therapeutic experiment

Day	Group 1 (n = 16*)	Group 2 (n = 16*)	Group 3 (n = 39**)
0–21	3 x faecal examination		
21	mebendazole 400 mg/kg p.o.	albendazole 100 mg/kg p.o.	–
31	mebendazole 400 mg/kg p.o.	albendazole 100 mg/kg p.o.	–
52–73	3 x faecal examination		
73	–	–	albendazole 100 mg/ kg p.o.
83	–	–	albendazole 100 mg/kg p.o.

* 15 animals infected by oxyurids, 1 animal infected by oxyurids and roundworms

** 17 nimals infected by oxyurids, 22 animal non-infected

RESULTS

Ciliate trophozoites and cysts, oxyurid and roundworm eggs and oxyurid larvae were found by flotation and by Baermann's technique. The prevalence of infections as determined by coprological examination is shown in Table 2. Albendazole and mebendazole showed 100% efficacy against both oxyurids and roundworms. No toxic effects were observed. The recovered parasites, their prevalence and abundance are shown in Table 2. Severe symptoms including anorexia, exsiccosis and vomitus occurred in three small tortoises (length of carapace: 7–11 cm) which harboured 2–4 large ascarids only. One of them died, while the physical condition of the others normalized after effective anthelmintic treatment. All other tortoises seemed to be healthy despite the rather high intensity of ciliate and oxyurid infections.

Table 2

Prevalence and abundance of endoparasites on the basis of coprological examinations and dewoming results of 71 tortoises

	Prevalence (%) on the basis of		Abundance (ranges)
	coproscopy	deworming	
Ciliata (*Balantidium* and *Nyctotherus* spp.)	38.0	–	n.d.*
Oxyurida (*Atractis*, *Mehdiella*, *Tachygonetria* and *Thaparia* spp.	69.0	71.8	32-30, 600
Ascarida (*Angusticaecum holopterum*)	2.8	8.5	1-4

* n. d. = not determined but high

DISCUSSION

The prevalence and abundance of ciliates and oxyurids were much higher than those of roundworms and other endoparasites (Table 2). Our findings are similar to those of Keymer (1978) and Holt et al. (1979). Roundworms are thought to be highly pathogenic for tortoises (Telford 1971, Holt et al. 1979), while ciliates are considered slightly or non-pathogenic (Telford 1971, Keymer 1978). Opinions regarding the pathogenicity of oxyurids vary from 'highly injurious to animals' (Zwart and van Ham 1972) to mutualist organisms (Telford 1971). In our study both ciliates and oxyurids seemed to be only slightly or non-pathogenic despite the rather high intensity of infections, but A. holopterum caused severe clinical disease and death even at low-level infections. Clinical symptoms were recorded only in small tortoises suggesting that the pathological effect is, at least partly, due to obstruction of the gastrointestinal

tract by large worms. Ciliate and oxyurid infections can be easily diagnosed by flotation and by Baermann's technique. However, deworming revealed a three times higher prevalence of ascarids than did the previous three faecal examinations. Thus low level, yet pathologically important roundworm infections may remain undetected by coprological examinations.

Several anthelmintics had been tested for chemotherapy of tortoises, but most of them have been found to be either ineffective at the recommended doses, or toxic to experimental animals at doses higher than that. Only thiabendazole (2 x 200 mg/kg per os) was found to be effective without any toxic effect (Moser 1973, Holt et al. 1978, Claussen 1981). On the basis of our results mebendazole (2 x 400 mg/kg per os) and albendazole (2 x 100 mg/kg per os) can also be used successfully and safely for anthelmintic treatment of tortoises.

ACKNOWLEDGEMENTS

The authors thank Prof. T. Kassai and Prof. I. Varga for their helpful comments. Financial support was provided by the Pro Renovanda Cultura Hungariae Foundation.

Sátorhelyi T. és Sréter T.: A szárazföldi teknősök belső élősködői

Összesen 71 (53 *Testudo hermanni*, 2 *T. graeca*, 1 *T. marginata*, 15 *Agrionemys horsfieldi* fajhoz tartozó) szárazföldi teknőst vizsgáltunk felszíndúsítással, ülepítéses dúsítással és Baermann-féle módszerrel. A koprológiai vizsgálatokkal csillós egysejtűek vegetatív formáit és cisztáit, oxyurida petéket és lárvákat, valamint orsóféreg petéket találtunk. A fertőzöttségük alapján az állatokat egy mebendazollal kezelt (2 x 400 mg/ttkg per os), egy albendazollal kezelt (2 x 100 mg/ttkg per os) és egy kezeletlen kontroll csoportra osztottuk. Mindkét anthelmintikumot 100 %-os hatásúnak találtuk az oxyuridák és az orsóférgek ellen. Toxikus gyógyszerhatást nem észleltünk. A teknősök 71,8 %-a oxyuridákkal (*Atractis, Mehdiella, Tachygonetria, Thaparia* spp., vegyes fertőzöttség), 38,0 %-a csillósokkal (*Balantidium, Nyctotherus* spp., vegyes fertőzöttség), 8,5 %-a orsóférgekkel (*Angusticaecum holopterum*), 1,4 %-a spiruridákkal volt fertőzött. A csillós egysejtűek és az oxyuridák apatogénnek, míg az orsóférgek erősen patogénnek tűntek.

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