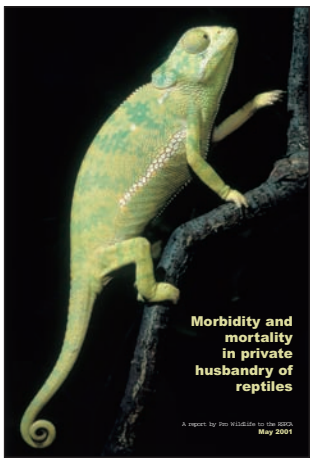
Far from home

– reptiles that suffer and die in captivity

Contents



An important new study[1] has confirmed the RSPCA's fears that many internationally protected reptile species – though legally imported into the European Union (EU) – are highly susceptible to husbandry failures and often suffer and die in captivity.

A significant growth of the pet trade in reptiles in recent years has led to millions of animals from a growing variety of reptile groups being imported into the EU.

As with other exotic animals, the welfare implications of taking these reptiles into captivity make them unsuitable for keeping as pets. Reptiles are poikilothermic (cold-blooded) and rely on their local surroundings to maintain their body temperature and survive. They are therefore closely adapted to their wild environment and many occupy very specialized niches in particular ecosystems. Many reptiles, captured and taken from the wild, transported improperly and eventually given inadequate climate, housing conditions and nutrition in captivity have been found to suffer and die.

Now the RSPCA is calling for the EU to ban the import of the most vulnerable reptile species and to tighten trade restrictions on other species identified by this report as being at risk. The reported husbandry difficulties and considerable welfare implications of taking animals that are highly adapted to their local environment in the wild into captivity has clearly demonstrated the unsuitability of keeping these vulnerable animals as pets.

The evidence

The RSPCA-commissioned report[1] contains a comprehensive review of the literature relating to welfare problems in reptile husbandry, and documents the causes of morbidity (sickness) and mortality (including death-rate) during capture, transportation and while kept in captivity.

The study focuses on specialist reptile keepers' publications, which provide first-hand information reflecting the practical husbandry problems keepers face. More than 400 articles in herpetological magazines, keepers associations' publications, reptile journals and the internet are analysed. Veterinarians specializing in reptile care, and representatives from associations of reptile keepers and the pet trade are also consulted.

From an analysis of the biological characteristics that make particular species susceptible to increased morbidity and mortality in captivity, the authors have provided guidelines on the suitability of different types of reptile for private husbandry. Each of the more than 400 reptile species listed in Annex B of the European Community (EC) Regulation 338/97 (see *The law*, page 10) to regulate their trade on conservation grounds, is assessed and assigned to one of the four categories below:

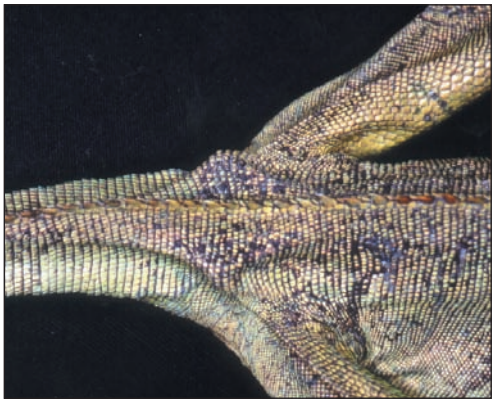
category 1 – not suitable for private husbandry - eg chameleon, crocodile and bosc monitor

category 2 – suitable only for qualified keepers - eg green iguana, royal python and American box turtle

category 3 – conditionally suitable for knowledgeable private individuals - eg lined day gecko, spotted python and Madagascar day gecko

category 4 – data deficient - eg Galapagos land iguana, Arabian sand boa and Cape girdled lizard

How reptiles suffer in captivity



DR PETRA KÖLLE

Hip region of lizard showing severe malnutrition

Diet

- Malnutrition is found in up to 15 per cent of pet reptiles.
- Individual reptiles need highly specialized diets. But there is evidence that some are given inappropriate food – even cat and dog food being fed to herbivorous reptiles – leading to a range of health problems, such as arteriosclerosis and gout.
- The combined effect of poor diet and low humidity may also cause metabolic bone disease – a group of disorders such as rickets and osteoporosis.

Most mistakes in husbandry concern the feeding of reptiles[2]. This includes the quantity and quality of the food and water provided, as well as the calcium-phosphorus balance and protein content of the diet. As with other animals, a balanced diet that provides all the necessary nutrients in captivity is essential for normal development and survival. The provision of the right amount of food of appropriate quality and composition is essential as the generally low metabolism of reptiles makes them prone to obesity – which has been found to lead to fatty liver syndrome, arteriosclerosis and kidney calcification in most lizards and snakes[3]. Other welfare implications also occur when the inappropriate food is provided in captivity, such as feeding herbivorous lizards and tortoises on cat and dog food[4,5,6]. Feeding reptiles on foods that are high in certain substances may also be harmful, such as the provision of spinach or rhubarb that is high in oxalic acid causing blood circulation disorders. The diet of certain reptiles may be highly specialized. The Texan horned lizard (*Phrynosoma coronatum*), for instance, depends on a diet of ants that provides the formic acid vital for proper digestion[8,9,10]. Veterinary surgeons also regularly observe gout and bladder stones in reptiles given inadequate drinking water or kept in enclosures without the necessary misting[3,11,12].

Humidity and air supply

- Incorrect humidity – too high or too low – can cause respiratory diseases, fungal infections and problems during sloughing (shedding of skin). In severe cases, incomplete sloughing may result in the loss of limbs and death.

Humidity is a vital but often neglected factor when keeping reptiles in captivity[13]. Diseases of the respiratory system, like pneumonia, often result from incorrect humidity, particularly widespread in snakes[2,14]. Chameleons[15], certain geckos[16], pythons[17]

and other snakes[2] are known to suffer in low humidity. An insufficient humidity can cause difficulties in skin sloughing and can result in the loss of extremities of limbs or tail, or may even be fatal[18,19]. Metabolic bone disease, eye problems and respiratory disorders in European tortoises are reported to increase when animals are kept in a low humidity[20,21]. However, an unnecessarily high humidity may also give rise to morbidity. The excessive spraying of the enclosure is quite a common mistake in the husbandry of young chameleons and the direct spraying of the animal in particular results in stomatitis (mouth rot) and pneumonia[22]. Keeping snakes in high humidity or poor air circulation can often cause severe fungal infections[23,24].

DR PETRA KÖLLE

Thermal burn

Temperature, light and UV radiation

- Each reptile species is adapted to the temperature in its natural environment – failure to replicate this in captivity can lead to severe digestive disorders.
- Insufficient light can lead to rickets, anorexia, starvation and mouth rot in some reptiles.
- The misuse of lamps and other heat sources in reptile enclosures can result in serious thermal burns.

Depending on the reptile's natural habitat in the wild, factors like the required temperature, light intensity, light and ultraviolet (UV) duration differ significantly. As reptiles are cold-blooded, each reptile species is reliant on its surroundings to maintain body temperature within the preferred temperature zone at which particular biological processes will function optimally[5]. If the preferred optimum temperature zone is exceeded by only a few degrees a critical level is reached that can be fatal[13,25]. This is illustrated by the digestive process in snakes and chelonians (tortoises, terrapins and other turtles). If the temperature is too high the food starts to decompose in the intestines before digestion can occur. However, a cold environment brings digestion to a standstill and the food in the intestine starts to rot[26,27]. The inability of a reptile to digest its food and assimilate the necessary nutrients for maintaining biological processes, development and survival would be fatal if the temperature remained outside the animal's optimal zone. The necessary quality and quantity of light provided for reptiles in captivity is also essential to provide light periods equivalent to those experienced in the wild, particularly for diurnal reptiles (active during the day). Green iguanas are reported to suffer anorexia as a result of improper light quality[28]. Insufficient light quantity causes rhinitis and stomatitis (mouth rot) among Mediterranean tortoises[27,29,30]. Similar problems have been reported for Central American and Asian tortoises, with animals kept in an enclosure that is too dark becoming less active, eating less and finally ceasing to feed[31,32,33]. UV radiation is also vital for diurnal reptiles, particularly those that inhabit deserts or mountains in the wild[17,34]. A lack of UV radiation and/or vitamin D and calcium often leads to rickets[35], as well as reports of lizards losing toes as a consequence of inadequate UV radiation[18].

Enclosure quality and size

- The wrong litter provided in enclosures can be fatal if ingested.
- High percentages of reptile cages have been found to be too small.

The quality of the enclosure environment is determined by how well the equipment and facilities imitate the habitat of the captive reptile in the wild. This means providing suitable nesting sites, as well as appropriate substrate and facilities to allow any digging, climbing and bathing activities that are part of the behaviour of many reptiles in their natural habitat. The litter material used for the enclosure substrate frequently causes problems in husbandry – it should imitate the natural habitat. Sand or gravel may be provided for chelonians[3], but can be fatal for animals suffering from calcium deficiency or a lack of dietary fibre. These animals will consume considerable amounts of the litter material, which may lead to lethal intestinal constipation[3,36,37]. Adequate nesting sites must be provided, as a lack of these can result in egg-binding[36,38].

The assessment of the appropriate size of the enclosure for a reptile should consider all biological needs, including the adult size of a species, its agility and any special behaviour that needs to be catered for (digging, climbing, bathing etc.). A survey of the size of reptile enclosures found that 71.8 per cent of chelonians, 40.2 per cent of lizards and 56 per cent of snakes are kept in enclosures that are too small[11].

Hygiene, diseases and medical care

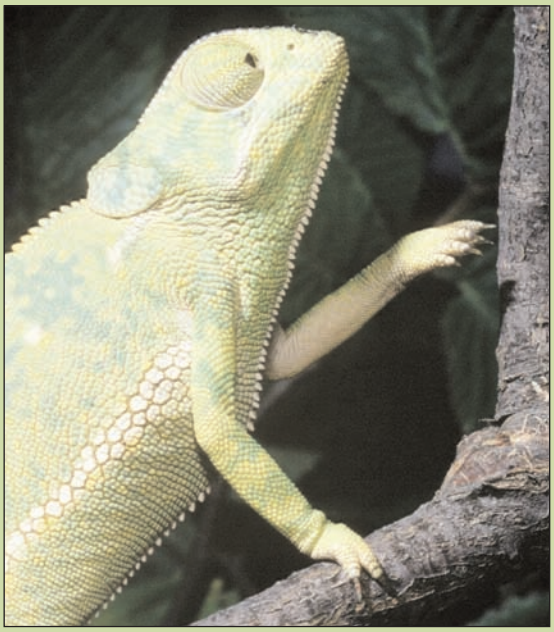
- Diseases like mouth rot and egg-binding are common in captive reptiles and induced by multiple factors including malnourishment, incorrect temperature and/or stress caused by overcrowding.

Hygiene is a central but often neglected factor in reptile care, with poor hygiene leading to a weakened immune system and a high risk of infection among reptiles, parasite infestations and infectious diseases[28,39]. Apart from the risks to the keeper, it is also likely that the difficulties in handling venomous reptiles may lead to the medical care and hygiene of dangerous animals being neglected. According to some recommendations the handling of venomous snakes should be kept to the bare minimum[40,41]. Both stomatitis (mouth rot) and dystocia (egg-binding) are common diseases in captive reptiles induced by multiple factors such as malnourishment, sub-optimal temperature and/or stress caused by overcrowding. Salmonella infections are also more abundant in reptiles than in other animals[42,43].

Seasonal activity patterns, including hibernation

- Failure to imitate natural seasonal changes has a negative impact on the general wellbeing of reptiles.
- European tortoises in captivity are subject to high morbidity and mortality during hibernation.

The husbandry of reptiles that have significantly varying seasonal activities often creates severe problems, as is well documented during hibernation in European tortoises[11]. The absence of natural seasonal changes has a negative impact on general wellbeing and on the reproduction of individual reptiles[32]. Seasonal activity patterns of many reptiles are caused by dramatic changes in precipitation and temperature, including chelonians[21] – with some species spending several months dug into the ground[44] – and many species of chameleons[45].



DUNCAN McEWAN/RSPCA PHOTOLIBRARY

Further information on the impact that inadequate husbandry has on the morbidity and mortality of reptile species can be found in the full report.

Species of particular concern

Of all the species discussed in the report, the RSPCA has identified some groups which are particularly vulnerable when taken from the wild and kept in captivity, because of factors such as large body size, dangerous nature, high activity level and/or their extreme specialist husbandry requirements. On this basis, the RSPCA's priority groups of reptiles are those listed below.

Chameleons

Between 1990 and 1999 the EU imported more than 176,000 specimens of chameleons, with a marked increase throughout the decade[46]. However, chameleons are a particularly diverse group of reptiles – many have unique characteristics and their specialist requirements for survival make them one of the most difficult groups of reptiles to care for in captivity[47,48,49]. Husbandry failures usually involve the special climatic requirements[50], diet and watering needed[43,50], while rough handling during trade can also create problems later on in captivity[51]. As a result of the high morbidity and mortality in captivity, the Association of German Pet Shops (ZZF) classifies all chameleons as being unsuitable for private husbandry[52] and the Swiss Animal Welfare Ruling (SAWR) lists all but one as species that are particularly difficult to keep[53].

Monitors

Between 1990 and 1999 the EU imported almost 80,000 live monitor specimens, with the bosc monitor (*Varanus*

exanthematicus) and water monitor (*V. niloticus*) being among the most frequently imported[46]. Monitors come from a wide range of different habitats. Some species are primarily arboreal and others are terrestrial or even semi-aquatic. Most are good swimmers and some even divers, while some terrestrial species are strong diggers. As predators, sometimes of large prey, the large-growing monitors in particular have strong claws and strong, muscular tails that are also used for climbing or swimming. Despite their specialist requirements and behaviour in the wild, the difficulties of handling, reports of aggression and the need for large enclosures, the German Society of Herpetology and Terrarium Care (DGHT) has observed an increasing interest among reptile enthusiasts in keeping monitors[54]. The ZZF classifies all monitors, except captive-bred animals of dwarf monitor species as unsuitable for private husbandry[52] and the SAWR only permits the housing of any monitor under special conditions authorized by the authorities[53]. All monitors with an adult size of more than 1metre have therefore been classified in category 1 as being 'not suitable for private husbandry'.

Crocodilians

The EU imported more than 28,000 live crocodiles between 1990 and 1999[46]. The spectacled caiman (*Caiman crocodilus*) is one of the most frequently imported species. It inhabits warm rivers, ponds and swamps or digs into mud during the dry season in the wild, and grows to an adult size of up to 2.7m – too large for terrarium conditions in captivity[55,56]. Crocodilians need large, warm enclosures with bathing facilities. The diseases caused by the provision of inadequate heating and poor husbandry for crocodiles have already been well documented[18,55]. As even young specimens are aggressive and can soon become dangerous[18], all crocodile species are classified by the ZZF as unsuitable for private husbandry[52]. The German agricultural ministry also stresses that most crocodiles are unsuitable for private husbandry, as their adult size is very large and their natural life-span can be more than 100 years[57].

Venomous lizards (*Heloderma spp.*)

The EU imported only 66 specimens between 1990 and 1999 from this species[46]. However, as both Annex B *Heloderma* species are venomous the ZZF classifies them as not suitable for private husbandry and SWAR only permits the housing of these animals under conditions authorized by the Swiss authorities[53]. *Heloderma* species may bite or spit venom, causing a decrease in blood pressure, shock and painful wounds[58,59]. Both Annex B species also have specialist needs. In the wild they inhabit desert areas and need to spend almost all the time underground in humid hiding places[59]. The British Small Animal Veterinary Association also notes their susceptibility to biotin deficiency, which may lead to muscle weakness in captivity[60]. The raw eggs eaten in the wild often contain embryos and provide a source of biotin, in contrast to the eggs offered in captivity.

Venomous snakes (*Viperidae spp.*)

The EU imported more than 1,600 Annex B-listed venomous snakes between 1990 and 199946. The Indian cobra (*Naja naja*) represented 85 per cent of this trade. As with venomous lizards, the ZZF classifies venomous snakes as not suitable for private husbandry. Veterinary experts also warn that venomous snakes should only be kept by specialists[61,62]. A serious consequence of the difficulty in handling a venomous animal is that husbandry – including hygiene measures, detecting injuries or disease symptoms and prophylactic medical care – is neglected[40,41].

Spiny–tailed lizards (*Uromastyx spp.*)

Imports into the EU of *Uromastyx spp.* have increased considerably since 1994, with more than 32,000 between 1990 and 1999[46]. All *Uromastyx* species are classified in category 2 as suitable only for qualified keepers. They are adapted to arid and semi-arid habitats with extreme temperatures and require a particularly high intensity of light[57,63]. Hibernation and digging facilities are also vital for all species. The spiny-tailed lizard (*Uromastyx maliensis*) is one of the most commonly imported reptile species and since it was described in 1996 more than 10,000 specimens have been imported. However, this species is

adapted to a climate of very high temperatures and long periods of UV radiation and is therefore – like the other *Uromastyx* species – difficult to keep[64] . Many imported specimens are found in a bad condition[65].

Horned lizards (*Phrynosoma*)

There are 14 species in this genus but only the Texan horned lizard (*Phrynosoma coronatum*) is in Annex B and assessed in the report. Only a few specimens of *P. coronatum* were imported into the EU between 1990 and 1999[46]. The formic acid from their specialized diet of ants is vital for proper digestion, and many die in captivity[8,10,66]. This desert inhabitant's specialized diet and its need for a very high temperature and UV radiation, make it unsuitable for private husbandry – husbandry should be limited to expert keepers[8,61,66,67].

The law

The report focuses particularly on reptiles already listed in Annex B of the European Community (EC) Regulation 338/97 which regulates their trade to minimize the risk of extinction in the wild. Article 4.6.c of the Regulation also provides for the introduction of import restrictions for live specimens of Annex B-listed species that suffer a high mortality during transport or in captivity, and are unlikely to survive in captivity for a considerable proportion of their potential life-span. But, although considerable mortality rates for many imported species cause a high 'turnover' and deplete wild populations, the EU has to date only implemented trade restrictions to ban the importation of wild specimens of 17 species of tortoise.

One reason for this inaction on restricting imports is thought to be the lack of detailed data on the survivorship of reptiles in captivity – this new report goes some way to providing those data.

What the RSPCA wants

As one of the world's main markets for live reptiles the EU bears a particular responsibility, and where appropriate it should restrict the import of vulnerable species. As most specimens are wild-caught, this would help to conserve species as well as improving the welfare of individual animals.

In particular, the RSPCA makes the following recommendations.

- The Commission should ban the import into the EU of the priority species identified as being most vulnerable when taken from the wild and kept in captivity. These are:
  - chameleons
  - monitor lizards
  - crocodilians
  - venomous snakes and lizards
  - spiny-tailed lizards (*Uromastyx*)
  - horned lizards (*Phrynosoma*)

- An import ban should also be considered for all remaining category 1 species (ie those unsuitable for any private keeping). Import restrictions should be tighter for both these species and those listed in the report as category 2 (ie those only suitable for qualified keepers). The Commission could consider, for example, that import permits should be granted only when the final recipient is identified and where s/he is

References

suitably experienced and has facilities to care for the animal properly.

- The import of any category 4 species with similar biological requirements and size potential to category 1 and 2 species in the same genus should also be restricted. High losses of closely-related species or species from similar habitats strongly suggest that they too would suffer increased mortality and morbidity during transport and in captivity.

- EU member states – including the UK – should establish enforceable measures under Article 9.4 of EU Regulation 338/97, which requires vendors of all Annex B-listed reptiles (including category 3 species) to ensure that purchasers are adequately informed about their biological requirements at the point of sale.

- All unprotected reptile species should be listed in Annex D of EC Regulation 338/97 to ensure all imports into the EU are registered, enabling the monitoring of trade in species not listed in Annex A or B. This would also identify the species most commonly kept in private husbandry.

1 Altherr S and Freyer D. Mortality and morbidity in private husbandry of reptiles. 2001

2 Kölle & Hoffmann 1997

3 Kölle 2000a

4 Kölle 2000b

5 Craft 1997a

6 Kroker 1998

7 Köhler 1992

8 Werning 2000

9 Knauf 2000

10 Anon 2001a

11 Kölle et al. 1998

12 Dennert 1999

13 Kirmair 1994

14 TVT 1995

15 Muller 1990

16 Nietzke 1998

17 Essers 2000

18 Jarofke & Lange 1993

19 Tamm et al. 1998

20 Häfeli & Zwart 2000

21 Innis 2000

22 Breuer 1994

23 Knauf 2000

24 Kirschner 2001

25 Stallman 1996

26 Schmidt 1995

27 Wiechert 2000

28 Divers 1995

29 Simon 2000

30 Hennen 2000

31 Vinke & Vinke 1997

32 Wilms & Löhr 2000

33 Kölle et al. 1996

34 Kölle & Hoffmann 1998

35 Kölle & Hoffmann 1997

36 Kirmair 1998

37 Wesche & Keil 2000

38 Craft 1997b

39 Blahak 2000

40 Mathes pers.comm. 2000 cited in 1

41 Anon 2001b

42 Meyer 1999

43 Muller 1990

44 Rogner 1995

45 Chameleon Trade House 2001

46 World Conservation Monitoring Centre 2001

47 Schmidt 1998

48 Martens & Jelden 1991

49 Necas & Modry 2000

50 Schmidt 1990

51 Leptien 1999

52 ZZF 1996

53 Akeret 2001

54 DGHT 1997

55 Schildbach 1990

56 Trutnau 1990

57 GAM 1997

58 Cole 1998

59 ZSP 1997

60 BSAVA 1992

61 Baur 2000

62 Hoffmann & Kölle 2000

63 Wilms 1999

64 Kirmair 1997

65 Wilms & Muller 1998

66 Baur 1997

67 Anon 2001c

Wilberforce Way
Southwater, Horsham
West Sussex RH13 9RS
Tel: 0870 010 1181
www.rspca.org.uk

Registered charity no. 219099
We receive no government funding
Z02 2.02

COVER PIC: TIM MARTAIN/RSPCA PHOTOLIBRARY