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SHORT COMMUNICATION

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Common toad *Bufo bufo* and hazel dormouse *Muscardinus avellanarius* cohabiting in a dormouse nesting box

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The common toad *Bufo bufo* is one of seven amphibians native to Britain and is considered widespread despite declines in some areas (Young & Beebee, 2004; Inns, 2011). Outside the breeding season this species tolerates dry conditions, and can be found some distance from water in a range of natural and semi-natural habitats (IUCN, 2008). This includes gardens, grasslands, woodlands and hedgerows, where they hunt for food at night and shelter under features such as logs, rocks, debris and artificial refugia during the day (Billings, 1984; Inns, 2011). In Denmark, common toads have been reported climbing trees where they shelter in holes and crevices (Bringsøe, 2016), and in England data from diverse taxonomic surveys has shown their ability to climb and utilise above ground structures including artificial nest boxes and tree cavities (Petrovan et al., 2022). In their study, Petrovan et al. (2022) analysed 51 toad records within tree cavities and dormouse nest boxes, but did not report cohabitation between the hazel dormouse *Muscardinus avellanarius* and toads. Here we build on this work by reporting an instance of cohabitation between these two species within a dormouse nest box.

Throughout the summers of 2022 and 2023 we undertook dormouse surveys at Goss Moor National Nature Reserve (NNR), Cornwall, UK (50° 24'16" N, 04° 52'15" W), a designated Site of Special Scientific Interest and Special Area of Conservation (Natural England's Devon, Cornwall and Isles of Scilly Area Team, 2017). Surveys were part of the National Dormouse Monitoring Programme (NDMP) where licensed individuals monitor nest boxes throughout England and Wales during the dormouse active season (April–October; for the full NMDP survey protocol, see PTES, 2022). At Goss Moor specifically, there were ten surveys of 100 traditional wooden nest boxes (two distinct transects) in both 2022 and 2023. In 2023, we discovered one dormouse and four toads in nest boxes (Table 1).

Although toads have previously been found to inhabit features of trees that are above ground and use disused rodent burrows for hibernation (Inns, 2011; Petrovan et al., 2022), to the authors knowledge, this is the first time they have been observed cohabiting with a dormouse in a nest box (Fig. 1A). This box (Fig. 1B) is attached to a goat willow tree *Salix caprea* at a height of approximately 150 cm, with a 3.5 cm entry/exit hole facing the tree trunk. The tree is located at the edge of goat willow-dominated wet woodland which regularly becomes flooded after heavy rainfall. Whilst both individuals were found together in September 2023, neither were present in October 2023, although the dormouse nesting material remained.

Table 1. Nest boxes containing toads and a dormouse at Goss Moor NNR in 2023

Date	Time	Box #	Transect #	Species present	Age
25/06/2023	10:30 h	23	1	Toad	Juvenile
30/07/2023	10:40 h	23	1	Toad	Juvenile
30/07/2023	11:45 h	1	2	Toad	Juvenile
29/09/2023	11:45 h	2	1	Toad and dormouse	Juveniles

Figure 1. Nest box 2 at Goss Moor NNR - **A.** Nest box 2 at the time of processing showing a juvenile dormouse and juvenile toad (circled in red) **B.** Location of nest box attached to a goat willow tree

It has been suggested that toads may use arboreal structures for shelter, to avoid predators or parasites, and to hunt for prey (Bringsøe, 2016; Petrovan et al., 2022). To deter predators, toads secrete toxins from granular skin glands that can cause a range of biological complications, such as cardio inhibitory effects (Kowalski et al., 2018). Some reptiles and mammals are able to prey on toads despite these protections, but their effects on hazel dormouse are unknown (Petrovan et al., 2022). Dormice eat seeds and fruits, and opportunistically feed on bird eggs (Adamík & Král, 2008;

Juškaitis et al., 2016; Sarà & Sarà, 2007) and both species feed on invertebrates (Inns, 2011; Büchner et al., 2018; Chanin et al., 2015; Goodwin et al., 2020). It is therefore unlikely that predation would occur between these two species and our observation suggests passive cohabitation.

Both tree cavities and nest boxes offer micro-climates that differ from ambient conditions, but natural tree cavities are more efficient thermal insulators and maintain higher humidities than nest boxes. Whilst nest boxes have relatively poor thermal insulation, they do at least maintain humidities above ambient (Marziarz et al., 2017). Furthermore, the solitary behaviour of toads and dormice, especially at this life stage, lead us to suggest that the nest boxes surveyed at Goss Moor were likely providing suitable temporary shelter and protection for two nocturnal species that otherwise occupy different ecological niches.

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