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SHORT COMMUNICATION
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Restoration of a peatland habitat leading to increased aquatic behaviour in common lizards *Zootoca vivipara*; a potential conservation benefit?

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The common lizard *Zootoca vivipara* is a small terrestrial species, widely distributed across Europe, and known for its adaptability to a range of habitats, including heathland, grasslands and peat bogs (Beebee & Griffiths, 2000). These lizards exhibit basking and other thermoregulatory behaviours in open areas, and are often seen on rocks, logs or vegetation (Edgar et al., 2010). They are notable for being a cool-adapted species that is the most northerly distributed reptile (Massot et al., 1992).

The peatland habitat at the head of the Rhondda Valleys in South Wales has undergone significant ecological restoration as part of the 'Lost Peatlands Project', aimed at rehabilitating degraded peatlands to support biodiversity, improve water quality and capture carbon (Taylor et al., 2018). Restoration activities have included rewetting degraded areas of former plantations using dam-blocking techniques (Anderson, 2014), which has led to the formation of ponds and waterlogged habitats that may influence the behaviour of local wildlife.

A total of 36 hours of wildlife survey effort was undertaken at the Castell Nos peatland restoration site in South Wales between the period of April to July 2024. On 28 April 2024, a common lizard was observed engaging in aquatic behaviour, initially it was on the bank of a peatland pool and on approach of an observer it jumped and submerged itself in the pool. Full submersion lasted for 1 minute 15 seconds before the individual reappeared with its nostrils poking out of the water surface on the edge of the pool (Fig. 1). Once settled, the individual then ran up the bank and into the vegetation surrounding the pool. Subsequently, in the period up to the 10 June 2024, 17 further sightings of common lizards exhibiting aquatic behaviours were recorded across several locations within the restored northern sections of the Castell Nos peatland site (for the full listing see Table 1S in Supplementary Material). These behaviours repeated examples of submersion in shallow pools and waterlogged areas associated with the approach of human surveyors, with submersion times ranging between one and four minutes. Notably, several instances involved prolonged submersions spanning three to four minutes after which the lizards swam away from the observer and climbed into poolside vegetation. This aquatic behaviour has been formally documented previously by Smith (1951, see p. 195), who reported a single *Z. vivipara* remaining submerged for approximately six minutes; in addition there is an isolated anecdotal report and video of a lizard submerging in a garden pond (Herpetofauna UK, 2011). The absence of observations on such aquatic behaviour is likely due to the fact that most ecological and behavioural studies have focused on heathland, grassland and dry bog margins. Of note is that all observations in the current study occurred within restored, re-wetted peatland areas, where common lizards were found to be more abundant than in the surrounding, drier habitats. This suggests that the availability of shallow pools in restored peatlands may not only support higher lizard densities but may also reveal or promote a behavioural response that has remained largely undocumented, especially in cold, wet upland environments not typically associated with ectothermic reptiles.

Figure 1. A common lizard *Zootaca vivipara* submerged in a peatland pool, with small air bubbles surrounding its nostrils

When observers were approaching these small pools, common lizards would often emerge from concealed positions within tussocks and nearby vegetation and then submerge themselves in the water (Figs. 1&2). In several cases, individuals were seen basking at the water's edge before entering, suggesting that the proximity of these pools may offer a strategic advantage for predator evasion. By selecting basking sites adjacent to these aquatic refuges, common lizards may be exploiting the pools as quick escape routes from potential threats (Baeckens et al., 2021; Chang et al., 2022). This behaviour suggests a form of risk management, where basking near water allows common lizards to monitor their surroundings and quickly seek shelter in response to predator presence.

Figure 2. A common lizard *Zootaca vivipara* swimming across the water surface after re-surfacing from submersion

These observations are of particular interest because common lizards are typically associated with drier microhabitats. Reptiles are known to modify their behaviour in response to habitat alterations, particularly in environments undergoing ecological restoration or mitigation efforts (Cathrine, 2024). However, to our knowledge this study provides the first documented cases of this aquatic behaviour in peatland habitat by common lizards, suggesting that the species may exhibit a greater degree of behavioural plasticity than previously recognised, especially in response to habitat modifications (Baeckens et al., 2021), such as the restoration efforts by 'The Lost Peatlands'.

In total, 18 sightings of common lizards exhibiting aquatic behaviour were documented. All of these occurred across the restored areas of the peatland site, whereas none were observed in adjacent un-restored peatland and mosaic heathland areas which had received a similar 36 h survey effort but were considerably drier with fewer pools. This apparent preference for the restored peatland site was unexpected, highlighting gaps in our understanding of reptile usage of upland peat habitats. As we restore these degraded habitats, careful monitoring of the impacts on reptiles may produce surprising results and perhaps suggest ways that sympathetic management can bring conservation benefits such as the provision of wetter upland habitats. This may prove beneficial at a time when our summers are becoming hotter and drier and could mitigate potentially negative impacts on these cool-adapted reptiles (Luccini et al., 2025).

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