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Introduced non-native amphibians and reptiles in Cambridgeshire 2010-2016

Steven J. R. Allain, Liam T. Smith & Gary J. Miller

Introduction

Non-native species threaten ecosystems globally (Vitousek *et al.*, 1996) with those on islands more vulnerable (Reaser *et al.*, 2007). This applies to areas such as Britain (Manchester & Bullock, 2000), where there is no natural method for repopulation or recolonisation if localised or national species extinctions occur (Green, 2003). These extinctions may occur through competition between native and introduced species, through disease spread by non-native species or through direct predation (Fritts & Rodda, 1998). Mainland areas of the Britain do not have the same level of extinction risk as its offshore islands but local extinctions can still occur especially if the habitat connectivity between the area of extinction and a source population is poor.

A number of non-native amphibian and reptile species have become established within the UK (Frazer, 1964; Lever, 2009). These mostly persist in small and isolated populations but climate change may enable some of these species to expand their ranges, requiring management plans to limit their dispersal. Two introductions thought to be attributable to accidental causes are the Aesculapian Snake (*Zamenis longissimus*) and the Common Wall Lizard (*Podarcis muralis*). Some non-native species have become established in the UK through deliberate introductions, including the Marsh Frog (*Pelophylax ridibundus*) (Zeisset & Beebee, 2003).

Cambridgeshire is not a heavily populated county with much of the landscape occupied by farmland. Despite this, several non-native reptiles and amphibians have been observed within the county. The records of these are reviewed here, together with a discussion of the probable sources of each introduction, and the threats that each might potentially pose to native wildlife.

As chairman of the Cambridgeshire and Peterborough Amphibian and Reptile Group (CPARG), SA has experience with surveying non-native species in Cambridgeshire. LS has been assisting SA with these surveys since 2013 and has other experience in this area too. In his last role, GM was manager of Cambridge Reptiles, Hardwick. During his time there GM kept detailed records of the non-native species which had been taken to him by concerned members of the public. Each of the species we have assessed had made their way into the Cambridge area, some of these were observed in the wild and others entered GM's care before this could happen. After entering the care of GM, each of the animals was successfully rehomed.

Amphibians

African Common Toad (*Sclerophrys gutturalis*)

This is a large toad that occurs in a range of habitats across sub-Saharan Africa. In late November 2015 a couple who had recently returned from Mauritius discovered a juvenile African common toad stowed away in their luggage. SA took charge of the toad shortly afterwards and whilst in his care the toad shed a number of parasitic worms before being passed onto Dr. John Wilkinson (Amphibian and Reptile Conservation Trust), who gave the toad a permanent home. Apart from the risk of spreading parasites, the toad is unlikely to have been a threat to our native species as a spell of cold weather would be expected to have been fatal if the toad had made it into the wild.

Common Midwife Toad (*Alytes obstetricans*)

This is a species of small terrestrial toad commonly found across the western Europe (Lever, 2003). It is unusual in that it breeds on land. (Plate 5, back cover) A population of this species was first discovered in Cambridgeshire by Baker (2007) and this has been monitored by CPARG since 2015. It is uncertain how or when this successfully breeding population became established but it is unlikely to pose a threat to the local native amphibian species except possibly as a disease vector of the amphibian chytrid fungus (*Batrachochytrium dendrobatidis*). CPARG is currently undertaking work to establish whether this fungus is present in that population.

Reptiles

Bibron's Gecko (*Pachydactylus bibroni*)

This species, which can grow to 20 cm (Branch, 1998), is endemic to southern Africa. Its dorsal surface is mainly brown with black crossbars that have a beaded appearance; the underbelly is a lighter brown to white. In 2012 a single individual found in a suitcase that had been brought from South Africa and was shortly after taken to GM who subsequently rehoused the animal. It is unlikely that this species would be able to survive in Britain due to the much colder climate.

Mediterranean House Gecko (*Hemidactylus turcicus*)

This small insectivorous species is tan in colour and grows to around 15 cm in length, and is native to the Mediterranean region, where they are a familiar sight (Lever, 2003). It has been successfully introduced to a number of countries outside of its range but is limited to habitats similar to those of its natural environment (Lever, 2003). In 2012, two individuals were taken to GM at Cambridge Reptiles by transport companies. The most likely introduction pathway is by the transport of goods since this species is not commonly handled by the pet trade. This gecko might survive in the wild in the warmer parts of Britain, especially if the climate continues to warm, since in other parts of its range it readily shelters in buildings.

Moorish Gecko (*Tarentola mauritanica*)

This species, which grows to around 15 cm in length is native to the western Mediterranean region and the Iberian peninsula (Lever, 2003). Their colouration changes throughout the day but they are generally grey or sandy in colour with occasional banding on the tail. This species has also been introduced into Asia and the Americas where it flourishes alongside human habitation. In March 2016 a young Moorish gecko was found in a shipment of furniture from continental Europe. The colouration suggested that this specimen had most likely originated from Montpellier.

White-spotted Gecko (*Tarentola annularis*)

This species, which is native to northern Africa, grows to around 15 cm in length, and looks superficially similar to the Moorish gecko. It occurs in the Americas as accidental imports or escapes from the pet trade (Lever, 2003). In 2013 three individuals were found with fruit at a supermarket. This species is unlikely to be a threat due to the vastly different environmental factors between the UK and Northern Africa.

Common Wall Lizard (*Podarcis muralis*)

This has a wide range across eastern, western and central Europe (Lever, 2003). This medium-sized lizard, reaching around 20 cm in length, is highly variable in colour and pattern, consisting of green, brown and grey with lighter stripes or reticulations. In July 2015 a specimen was reported from a local garden centre, possibly introduced with a delivery of furniture from France. It was seen occasionally for a few weeks before it disappeared, presumably unable to survive the weather conditions in Cambridgeshire, though populations have established in other more southerly parts of Britain.

Corn Snake (*Pantherophis guttatus*)

This non-venomous species, which is a popular pet in the UK, has a natural range in North America (Lever, 2003). It can reach six feet in length and is highly variable in colour. In 2014 the authors helped rehome three individuals that had been found in Cambridgeshire. The first two snakes had escaped captivity and were found on the streets of Cambridgeshire in July. The third specimen, which was approximately 2-3 months old, was found on a compost heap in Hemingford Grey in mid-August. Corn Snakes are often encountered in the wild as escapees but it is not known how long they can survive or whether they are able to breed in this country.

Red-eared Terrapin or Red-eared Slider (*Trachemys scripta elegans*)

This is another species native to the south-eastern United States that became a popular pet (Lever, 2003), especially in the 1990s following the Teenage Mutant Ninja Turtle craze (Langton & Herbert, 2011). It is not suitable as a pet because the animal grows quickly and becomes too large (its carapace can reach 40 cm) for most pet-owners. A number of unwanted animals have been released into local waterways around the country. In 2016 a population was found to

inhabit the pond on the Vision Park in Histon, although this population, which is now being monitored by CPARG, seems to have been present there since at least 2006, probably continuously. (Plate 6, back cover). There are numerous reports of this species found in the wild in Britain, though how many breeding populations exist is uncertain.

Records prior to 2010

Earlier records of non-native reptile and amphibian species are not numerous. Some non-native reptiles, such as terrapins, are hard spot due to their semi-aquatic lifestyle. They are easily seen when basking but when submerged they can be easily overlooked. Anglers, who visit waterbodies on a regular basis, are most likely to observe introduced terrapins as they spend many hours in suitable habitats. The records explored here have been verified by the Cambridgeshire and Peterborough Environmental Records Centre (CPERC).

There are records of Red-eared sliders in the Vision Park Pond in Histon dating back to 2006. We have confirmed their presence there during 2016 and presume that they are the same individuals since this species is long-lived (Lever, 2003). There is a 2003 record of a Red-eared slider from Little Paxton Pits but it has not been reported since. Additional records of other terrapins that may still persist in Cambridgeshire include an unknown species spotted at the Cambridge Science Park in 2007.

The most interesting record CPERC has regarding non-native reptiles is that of a European Pond Terrapin (*Emys orbicularis*) from Lattersey Local Nature Reserve dating from 1991. It is unlikely that this individual still persists as there are no subsequent records from the site. This individual may have been released in the aftermath of the Teenage Mutant Ninja Turtle craze, when many non-native terrapins were released into British waterways.

The only record of adult Midwife Toads before 2010 is the short report by Baker (2007), who confirmed their presence on the basis of their unique call. How these toads became established remains unknown. There is an unconfirmed record from 2014 of Midwife Toad tadpoles from a drainage ditch near Thorney.

Discussion

It is hard to assess whether or not a non-native species will become established and persist within the environment after an introduction has occurred. This uncertainty exists for a number of reasons such as the species' ability to adapt to the new conditions and find a niche within the new ecological system. Some species fail to establish, others establish but do not persist and then there are species that establish and thrive. An example of a species which once persisted but then was lost is the Common Tree Frog (*Hyla arborea*). In 1987 a localised population in the New Forest became extinct (Snell, 1991). Other populations, such as one in East London and elsewhere, have also since become extinct (Snell, 2006). Single sightings of them are now uncommon but can be attributed to escaped pets.

It is unlikely that the stowaway animals that we were able to intercept and rehome would become established in the wild. For a non-native species to become established, multiple breeding individuals need to come into contact with one another. This is much more likely to occur during an intentional release, instead of the odd individual making their way outside of their range by stowing away in goods.

Most of the species listed above have not caused serious ecological impact, and are unlikely to do so if they were to become established in the wild. One species, however, poses a much greater threat. The American Bullfrog (*Lithobates catesbeianus*) has been introduced to countries far beyond of its natural range, including the UK (Lever, 2003) though the species has not yet been reported from Cambridgeshire. The exported animals have been used to set up farms to cater for the demand for frog legs or to be sold in the pet trade. It is by this latter commercial use that the American Bullfrog was introduced to Britain. Bullfrogs were imported into the UK until 1997 when this practice was banned by EU legislation, in order to protect native European fauna. Unfortunately the Bullfrogs had already become established at a site in East Sussex. In 1999 an eradication program was initiated in order to remove the population whilst it was still localised (Banks *et al.*, 2000). Due to its much larger size, the American Bullfrog is able to consume and compete with native amphibians, potentially leading to their local extinction.

Reptiles dominate the above list, most probably because they are hardier and more robust during transport compared with amphibians. A consequence of this is that not many exotic amphibian species have become established, although there are cases in other counties. The Alpine Newt (*Ichthyosaura alpestris*) is native to northwestern Europe and is the most successful introduced species of urodele in Britain (Wisniewski, 1989). The first recorded population became established in Surrey during the 1920s (Bond & Haycock, 2008). It has yet to be recorded in Cambridgeshire but it is just possible that they may exist in areas that are poorly surveyed, such as the fens. The overall distribution of the species is still poorly understood and it is unclear how much of a threat they pose to our native amphibian species (Beebee, 2007).

Common Wall Lizards are sufficiently common in the UK to form breeding populations but these occur only in the south of England (Gleed-Owen, 2004). The specimen from Cambridgeshire probably perished as it would be unlikely to be able to survive in its new environment. The other escaped reptiles mentioned above may have suffered the same fate. However, climate change is opening up new opportunities and some species, such as the Wall Lizard, have even been able survive in Britain by adopting a different reproductive strategy. In populations in southern England, where the temperatures are 5-10°C lower than in their native range, female lizards retain their eggs for longer and the eggs are present in the soil for shorter periods of time (While *et al.*, 2015). This adaptation highlights the plasticity in some species allowing them to adapt to new environments. Conversely, climate change may favour introduced species at the expense of native species (Araújo *et al.*, 2006).

Each of the animals that were in GM's care after their discovery (either as stowaways or escapees) were rehomed after a six week quarantine period (or after enough time has elapsed to give a parasite-negative stool sample). Faecal samples were checked for internal parasites since these could easily be transferred to native species, where they may be detrimental. The parasitic worms shed by the *S. gutturalis* have yet to be analysed and their threat evaluated.

Non-native species can also be vectors of fungal infections. In 2013 a species of chytrid fungus, *Batrachochytrium salamandrivorans*, caused a drastic decline in Fire Salamanders (*Salamandra salamandra*) in the Netherlands (Martel *et al.*, 2013). In subsequent laboratory tests the fungus was shown to be deadly to 41 of 44 Western Palearctic salamander and newt species (Martel *et al.*, 2014). The disease is believed to have been spread by Asian newts via affected native amphibians in the UK but careful monitoring seems sensible.

Future surveys are needed to establish a more complete overview of non-native species that may have been overlooked in Cambridgeshire and more attention needs to be paid to their potential introduction routes. In the case of reptiles and amphibians this is mainly through the pet trade or the shipment of goods. Pet owners need to be informed how to responsibly rehome a pet if it is no longer wanted. Releasing unwanted pets into the wild is illegal but some pet owners seem to be oblivious of this fact. In terms of the shipping introduction pathway, not much can be done except the implementation of more stringent screening protocols in areas where animals are likely to stowaway or come into contact with transportation vehicles.

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Nightingales at St Ives Meadow Lane pits 2012-2016 and in nearby areas 1994-2016

Tim Reed

Abstract

Nightingales (*Luscinia megarhynchos*) were surveyed each year at two pits at Meadow Lane, St Ives, Huntingdonshire between 2012 and 2016. Numbers of singing males on individual visits varied between two and seven in any year-adding c. 10% to the previously reported number of birds in the county. Earlier records suggest that Nightingales bred there from the late 1990s, but there were no records between 2006 and 2011. Variations in numbers from year to year are typical of central Ouse Valley gravel pit populations. The site may well be