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The prevalence of endoparasites in reptiles kept in captivity domestic environments

Abstract

Tropical reptile species are increasingly appearing among domestic pets. The owners of these animals are interested in providing the best possible living conditions for their pets; however, they do not always possess sufficient knowledge on the subject. As a result, these animals often suffer from various ailments and are susceptible to parasitic infections. The aim of this study was to identify internal parasites found in the most commonly kept reptiles – lizards, snakes, and turtles. The study was conducted on a sample of 112 individuals, with the largest group consisting of lizards, mainly *Pogona vitticeps* Ahl and *Eublepharis macularius* Blyth. Faecal analysis for the presence of parasites was carried out using flotation and direct smear methods. The most frequently detected parasites were Nematoda, Protozoa, and Coccidia (*Coccidea*). The results of the study may contribute to more effective prevention of parasitic diseases in reptiles.

Keywords: Coccidea, direct smear method, flotation method, Nematoda, Protozoa

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Introduction

One of the emerging challenges in modern veterinary medicine is the development of a field dedicated to the treatment of exotic animals. Exotic amphibians, reptiles, birds, and even small mammals are increasingly being kept in domestic environments (Harrington et al., 2019; Dawidowicz, 2025a, b). This trend creates a growing need to expand knowledge about the optimal husbandry conditions for these animals, to discover or improve treatments for diseases, and to ensure the humane sourcing of species for home breeding (McFadden, 2011; Fass, 2013; Jepsen, 2016).

Over the years, reptiles have been gaining increasing interest among breeders, which compels veterinarians to continuously expand their knowledge in the specialized field of non-domesticated animal medicine. In the second half of the 20th century, reptiles were imported from various regions of the world, including Australia, Africa,

South and Central America, and Asia, to serve as pets. However, it was not until the 1980s and 1990s that a true wave of reptile trade began, with reptiles being widely offered as companion animals, marking a significant increase in their popularity and availability. According to data from the year 2000, it was estimated that approximately 2.9 million reptiles were being kept as companion animals worldwide. It is worth noting that over 566,000 *Iguana iguana* L., 94,000 *Python regius* Shaw, and 29,000 *Boa constrictor* L. were imported into various parts of the world. At the turn of the 20th and 21st centuries, an initiative focusing on breeding reptiles in captivity emerged. This type of breeding has helped preserve the existence of some rare reptile species, such as *Iguana iguana*, *Pogona vitticeps* Ahl, and many species of geckos and chameleons. The movement aimed to maintain the populations of these taxa and protect them from threats, thereby contributing to their survival. Captive breeding of reptiles has become an important tool in their conservation and in preserving biodiversity. However, illegal smuggling and the removal of animals from their natural habitats still occur and continue to pose a threat to these fascinating creatures (MacCurley, 2005; Mitchell, 2009).

Due to the high market value of exotic animals, their owners are often interested in ensuring care from a specialised veterinary practitioner (McFadden, 2011; Herz, 2013, 2017). The fundamental methods of reptile examination in veterinary clinics include general behavioural observation, inspection of the body surface, and routine faecal analysis. Below there are three general guidelines indicating when faecal examination should be performed in reptiles kept in captivity: (1) when introducing a new animal into a terrarium – ideally, a three-month quarantine should be conducted before the animal is placed in its target environment, including faecal testing at the beginning, middle, and end of the quarantine period; (2) before planned hibernation – deworming treatment should be considered and appropriately timed prior to brumation; (3) in cases of concerning behaviour – such as apathy, restlessness, lack of appetite, aggression, weight loss, respiratory difficulty, or watery stool (Mitchell, 2009).

It is not uncommon for veterinarians to receive severely neglected, parasitised, or malnourished animals, often due to improper living conditions. Therefore, gaining a thorough understanding of the biology and basic life requirements of the species being kept is essential (Russo, 2007; Mitchell, 2009; Kohler et al., 2013; Kolle, 2015; Dawidowicz, 2025a, b).

The aim of this study was to identify the species and abundance of endoparasites present in the gastrointestinal tract of reptiles kept as pets in home terrarium settings.

Research methodology

Object of the study

Research material, in the form of reptile faecal samples, was collected at a veterinary clinic in Kraków (Lesser Poland Voivodeship, Southern Poland) between January and March 2023. Samples were provided to the clinic by reptile owners (they were previously instructed on how to collect so). Samples were collected in standard, sterile faecal containers (20 ml capacity) and delivered directly to the clinic. If same-day delivery was not possible, faeces were stored in a refrigerator and then delivered to the clinic up to three days after defecation.

The study was conducted on 112 individuals belonging to 15 families and 22 species, including:

- **15 species of lizards** (88 individuals) – Lacertidae – Green keel-bellied lizard (*Gastropholis prasina* Werner), Teiidae – Argentine black and white tegu (*Salvator merianae* Duméril & Bibron), Red tegu (*Salvator rufescens* Günther = *Tupinambis rufescens* Boulenger – Fig. 1A – Appendix 1), Diplodactylidae – Crested gecko (*Correlophus ciliatus* Guichenot – Fig. 1B – Appendix 1), Eublepharidae – Leopard gecko (*Eublepharis macularius* Blyth – Fig. 1C – Appendix 1), Gekkonidae – Madagascar day gecko (*Phelsuma madagascariensis* Gray – Fig. 1D – Appendix 1), Agamidae – Pygmy bearded dragon (*Pogona henrylawsoni* Wells & Wellington), Bearded dragon (*Pogona vitticeps* Ahl – Fig. 1E – Appendix 1), Arabian spiny-tailed lizard (*Uromastyx yemenensis* Wilms & Schmitz), Chamaeleonidae – Veiled chameleon (*Chamaeleo calyptratus* Duméril & Duméril – Fig. 1F – Appendix 1), Panther chameleon (*Furcifer pardalis* Cuvier), Crotaphytidae – Collared lizard (*Crotaphytus collaris* Say – Fig. 1G – Appendix 1), Green basilisk (*Basiliscus plumifrons* Cope), Iguanidae – Green iguana (*Iguana iguana* L. – Fig. 2A – Appendix 1), Blue iguana (*Cyclura lewisi* Grant),
- **4 species of snakes** (10 individuals) – Anolidae – Green anole (*Anolis carolinensis* Voigt), Boidae – Boa constrictor (*Boa constrictor* L. – Fig. 2B – Appendix 1), Colubridae – Corn snake (*Pantherophis guttatus* L.), Pythonidae – Royal python (*Python regius* Shaw – Fig. 2C – Appendix 1),
- **3 species of turtles** (14 individuals) – Geoemydidae – Reeves' turtle (*Mauremys reevesii* Gray), Testudinidae – Horsfield's tortoise (*Testudo horsfieldii* Gray), Hermann's tortoise (*Testudo hermanni* Gmelin – Fig. 2D – Appendix 1).

The study variables included three animal parameters: age, sex, and source. Reptiles whose housing conditions did not meet the minimum standards required for home care were excluded from the study. Animals most often came from breeders or pet stores, but some were of unknown origin. The species name was provided upon purchase or acquisition of the animal, but the accuracy of these identifications was verified in each case using the tropical reptile identification key by Gorazdowski and Kaczorowski (2003).

Detailed information about age, gender, past diseases, etc. was obtained from the clinic's information system, where each patient had own card.

Research techniques

The selected methods of research conducted here are flotation and the direct smear method (Szilman, Horak-Czaczuń, 2011; *ESCCAP*, 2022). The most important factor considered prior to the examinations was whether the animals had undergone deworming within the past year. Reptiles that had been treated with deworming agents during this period were excluded from the faecal examination records.

In the direct smear method, a faecal sample was collected on a stick and smeared onto a glass slide – if the sample was dry, a drop of NaCl was added. The smear was then covered with a coverslip and placed under a microscope for qualitative and quantitative analysis of the parasites present in the sample.

In the flotation method, a faecal sample was placed in a flotation container and covered with a saturated sodium chloride (NaCl) solution until a convex meniscus formed. The prepared solution was then covered with a coverslip and left for approximately 8–15 minutes. After this time, the coverslip was placed on a glass slide and microscopic observation was started immediately to prevent crystallisation of the sample.

For the classification of parasites observed in the faecal samples, a frequency scale was used according to the criteria listed below – Tab. (1).

Tab. 1. The adopted categories of parasite frequency in the analysed faecal samples of reptiles bred in home conditions

Frequency category designation	**0**	+	++	+++
Number of parasites	No occurrence	Few 1–4	Numerous 5–10	Very numerous 11 or more

Parasites identification was performed using the study by Jańczak et al. (2019). The nomenclature of all species was adopted in accordance with the *Catalogue of Life* (https://www.catalogueoflife.org/data/taxon/4KV6Z) and other Internet sources.

Research results

The results showed that in over half of the faecal samples (63), Nematoda were present, primarily pinworms, but different from those found in humans. Protozoa (amoebae, trichomonads, flagellates) and Coccidia, in quantities of 17 and 15 samples respectively, ranked second in terms of prevalence. It is worth emphasizing that mixed infections with several parasites were recorded in the examined faecal samples. In three samples, the presence of cricket eggs or mites (Acari), was additionally detected, which were

considered probable contamination of the sample when collected by the owner (Fig. 3). Additionally, 30 samples showed no presence of any parasites when examined using the smear methods adopted here (Tab. 2 – Appendix 1).

The comparison of the proportion of healthy individuals and those infected with parasites (Nematoda, Protozoa, Coccidia) among the analysed groups of reptiles – lizards, turtles, and snakes – showed that the highest prevalence in faecal samples was infections caused by Nematoda (Fig. 4).

The largest number of healthy individuals was recorded among lizards, but this group also had the highest overall population size (n = 88). When converted to percentages, the proportion of healthy individuals in the entire study population was 26% for lizards, 29% for turtles, and 30% for snakes.

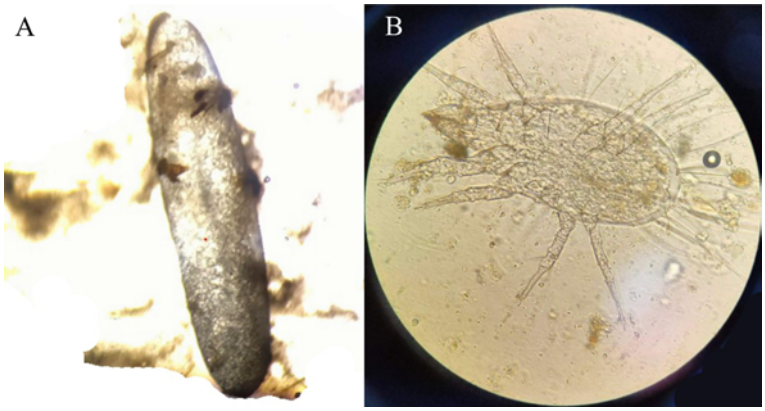

Fig. 3. Cricket egg in faece of *Amphibolurus vitticeps* Ahl. – A; mite (Acari), most likely contamination of the sample – B (Photo. M. Czerniecka)

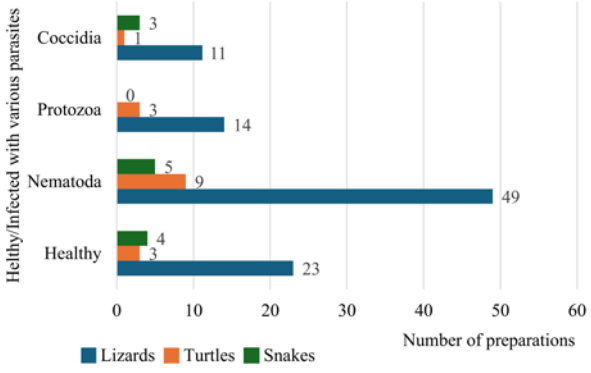

Fig. 4. Comparison of the number of healthy individuals and those infected with parasites from different groups (Nematoda, Protozoa, Coccidia) based on the analysed faecal preparations of lizards (n = 88), turtles (n = 14) and snakes (n = 10), bred in home conditions; the preparations showed multiparasitic infections

The comparison of the percentage share of parasites from the recorded groups with different frequency categories in the preparations showed that among lizards and turtles, about 30% of infections caused by Nematoda were characterised by a very high (+++) presence of these parasites in the preparations, while in turtles, as much as 50% of infections with the same parasites occurred at a high (++) level in the analysed preparations (Fig. 5A). Different species of Protozoa infected lizards and turtles, with 41% of the preparations from lizards showing a very high (+++) presence of these parasites, whereas in turtles, all Protozoa appeared in low numbers (+) in the preparations (Fig. 5B). In preparations infected with Coccidia, a very high (+++) presence of these parasites was recorded in 40% of lizard samples and 33% of snake samples; meanwhile, in turtles, these parasites appeared in low numbers (+) in all preparations (Fig. 5C).

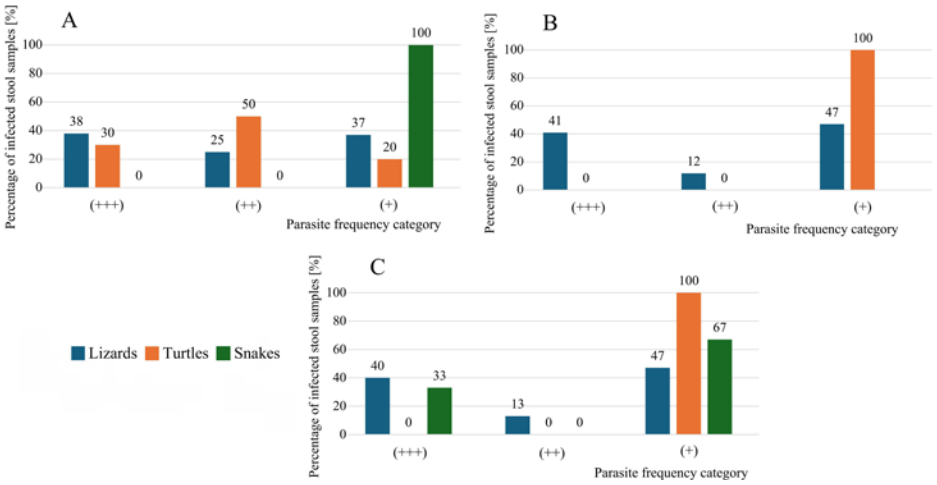

Fig. 5. Percentage of parasites from the recorded groups (A – Nematoda, B – Protozoa, C – Coccidia) with different frequency categories in faecal samples of lizards, turtles, and snakes raised in home conditions; (+++) – very numerous, (++) – numerous, (+) – few, 0 – absent in the sample

The comparison of the percentage share of healthy and parasite-infected males and females in the analysed groups of reptiles kept in domestic conditions showed a clear tendency for males to predominate in the group of sick animals – the proportion of females was visibly lower. In contrast, in the group of healthy animals, the sex ratios were generally similar (Tab. 3); however, due to the small group size, these conclusions may not be entirely certain.

The comparison of the age of reptiles kept in domestic conditions – both healthy and parasite-infected – illustrated that the highest number of parasitic infections in lizards and snakes was recorded in individuals older than 5 years, while in turtles, a relatively high number of infections also occurred in the age range of 2 to 5 years (Fig. 6). These results can be considered as a characteristics of the studied population.

Tab. 3. Comparison of the percentage of healthy and parasite-infected males and females in the analysed groups of reptiles bred at home; the percentage is highlighted in grey

Reptile group/ Gender	Healthy				Parasite-infected				Total [n =]
	♂		♀		♂		♀		
Lizards	10	11%	13	15%	43	49%	22	25%	88
Snakes	2	20%	2	20%	4	40%	2	20%	10
Turtles	2	14%	1	7%	11	78%	0	0%	14

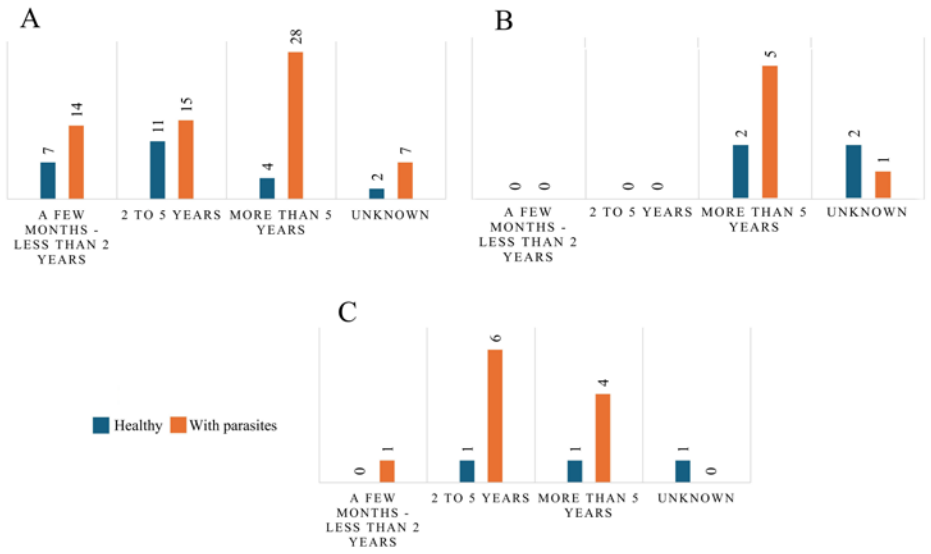

Fig. 6. Comparison of the number of parasitic infections in different age groups of the examined reptiles kept in home conditions; lizards – A, snakes – B, turtles – C

Discussion

Parasites use other organisms as a source of food and habitat, which places a burden on the host (Paperna, Lainson, 2000; Pojmańska, 2005). According to Crofton (1971), parasitism is characterised by the following ecological and physiological relationships: the parasite is physiologically dependent on the host, has a higher reproductive potential than the host, but also exhibits greater mortality; the process of infecting hosts leads to the spread of parasites within the host population, but also causes the death of parasites; heavy infections cause the death of the host, which leads to the death of parasites, with more parasites dying than hosts. Diseases caused by parasites depend on their life cycle and abundance. According to Schneller and Pantchev (2008), intestinal parasites are organisms that can infect the digestive system of reptiles and cause various health problems. They often concentrate in the cecum, which can lead to its

obstruction and bloating. Heavy parasite infestations can result in infertility in young individuals, as well as poisoning of the animal's body by parasite toxins (McFarland et al., 2021). Turtles, especially during hibernation, may be particularly vulnerable to these problems (Vetter, 2006).

Faecal analysis of reptiles using the flotation and direct smear methods are the most commonly used procedures in antiparasitic diagnostics for reptiles. There are many publications confirming the effectiveness of these methods. For example, in an extensive study conducted in Italy, Papini et al. (2011) examined a total of 324 reptiles (lizards, snakes, turtles) and confirmed the presence of endoparasites in over half of the animals (57.4%), mainly infections by Nematoda (16%) and Coccidia (12.3%). Parasites were most frequently observed in lizards, and less often in snakes and turtles. Meanwhile, Wolf et al. (2014) compared methods for detecting intestinal endoparasites using direct smear, flotation, and the SAF technique (fixative solution of sodium acetate-acetic acid-formalin). They examined a total of 59 different reptile faecal samples, including 20 from lizards, 22 from snakes, and 17 from turtles. Their results were clear: smear and flotation methods proved more effective in detecting, among others, flagellates, Coccidia, and Nematoda. The faeces showed dominance of Nematoda (55.9%) and Protozoa (47.5%). These results align with the findings of the present study and confirm the frequent occurrence of parasitic infections in reptiles caused by Nematoda species, which also show high frequency in the preparations (Fig. 4–5; Table 2 – Appendix 2). It is worth emphasising that Raś-Noryńska and Sokół (2015) examined reptile faeces (76 lizards, 15 turtles, and 10 snakes) using the flotation method and direct staining with Lugol's solution. In 63 samples (62.4%), they detected the presence of parasite eggs and oocysts. Coccidia were present in 33% to 100% of samples depending on the reptile species, while Nematoda eggs were found in 10% to 75% of samples.

Rom et al. (2018) used the flotation method with a concentrated NaCl solution for the analysis of reptile faeces and additionally subjected the samples to centrifugation. Their study population included reptiles kept in domestic conditions in Slovenia, as well as turtles and lizards living in the Wrocław Zoo (Poland). The study revealed that 81.8% of pet reptiles in Slovenia were infected with parasites. Among 563 turtles, 88.5% were infected with eight different species of endoparasites. In the case of lizards, out of 331 individuals tested, 76.1% showed the presence of 19 groups of parasites, including both endo- and ectoparasites. Among 55 examined snakes, 47.3% were infected, involving 12 groups of endoparasites and two species of ectoparasites. Nematodes were the most common type of parasite found in the studied reptiles. In the Wrocław Zoo, 81.2% of turtles were found to be infected with nematodes from the Pharyngodonidae family, while in lizards from the Agamidae family (species *Paralaudakia caucasia* Eichwald and *Laudakia stellio* L.), 87% and 96% respectively were infected with parasites from the Nematoda group. It is worth noting that the above publication identifies Coccidia

as the second most frequently occurring group of endoparasites (64.3% in the studied chameleons *Chamaeleo calyptratus*), a finding that had already been indicated earlier (Sloboda, Modrý, 2006).

The flotation and direct smear methods also have certain limitations, which became apparent during the research conducted for this study. One of the issues is improper storage of faeces before analysis. Properly stored faecal samples should be placed in a sealed container along with a moist gauze pad or cotton wool to prevent drying out. This is very important, as most developmental stages of parasites can degenerate – for example, in the case of the roundworm *Kalicephalus* spp., the larva dies and disintegrates, making it difficult to examine the material. The faecal container must be kept in a refrigerator until it is transported to the laboratory. Ideally, the sample should be collected over three days; however, due to species-specific characteristics (reptiles defecate every few days), the sample is often collected from a single defecation. It's also important to ensure the sample is as free from bedding contamination as possible. Another challenge is analysing the medical history of the examined animal. Obtaining information about whether and when the animal was dewormed, as well as details on past illnesses and medications used – which may influence the presence of parasites – can be very difficult, and sometimes even impossible to acquire.

The scientific literature emphasizes the importance of conducting faecal examinations for the detection of gastrointestinal parasites, alerting future keepers of exotic animals that parasitic infestations can pose a serious threat – not only to the health but also to the lives of reptiles kept in captivity under terrarium conditions (Lainson, Paperna, 1999; Lainson, 2003; Souza et al., 2025). A significant factor in this context is the origin of the animals – whether they come from breeding surpluses, pet stores, or have been captured from the wild (Rom et al., 2018). Unfortunately, the origin of these exotic animals is often unknown, as was observed during the course of this study (Table 2 – Appendix 2). When the origin of the animals is unknown, it becomes difficult to determine their age. This is particularly important, as age may be related to susceptibility to parasitic infections. In general, older individuals tend to be weaker and more vulnerable to diseases, including parasitic infections (Fig. 6). It is also likely that sex plays a role in this context. Generally, females are more resistant to infections – including parasitic ones – due to their reproductive role, but the results obtained here, due to the small sample size of some groups, do not provide definitive confirmation of these hypotheses (Table 3). These issues certainly require further research.

In a publication by Vergles-Rataj et al. (2011), the authors pointed out the direct health risks to humans associated with keeping reptiles as pets. Between 2000 and 2005, a significant number of reptiles were transported from Slovenia to Poland: 949 individuals, including 55 snakes, 331 lizards, and 563 turtles. These animals belonged to 68 different species and were examined for both ecto- and endoparasites. In snakes,

twelve groups of parasites were identified, mainly from the genus *Nematoda*. Parasitic infections were found in 47.3% of the examined individuals. Lizards were carriers of eighteen different parasitic groups, with *Nematoda* again being the most common – resulting in an infection rate of 76.1%. The situation was similar in turtles, where *Nematoda* accounted for 88.5% of all endoparasitic infections.

The bibliographic data and the research conducted here provide a clear picture that Nematoda is the group of parasites most commonly found in the gastrointestinal tract of terrarium reptiles. Coccidia and Protozoa are listed second in terms of the frequency of parasitic infections (e.g., Modrý, Jirků, 2006; Papini et al., 2011), which was also confirmed by the present study. The frequent occurrence of various parasites in breeding reptiles highlights the necessity of conducting detailed examinations for pathogens before introducing them into a domestic environment.

Conclusions

The study sample included 112 individuals, and an equal number of faecal samples were examined using flotation and direct smear methods, which are commonly used in the diagnosis of endoparasites. In over half of the cases, the presence of Nematoda – mainly pinworms (63 samples) – was detected. In lizards and turtles, these parasites were very frequent in 30% or more of the samples. The second most commonly detected parasites were Protozoa (17 samples) and Coccidia (15 samples). A large group consisted of clean samples, in which no parasites were detected using the methods mentioned above. An important aspect of antiparasitic prevention in reptiles is ensuring proper living conditions (appropriate lighting, humidity, temperature, and terrarium size) as well as correct feeding (quarantined feeder insects).

Conflict of interest

The authors declare no conflict of interest related to this article.

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Appendix 1

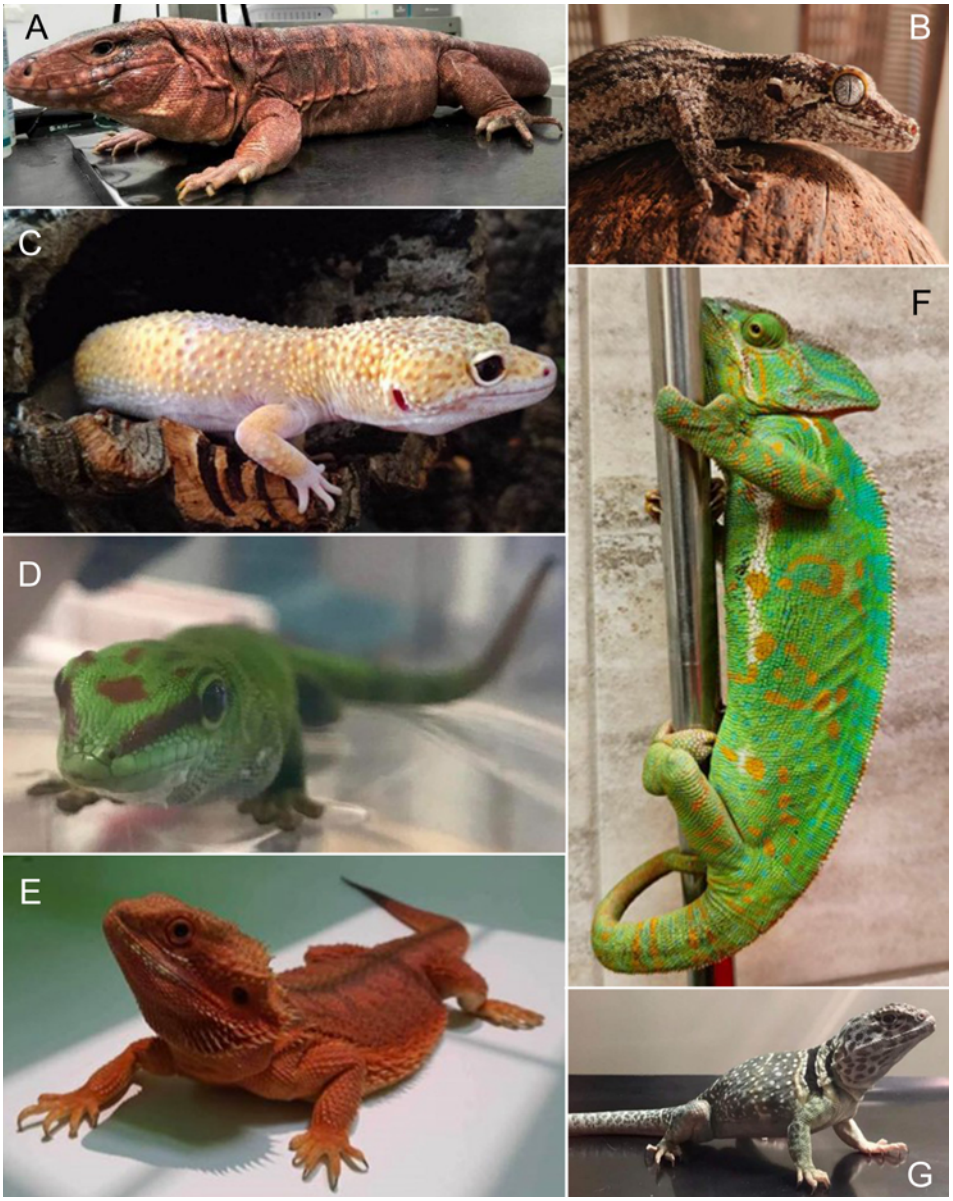

Fig. 1. *Salvator rufescens* Günther – A, *Correlophus ciliatus* Guichenot – B (Photo. A. Polińska-Frąszczak), *Eublepharis macularius* Blyth – C, *Phelsuma madagascariensis* Gray – D, *Pogona vitticeps* Ahl – E, *Chamaeleo calyptratus* Duméril & Duméril – F, *Crotaphytus collaris* Say – G (Photo. M. Czerniecka)

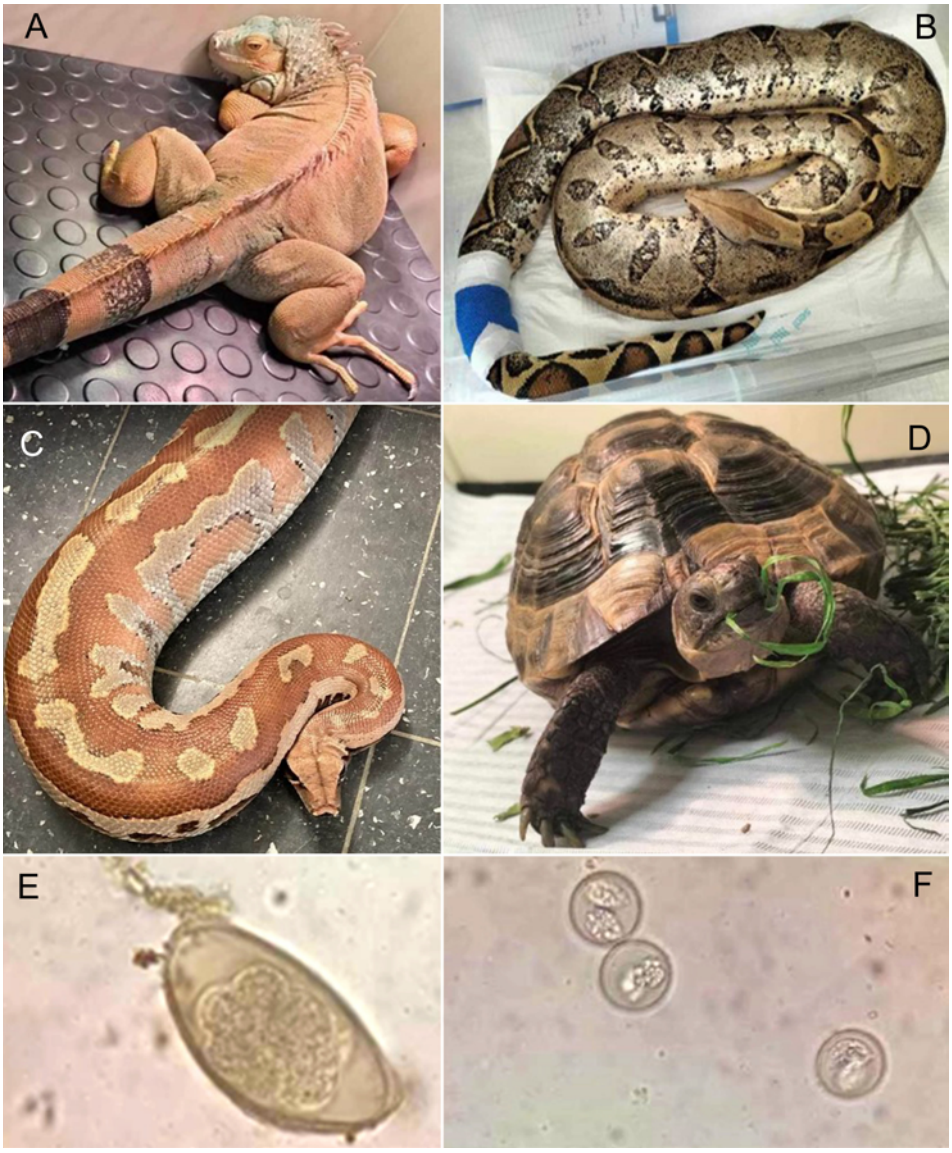

Fig. 2. *Iguana iguana* L. – A; *Boa constrictor* L. – B; *Python regius* Shaw – C; *Testudo hermanni* Gmelin – D; Nematoda egg in Leopard gecko faeces – E, Coccidia in Bearded dragon faeces – F (Photo. M. Czerniecka)

Appendix 2

Tab. 2. Summary of the most important results of the analysis of faeces of reptiles bred in home conditions; n – means the number of examined individuals of a given species; y/m – year/month; mh – month; frequency categories: (+++) – very numerous, (++) – numerous, (+) – few, 0 – absent in the sample

Individual No.	Age y/m or mh	Gender	Source of collection	Flotation method	Direct smear method	Frequency of parasites in the preparation
Gastropholis prasina; n = 1						
1	8	♂	unknown	Coccidia, Nematoda	Coccidia, Nematoda	Coccidia (+++), Nematoda (+++)
Salvator merianae; n = 2						
2	some months	♀	breeding	Coccidia (in food)	Coccidia (in food)	(+)
3	2/7	♂	pet shop	0	0	0
Salvator rufescens; n = 1; Fig. 1A – Appendix 1						
4	2/7	♀	unknown	0	0	0
Correlophus ciliatus; n = 1; Fig. 1B – Appendix 1						
5	1/7	♀	unknown	0	Protozoa	(+++)
Eublepharis macularius; n = 23; Fig. 1C – Appendix 1						
6	unknown	♂	unknown	Nematoda	Nematoda	(++)
7	unknown	♂	unknown	Nematoda	Nematoda	(+)
8	8	♂	unknown	Nematoda, Coccidia	Nematoda, Coccidia	Nematoda (++), Coccidia (+)
9	unknown	♀	unknown	Nematoda	Nematoda	(+)
10	8	♂	unknown	0	Protozoa	(+++)
11	unknown	♂	OLX	0	0	0
12	1	♂	unknown	Coccidia, Nematoda	Coccidia, Nematoda	Coccidia (+), Nematoda (+)
13	1	♂	unknown	Nematoda, Coccidia	Nematoda, Coccidia	Nematoda (+++), Coccidia (++)
14	1	♂	unknown	0		0
15	6	♂	unknown	Nematoda	Nematoda	(++)
16	1	♂	unknown	Nematoda	Nematoda	(++)
17	6	♂	breeding	Nematoda	Nematoda	(+++)
18	6	♂	unknown	Nematoda	Nematoda	(+++)
19	6	♀	unknown	Nematoda	Nematoda	(+++)
20	7	♀	unknown	Nematoda	0	Nematoda (+)
21	unknown	♀	unknown	Nematoda, Coccidia	Nematoda, Coccidia	Nematoda (+++), Coccidia (+++)
22	7	♂	unknown	Coccidia	Protozoa	Coccidia (+), Protozoa (+)

23	7	♂	unknown	Nematoda	Nematoda	(+++)
24	1/7	♀	breeding	0	0	0
25	10	♂	unknown	0	*Giardia lamblia*, Protozoa	*Giardia* (++), Protozoa (+)
26	1/4	♂	unknown	Nematoda	Nematoda, Protozoa	Nematoda (+), Protozoa (+++)
27	2/3	♂	unknown	Nematoda	Nematoda	(+)
28	7	♀	unknown	0	Protozoa	(+)
Phelsuma madagascariensis; n = 2; Fig. 1D – Appendix 1						
29	5	♂	unknown	0	0	0
30	unknown	♂	terrarium exchange	0	0	0
Pogona henrylawsoni; n = 1						
31	8	♂	unknown	Nematoda	Nematoda	(+++)
Pogona vitticeps; n = 35; Fig. 1E – Appendix 1						
32	1/5	♀	OLX	Nematoda	Nematoda	(+)
33	1/5	♂	unknown	Nematoda	Nematoda	(+)
34	5	♀	pet shop	0	0	0
35	9	♂	unknown	0	0	0
36	7	♂	unknown	Nematoda	Nematoda	(+++)
37	6	♂	unknown	0	Protozoa	(+)
38	5	♂	OLX	0	Protozoa, Nematoda	Protozoa (+), Nematoda (+)
39	3/10	♂	pet shop	Nematoda	Nematoda	(+++)
40	2/10	♂	unknown	Nematoda	Nematoda	(+++)
41	2/9	♂	unknown	0	0	0
42	10	♀	unknown	Nematoda	Nematoda	(++)
43	10	♀	unknown	Protozoa, Nematoda	Protozoa, Nematoda	Protozoa (+), Nematoda (+)
44	5	♀	OLX	Nematoda	Nematoda	(+++)
45	9	♀	unknown	Nematoda	Nematoda, Protozoa	Nematoda (++), Protozoa (+)
46	8	♀	pet shop	0	0	0
47	8	♀	unknown	Nematoda	Nematoda	(+)
48	8	♀	unknown	0	0	0
49	7	♀	unknown	Nematoda	Nematoda	(++)
50	5	♀	unknown	0	0	0
51	4/8	♀	unknown	0	0	0
52	4	♂	OLX	Nematoda	Nematoda	(++)
53	4	♀	unknown	Nematoda	Nematoda	(+++)

54	3/6	♀	unknown	0	0	0
55	3/4	♀	unknown	Nematoda	Nematoda	(+)
56	4	♀	pet shop	Nematoda, Protozoa, Coccidia	Nematoda, Coccidia	Nematoda (+++), Coccidia (+++), Protozoa (+++)
57	unknown	♂	unknown	Nematoda	Nematoda	(+)
58	7	♀	unknown	0	0	0
59	9mh	♀	unknown	0	0	0
60	10mh	♀	unknown	0	0	0
61	10mh	♂	unknown	0	0	0
62	9mh	♂	unknown	Nematoda	Nematoda	(+)
63	7mh	♂	unknown	Coccidia	Coccidia	(+++)
64	10	♂	unknown	Coccidia	Coccidia	(++)
65	10	♂	unknown	0	Protozoa	(+++)
66	5	♀	unknown	Nematoda	Nematoda	(+++)
Uromastyx yemenensis; n = 1						
67	9	♂	unknown	Nematoda, Coccidia	Nematoda, Coccidia	Nematoda (+), Coccidia (+)
Chamaeleo calyptratus; n = 6; Fig. 1F – Appendix 1						
68	7	♂	unknown	Nematoda	Nematoda	(+++)
69	3	♀	unknown	0	0	0
70	1/10	♂	unknown	Coccidia	Coccidia, Nematoda	Coccidia (+++), Nematoda (++)
71	2/9	♂	unknown	0	0	0
72	3	♂	unknown	Nematoda	Nematoda	(+++)
73	1/2	♂	breeding	0	0	0
Furcifer pardalis; n = 4						
74	2	♂	breeding	Nematoda	Nematoda, Protozoa	Nematoda (++), Protozoa (++)
75	5	♂	breeding	0	0	0
76	2	♂	breeding	0	Protozoa	Protozoa (++)
77	1	♂	unknown	Nematoda	Nematoda	(+)
Crotaphytus collaris; n = 4; Fig. 1G – Appendix 1						
78	1	♂	unknown	Nematoda	Nematoda	(+)
79	6/9	♀	unknown	0	Protozoa	(+++)
80	2/7	♀	pet shop	Nematoda	Nematoda	(+++)
81	10mh	♀	terrarium exchange	0	0	0
Basiliscus plumifrons; n = 1						
82	unknown	♂	pet shop	Nematoda	Nematoda, Protozoa	Nematoda (++), Protozoa (+)

Iguana iguana; n = 5; Fig. 2A – Appendix 1						
83	6	♂	unknown	Nematoda	Nematoda, Protozoa	Nematoda (++), Protozoa (+++)
84	9	♀	unknown	Nematoda	Nematoda	(+++)
85	3/6	♂	pet shop	Coccidia	Coccidia	(+)
86	9	♂	unknown	Nematoda	Nematoda	(+++)
87	5mh	♀	breeding	0	0	0
Cyclura lewisi; n = 1						
88	unknown	♂	breeding	Nematoda	0	Nematoda (+)
Anolis carolinensis; n = 1						
89	5/5	♂	breeding	0	0	0
Boa constrictor; n = 4; Fig. 2B – Appendix 1						
90	9/8	♂	unknown	Coccidia	Coccidia	(+++)
91	9	♂	unknown	Nematoda	Nematoda	(++)
92	9	♂	unknown	Nematoda, Coccidia	Nematoda, Coccidia	Coccidia (+), Nematoda (++)
93	9	♂	unknown	Coccidia, Nematoda	Coccidia, Nematoda	Coccidia (+), Nematoda (++)
Pantherophis guttatus; n = 2						
94	5/9	♀	unknown	0	0	0
95	3/2	♀	unknown	Nematoda	Nematoda	(+)
Python regius; n = 3; Fig. 2C – Appendix 1						
96	unknown	♂	pet shop	0	0	0
97	unknown	♀	pet shop	0	0	0
98	unknown	♀	pet shop	Acari (pest found in food), Nematoda	0	Acari (+), Nematoda (+)
Mauremys reevesii; n = 1						
99	4	♂	pet shop	0	0	0
Testudo hermanni; n = 11; Fig. 2D – Appendix 1						
100	8	♂	unknown	Nematoda	Nematoda	(++)
101	8	♂	unknown	0	0	0
102	6	♂	unknown	Nematoda	Nematoda	(+++)
103	6/3	♂	unknown	Nematoda	Nematoda, Protozoa	Nematoda (++), Protozoa (+)
104	6/2	♂	unknown	Nematoda	0	(+)
105	5	♂	unknown	Nematoda	Nematoda, Protozoa	Nematoda (+), Protozoa (+)
106	5	♂	unknown	Nematoda	Nematoda	Nematoda (++)
107	5	♂	unknown	0	Protozoa	Protozoa (+)

108	5	♂	unknown	Nematoda	Nematoda	(+++)
109	4/7	♂	unknown	Nematoda	Nematoda	(+++)
110	3/4	♂	unknown	Coccidia, Nematoda	Coccidia, Nematoda	Coccidia (+), Nematoda (++)
111	1	♂	unknown	Nematoda	Nematoda	(++)
Testudo horsfieldii; n = 1						
112	unknown	♀	unknown	0	0	0

Występowanie pasożytów wewnętrznych u gadów utrzymywanych w niewoli w warunkach domowych

Streszczenie

Coraz częściej wśród zwierząt domowych pojawiają się gatunki gadów tropikalnych. Właściciele tych zwierząt są zainteresowani stworzeniem jak najlepszych warunków bytowania dla swoich podopiecznych, jednak nie zawsze posiadają odpowiednią wiedzę na ten temat. Dlatego nierzadko zwierzęta te mają różne dolegliwości i są atakowane przez pasożyty. Celem pracy była identyfikacja pasożytów wewnętrznych występujących u najczęściej hodowanych gadów – jaszczurek, węży oraz żółwi. Badania przeprowadzono na próbie 112 osobników, z czego największą grupę stanowiły jaszczurki, głównie *Pogona vitticeps* Ahl i *Eublepharis macularius* Blyth. Analizę kału w kierunku pasożytów przeprowadzono metodą flotacji oraz rozmazu bezpośredniego. U ponad połowy stwierdzono występowanie Nematoda, głównie owsików (63 próbek), przy czym u jaszczurek i żółwi w 30% i więcej preparatach nicienie były bardzo częste. Na drugim miejscu pod kątem występowania odnotowano Protozoa (17 próbek) i Coccidia (15 próbek). Dużą grupę stanowiły próbki czyste, u których po wykonaniu badań wyżej wymienionymi metodami nie stwierdzono obecności pasożytów. Ważnym elementem profilaktyki antypasożytniczej gadów są ich warunki bytowania (odpowiednie oświetlenie, wilgotność, temperaturę i wielkość terrarium) oraz prawidłowy pokarm (owady poddane kwarantannie).

Słowa kluczowe: Coccidea, metoda bezpośredniego rozmazu, metoda flotacji, Nematoda, Protozoa

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