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Background

Second generation anticoagulant rodenticide (SGAR) use differs between Ireland and Britain. All approved SGARs (including the more toxic brodifacoum, flocoumafen, difethiolone) can be used outdoors in Ireland but such use has been restricted to difenacoum and bromadiolone in Britain. Ireland also has a less diverse small mammal fauna than Britain and predators generally eat a greater proportion of commensal (target) rodents. These two factors may enhance the risk of secondary SGAR exposure and poisoning in predators in Ireland.

Our aim was to investigate whether the risk of secondary SGAR exposure is greater in Ireland than Britain. We compared SGAR exposure in a sentinel predator species, the barn owl (*Tyto alba*), from Ireland and Britain.

Liver SGARS were quantified in 70 barn owls from Ireland that died from various causes between 2006 and 2011. The data were compared with residues in 332 owls from Britain that died over the same time period and had been analysed by the Predatory Bird Monitoring Scheme (<http://pbms.ceh.ac.uk/>).

Results

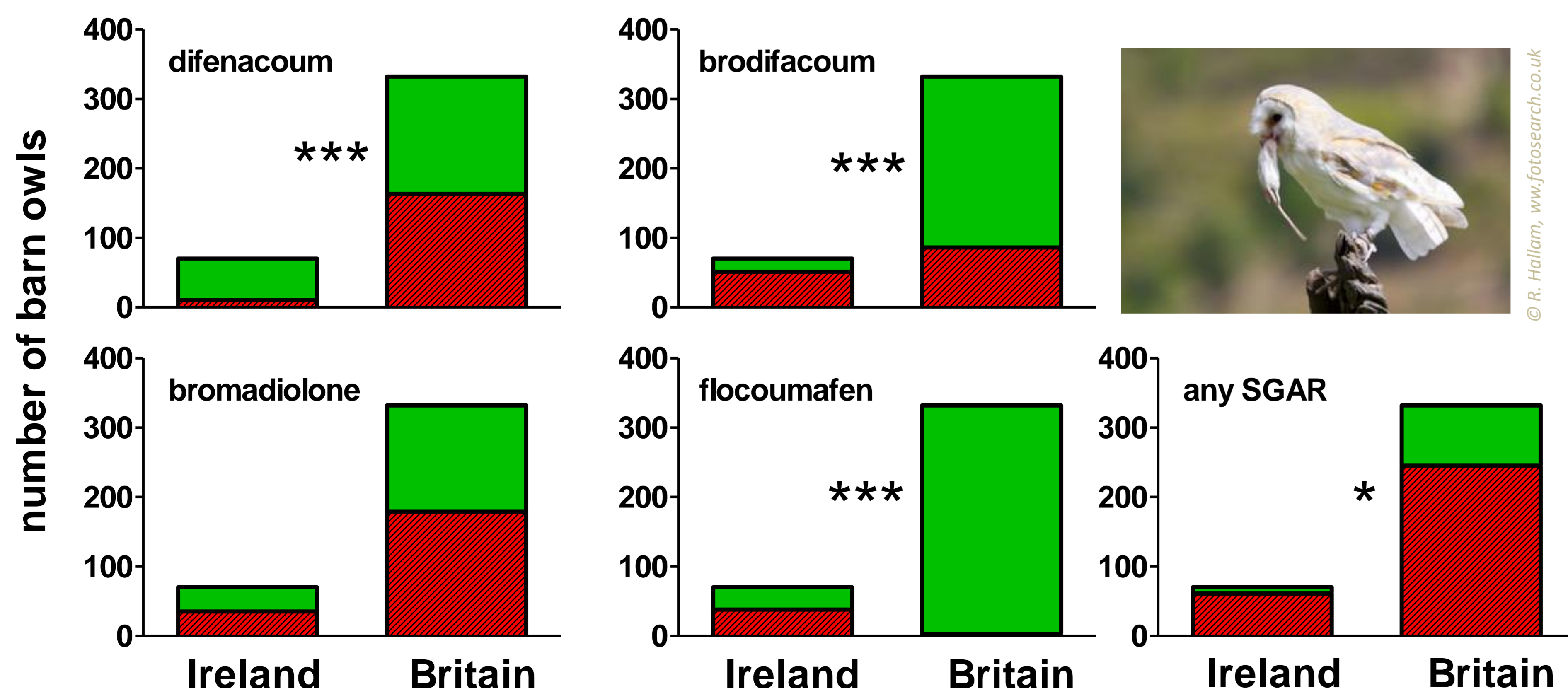


Figure 1. No. barn owls with detectable (red hashed) and non-detectable (green) liver SGAR residues. Significant differences in proportion of birds with/without residues (Fisher's Exact test) are indicated * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

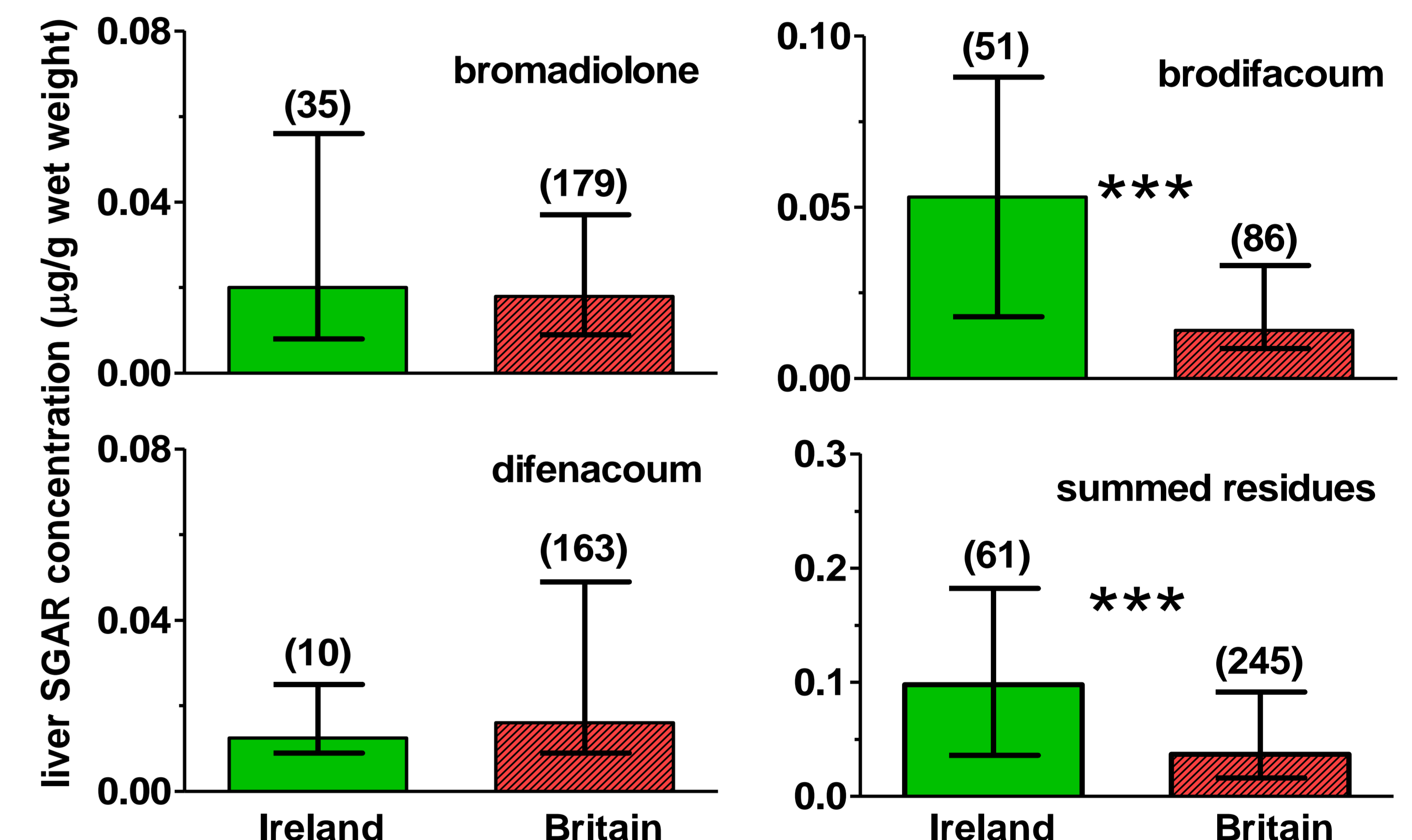
Brodifacoum and flocoumafen were detected in a significantly higher proportion of Irish than British barn owls and, similarly, a greater proportion of owls from Ireland (87%) than Britain (74%) had residues of one or more SGAR (Figure 1).



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Median liver SGAR concentrations (birds with detected residues) were significantly higher in Irish owls (Figure 2) and sum SGAR residues largely consisted of brodifacoum and flocoumafen (88% on average).

Figure 2. Median and interquartile range for liver SGAR residues in birds with detected residues. Significant differences between countries (Mann-Whitney U test) indicated by *** ($P < 0.001$). Numbers in brackets are the numbers of birds with detected residues. Data for flocoumafen is not shown as only two birds from Britain had detected residues.



Seven of the 70 owls from Ireland had post-mortem signs and/or residue magnitude consistent with SGAR poisoning.

Discussion

Our results demonstrate that barn owls in Ireland have greater exposure to brodifacoum and flocoumafen than birds from Britain. This presumably reflects extent of, and outdoor usage of, SGARs in Ireland.

The higher overall exposure to SGARs in Irish barn owls (% of birds exposed and accumulated summed SGAR liver residues) may reflect usage patterns and the effects of the restricted prey guild.

Barn owls in Ireland may be at two-fold greater risk from SGARs than in Britain.