

Factors contributing to poor welfare of pet reptiles

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Introduction

Exotic-pet veterinary practice experience (Hess 2011; Stanford 2013; Whitehead & Forbes 2013; BVA, BSAVA, BVZS & FVS 2015), reptile veterinary textbooks and review articles (Mader 2006; Mans & Braun 2014; Reavill & Griffin 2014; Schuppli *et al.* 2014; Warwick *et al.* 2014; Wilkinson 2015; Rowland 2016; Pasmans *et al.* 2017; Warwick *et al.* 2017; BSAVA 2018), and surveys of vets (Whitehead & Vaughn-Jones 2015) and reptile owners (Köhler 2010; Pees *et al.* 2014; Howell & Bennett 2017) indicate that pet reptiles are very commonly kept with sub-optimal husbandry, and suffer illnesses associated with deficient husbandry. Serious illness and suffering associated with poor husbandry appears far more common *per capita* in pet reptiles than in zoo reptiles, or in more commonly kept pets such as dogs and cats.

Owners do not purchase and keep pets for them to have poor welfare, so this husbandry-associated illness and suffering must be unintentional. This article outlines 18 factors, grouped into four categories (Table 1), contributing to owners unintentionally causing poor welfare of pet reptiles.

Table 1. Unintentional failure to meet reptiles' welfare needs results from:

A huge variety of reptiles are easily available, ownership is encouraged and there is almost no legal restriction of species ownership

Reptiles are maladapted to UK conditions and, although it can be difficult to meet their welfare needs in captivity, and their welfare needs are not fully known, most owners have limited understanding of reptile biology and are often unaware of the difficulties of meeting their pets' welfare needs

It is difficult to assess the welfare status of reptiles

Human attitudes to reptiles are such that owners' motivation to meet their welfare needs is less than for more commonly kept domesticated pets

1. Easy availability with no restriction of ownership

1a. Almost no legal restrictions on owning and keeping reptiles as pets

Almost all of the 10,500 known reptile species (Reptile Database 2018) could conceivably be kept as pets. Some are rare or difficult to obtain, but that can make them more attractive to some keepers (Courchamp *et al.* 2006; Hall *et al.* 2008). UK and EU law bans ownership, as pets, of very few reptiles: all sea turtle species and some endangered species native to EU countries for species-conservation reasons under (in England) the Wildlife & Countryside Act 1981 and the Conservation of Habitats and Species Regulations 2017; and *Pseudemys scripta* sub-species (not already owned as of August 2016) under EU Invasive Alien Species Regulation 1143/2014.

Relatively few reptile species require a license to sell, obtain and/or keep in the UK for public safety (Dangerous Wild Animals Act 1976) or species conservation reasons (Wildlife & Countryside Act 1981, Convention on International Trade in Endangered Species, EU Wildlife Trade Regulation 2017/160). Among Regulation 2017/160 Annex A species are two of the most common UK pet reptiles, *Testudo hermanni* and *T. graeca*.

There is no legal restriction of species trade or ownership for animal welfare reasons; almost anybody can legally sell almost any reptile species to almost anybody, whether or not the buyer has the knowledge, ability and facilities to meet the animal's welfare needs.

1b. Unrestricted supply

A huge variety of reptiles are easily obtainable via the pet trade, private breeders, the Internet and from abroad. There is no legal requirement for vendors to determine whether the buyer has the knowledge, ability and facilities to meet the animals' welfare needs, or provide information about the animal or its care. As of October 2018, new legislation – the Animal Welfare (Licensing of Activities Involving Animals) (England) Regulations 2018 – should partially improve this situation, requiring pet shops to provide some written information, and all commercial sales, including those online, to require a licence.

1c. Reptile ownership is encouraged

Reptile keeping is encouraged by the pet trade, breeders and hobbyist groups. Some reptiles are even marketed as 'easy' pets.

2. Animal and resource-availability factors

2a. Reptiles are maladapted to the UK environment and it can be difficult to meet their welfare needs in captivity

Almost all reptile species are maladapted to the UK's climate and indoor conditions. A survey of UK zoo, exotic-pet and wildlife vets found they believed

common pet reptiles to be less suited to their typical captive environment in the UK than are common domesticated pet species (Whitehead & Vaughn-Jones 2015). As poikilotherms, most reptiles are highly dependent on specific temperatures, usually substantially warmer than the UK. Many pet reptiles are adapted to additional specific environmental conditions (Table 2), including UVb light levels, humidity and diet, and their welfare depends on keepers providing the necessary conditions over their whole lives.

As exotic-pet veterinarians routinely experience, failure to meet reptiles' basic requirements for health leads to illness and death. But poor welfare also arises in other ways. A pragmatic definition of good welfare is 'when the animal is healthy and has what it wants' (Dawkins 2008). If it can be difficult to meet captive reptiles' basic requirements for health, how much more difficult is it to know, and provide, reptiles' mental/behavioural needs and what they want? And how does the keeper know if they have failed to meet those needs/wants (Warwick *et al.* 2013)? Recent research has shown reptiles to be more cognitively complex than previously thought (Wilkinson & Huber 2012; Burghardt 2013) with species showing complex sociality (Clark 2004; Amarello & Smith 2012; Doody *et al.* 2012; Gardner *et al.* 2016; Dinets 2017), play (Burghardt *et al.* 1996; Dinets 2015), problem solving (Manrod *et al.* 2008), social and imitative learning (Wilkinson *et al.* 2010a; Kis *et al.* 2015), gaze following (Wilkinson *et al.* 2010b) and long-term memory (Soldati *et al.* 2017). Mental/behavioural needs and wants may not be met in typical captive conditions in which reptiles have limited control over their choice of environment: over being in close proximity to, viewed by and handled by humans; over interaction – or lack thereof – with conspecifics; and limited stimulation and scope for activity and normal behaviour.

Table 2. Husbandry factors involved in meeting pet reptiles' health and welfare needs, varying across species

Species-specific factors:	In close captivity also:
<ul style="list-style-type: none"> • Temperature: <ul style="list-style-type: none"> • Basking & gradient • Diurnal variation • Annual variation • Day length & annual variation • Visible light intensity • UV light: Spectrum, intensity, location • Humidity • Diet: type & amount • Hibernation management • Interaction with humans 	<ul style="list-style-type: none"> • Substrate • Hygiene • Ventilation • Noise & vibration • Size of vivarium/enclosure • Visible light intensity <ul style="list-style-type: none"> • (Restricted) activity/exercise • (Restricted) normal behaviour • Hiding places & enrichment • Conspecifics, or other species • Interaction with humans

2b. Poor knowledge of the welfare needs of reptiles

The natural history, optimal husbandry and welfare needs of many species of reptile are not fully understood by biological science, yet alone pet owners. Zookeepers and dedicated reptile hobbyists/enthusiasts put much time and effort into studying and keeping certain species because that is their interest. However, the great majority of reptile owners just want a pet; only a minority of the 700,000 – perhaps well over a million – pet reptiles in the UK (Welsh Government 2017; PFMA 2018) are kept by serious enthusiasts. Most owners have no specific interest in the physiology, ethology and husbandry of their pet – indeed, husbandry may be seen as an inconvenience.

Husbandry of dogs and cats may also be an inconvenience, but is far easier for the average person to get right because how to meet their basic welfare needs is common knowledge; almost everybody grows up with dogs and cats or has friends, relatives, neighbours with these pets, and television programmes about them are common. How to meet the, often more specialised, basic welfare needs of reptiles is not common knowledge. Further, husbandry is a practical skill, and – as veterinary experience illustrates – providing keepers with facts and the necessary equipment (vivarium, heat lamp, thermostat, UV light, etc.) is not sufficient to ensure reptiles' welfare needs will be met.

The basic needs of many less commonly kept species are not fully known – indeed, the challenge of keeping such species appeals to some hobbyists. But the same applies to some of the most commonly kept species. The insects fed to insectivorous and omnivorous lizards are one example. Leopard geckos, chameleons and bearded dragons are typically fed a restricted range of insect species grown by live-food suppliers. They are mostly not the insects these reptiles are adapted to eat in the wild (Khan 2009; Oonincx *et al.* 2015), are less varied than their wild diet, and have a different nutrient profile (Finke & Oonincx 2014; Finke 2015; Kouřimská & Adámková 2016; Finke & Oonincx 2017). What health effects might that unnatural diet have over the long-term?

2c. Poor provision of knowledge by vendors and on the Internet

A further factor limiting keepers' knowledge is that the available biology and husbandry information often does not reach keepers. My experience of owners of common pet reptiles is that they genuinely believe they know how to care for their reptiles, and are surprised when I explain to them that their husbandry is deficient and has, or may have, contributed to their pets' illness. Such deficiencies are often basic; inappropriate temperature, UVb provision, diet, hibernation management, etc.

There is little or no reason for most non-expert reptile owners to realise, before or after purchase, that they do not know how to fully provide their

reptiles' welfare needs. There is almost no legal restriction on species ownership, reptiles are freely available to purchase, pet shops, breeders, hobbyist groups and Internet sites encourage ownership, and many people own reptiles. Even some exotic-pet veterinarians, who routinely see the problems caused by poor husbandry, encourage ownership. Pet shops and Internet sites provide basic care information, equipment and food. Although a few animal welfare organisations and individuals express concern about the welfare of pet reptiles, little or nothing alerts owners or potential purchasers as to how difficult it can be for the average person to meet these species' needs, and that they may not meet these needs well.

Worse still, some pet shops and Internet suppliers and sources may provide inappropriate equipment, and no or even incorrect information about care of reptiles, and Internet information can be poor or contradictory (Blue Cross 2016; Williams & Jackson 2016; RSPCA 2017).

2d. Societal infrastructure

As well as better information, there is better infrastructure in our society for caring for dogs and cats than for reptiles. A large variety of highly researched, appropriate dog and cat diets are available in supermarkets, pet shops, veterinary practices and online. For many reptile species diets are less accessible, and are often not tailored to the species by being equivalent to their natural wild diet, or a highly researched substitute. The UV lamps marketed do not necessarily provide suitable UVb for some species (Diehl *et al.* 2018).

2e. Degree of captivity

Most reptiles are, necessarily, kept in far more confined captivity than dogs and cats – garden tortoises being an exception. Many species require close confinement most of the time to allow their environmental needs (temperature, UV lighting, humidity, etc.) to be met. For some species, their vivarium or other enclosure is to a large extent a life-support system. Many species need to be closely confined to prevent escape.

Except for perhaps the smallest reptiles, close captivity restricts activity and animals' opportunity to exhibit normal behaviours – one of the five welfare needs listed in the Animal Welfare Act 2006. It can also restrict the degree of environmental variation – the range of 'microclimates' – limiting the animal's choice of where it can be most comfortable or experience environmental conditions best matched to its needs. In short, close captivity makes meeting reptiles' welfare needs more difficult (Table 2).

Bearded dragons (*Pogona vitticeps*) – the UK's most common pet lizard – are active, hunting, foraging, semi-arboreal creatures, the males territorial. Yet routine advice and common practice is to keep them in a 4'x2'x2'

vivarium. That 4'x2' floor area is a little over 2x1 times full adult total body length (a little over 5x2.5 times adult snout-vent length). How can such an animal exhibit its normal behaviour patterns – as required by the Animal Welfare Act 2006 – in such a small space?

2f. Reptiles are genetically wild animals

Dogs and cats benefit from thousands of years of domestication – both their adaptation to living with humans, and humans' familiarity with and understanding of them. In contrast, reptiles are genetically wild animals in captivity. Some reptiles appear relaxed around humans, including many tortoises that actively approach their keepers. However, interactions with owners may be stressful for some pet reptile species, even if captive bred. Such interactions include not only handling, but also being looked at when in a confined environment with minimal chance to hide or escape.

2h. Veterinary care

Veterinary science knows far more about the health and diseases of dogs and cats than of even the most common species of pet reptile. There is far more training of vets, and far more veterinary surgeons are available, for dogs and cats than for reptiles. Some routine diagnostic tests and treatment options are excluded for some reptile species because they are too small – blood sampling, for example.

Veterinarians have detailed knowledge of correct doses of drugs for dogs and cats, as medicines are tested in and manufactured for them. Few drugs are made for reptiles and so drugs tend to be dosed empirically (on the basis of experience or 'best guesses'), and it is unclear how effective they are. This is particularly a concern for painkilling drugs, especially as it is much harder to tell if a reptile is in pain than for dogs and cats. If I do surgery on a reptile, or I am presented with a reptile in pain, I give it painkillers, but I am far from certain how effective they are.

3. Humans' poor ability to identify reptiles' welfare status

3a. Owner ability to identify welfare status

When poor welfare is not perceived, animals suffer. Humans' ability to perceive the welfare status – good or poor – varies across species, as a result of many factors (Table 3). Reptile species are disadvantaged in regard to all these factors compared to, say, dogs and cats. Importantly, reptiles cannot deliberately communicate aspects of their welfare state to humans in the way that dogs and cats can – e.g., to tell us if they are hungry or happy – and there is little or no reciprocal, socially-meaningful interaction between reptiles and humans, unlike for dogs and cats.

Table 3. Factors determining the ability of humans to assess the welfare status of species.

- Facial expressions
- Body language
- Degree of physical activity
- Normal behavioural repertoire
- Meaningful-to-humans vocalisation
- Does the animal hide signs of illness – e.g., as many prey species do?
- Does the animal deliberately communicate its state to humans?
- Degree and amount of reciprocal, socially-meaningful interaction
- Time owners spend seeing & interacting with the animal
- Familiarity with what is normal for the species

Even severe pain can sometimes be difficult to recognise in reptiles (Sneddon *et al.* 2014; Balko & Chinnadurai 2018; Perry & Nevarez 2018).

If a reptile shows signs of illness resulting from husbandry, its welfare needs have not been met – but that deficiency has been detected too late. Yet that is a common reason for reptiles – often seriously ill – to be presented to veterinarians. And, as noted above, it is harder to know reptiles' mental/behavioural needs – factors important to their welfare but not critical for their basic health – and whether they are being met (Warwick *et al.* 2013).

4. Human psychological & sociological factors

4a. Economic value of species

All else being equal, it is likely that owners will value, and so take more care of, a pet reptile they have bought for £500 than one they have bought for £50.

4b. Emotional attachment to species

Emotional attachment to pets – roughly, the 'human-animal bond' – of both adults and children varies across species. It is lower for cats than dogs, and lower still for other species (Zasloff 1996; Vizek Vidovic *et al.* 1999; Bonas *et al.* 2000; Winefield *et al.* 2008; Smolkovic *et al.* 2012; Cromer & Barlow 2013; Martens *et al.* 2016; Hawkins *et al.* 2017), although no study mentions reptiles specifically. Lower emotional attachment is likely to be associated with reduced time, effort, money and resources spent on caring for a pet.

4c. Attribution of sentience

The degree of sentience – including cognitive complexity and emotional capacity – humans attribute to animals declines with the degree to which the species differs phylogenetically from humans (Eddy *et al.* 1993; Plous 1993; Driscoll 1995; Hills 1995; Nakajima *et al.* 2002; Phillips & McCulloch 2005; Harrison & Hall 2010; Morris *et al.* 2012; Phillips *et al.* 2012; Wilkins *et al.*

2015). The less sentience a keeper attributes to an animal, the less they are likely to try to maximise its welfare. If an owner does not believe an animal can experience a particular negative mental state, e.g., pain or fear, they have no reason to act to prevent the animal experiencing that state. That will be detrimental to the animal's welfare if it does experience that state.

4d. Empathy

The degree of empathy – defined as ‘understanding another being's condition from their perspective’ – that humans feel towards animals also decreases with phylogenetic distance from humans (Serpell 2004; Westbury & Neumann 2008; Harrison & Hall 2010). The less owners empathise with – ‘feel the pain of’ – an animal, the less care they are likely to take over that animal.

4e. Moral importance

The moral value of a species also decreases with phylogenetic distance from humans (Driscoll 1995; Allen 2002; Gray *et al.* 2007; Crimston *et al.* 2016). The less moral importance animals are regarded to have, the less likely owners are to be concerned by their suffering. In the UK, this is apparent in UK law covering laboratory animal experimentation, where replacement of ‘higher’ by ‘lower’ vertebrates is encouraged as way of reducing the moral load of suffering (UK Government 1986; Webster 2014), despite it being, in general, more difficult to recognise suffering in ‘lower’ vertebrates.

4f. Likeability of species

Species likeability also decreases with phylogenetic distance from humans (Serpell 2004; Batt 2009). The less likeable animals are regarded to be, the less owners are likely to be concerned by their suffering.

4h. Animal welfare legislation

Reptiles are less protected by animal welfare legislation than are some more traditional pet species. Pet reptiles generally live much more out of public sight than dogs and cats, and suffering of reptiles is less likely to be recognised and regarded as morally important, so unnecessary suffering is less likely to be reported to authorities. In the UK, the Animal Welfare Act 2006 – despite its intention to protect all vertebrate species – routinely fails to protect pet reptiles from the primary causes of their welfare problems. This is because their poor welfare arises from unintentional failure to meet welfare needs, is often not recognised by owners, and the behaviours – the husbandry practices – causing the poor welfare are normal among pet-reptile keepers, so owners cannot be viewed as culpable for their animals' suffering (Whitehead 2015; 2016a,b,c).

In effect, the Animal Welfare Act cannot protect pet reptiles from the

primary cause of their welfare problems because, despite the Act's explicit requirement that keepers meet their animals' welfare needs, it is a societal norm to keep reptiles in ways that fail to meet their welfare needs.

Conclusion

Pet reptiles are maladapted to their UK environment, and it is difficult for many owners to meet their welfare needs in captivity. Many pet-reptile owners are unaware that they are not fully meeting their pets' welfare needs, resulting in unnecessary suffering. It is difficult for owners to assess welfare in reptiles, and attitudes to reptiles are such that the drive to optimise welfare for pet reptiles is lower than for some domesticated pet species. These factors have caused a widespread, severe welfare problem for pet reptiles such that it is a societal norm for pet reptiles to be kept without adequately meeting their welfare needs – resulting in suffering – despite the requirements of the Animal Welfare Act 2006.

Conflict of interest

The author, a veterinarian treating exotic pets, profits from the endemic, unnecessary illness and suffering of pet reptiles.

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