

Non-Target Rodents & Small Mammals

- Rodent and small mammal species other than Brown Rat and House Mouse are present in Ireland
- Most are non-target species
- Taken as prey by a wide variety of predators *e.g.* owls, falcons, Red Kites, Foxes, Buzzards, Stoats and Pine Martens
- If contaminated with rodenticides they become the main route of exposure of wildlife
- Some become pests if they enter buildings *e.g.* Wood Mice

Non-Target Rodents & Small Mammals

Concern about rodenticide use arises from:

- Exposure and accidental killing of these animals when they take baits (Primary Poisoning)
- Secondary exposure of predators when they feed on contaminated target, non-target rodents or small mammals (Secondary Poisoning)

Non-target species found in woodland and on farms

Apodemus sylvaticus (Wood Mouse, Long-tailed Field Mouse)



- Non-target mammal most likely to take bait
- Often mistaken for House mouse - may cause similar damage
- May be controlled in some circumstances *i.e.* when baits are approved for 'mouse' control
- Common in hedgerows and farmland but often enters farm buildings and grain stores
- Taken by a wide range of bird & mammalian predators (Stoats, owls,

Non-target species found in woodland and on farms

Myodes (=Clethrionomys) glareolus



- Limited distribution - introduced to west Limerick in 1920s
- Mainly found in deciduous woodland, hedgerows, field margins, ditch banks *etc.*
- Never a 'target' rodent
- May take food from game-bird feeders
- May enter sheds, barns outbuildings,
- Taken by Stoats, owls

Non-target species found in woodland and on farms

***Sorex minutus* (Pygmy Shrew)**



- A native, protected species
- Ireland's smallest mammal – adults weigh less than 4 grams
- Found throughout Ireland in areas with good ground cover - grassland, heath, hedgerows, peatlands and sand dunes
- Feeds primarily on insects
- An important prey item for predators

Non-target species found in woodland and on farms

Crocidura russula (Greater White-toothed Shrew)



- First discovered in south Tipperary in 2008 - expanding range. Now confirmed in Tipperary, Limerick, and parts of Cork, Offaly & Westmeath
- May enter farm buildings
- Can occur in high densities and are an important prey item for predators
- Never a 'target' species
- Study in Europe has shown high exposure

Non-target species found in woodland and on farms

Sciurus vulgaris (Red Squirrel)

- Native species – protected
- Distribution patchy but widespread
- Cannot compete with grey squirrel for food
- Susceptible to squirrel pox – grey squirrel a carrier of the virus
- Population recovery in midlands – possibly associated with recovery of Pine Marten population
- Non-target for rodent control



Predatory Birds -The Barn Owl

Barn Owl numbers declined dramatically over past 40 yrs - a Red-listed Bird of Conservation Concern

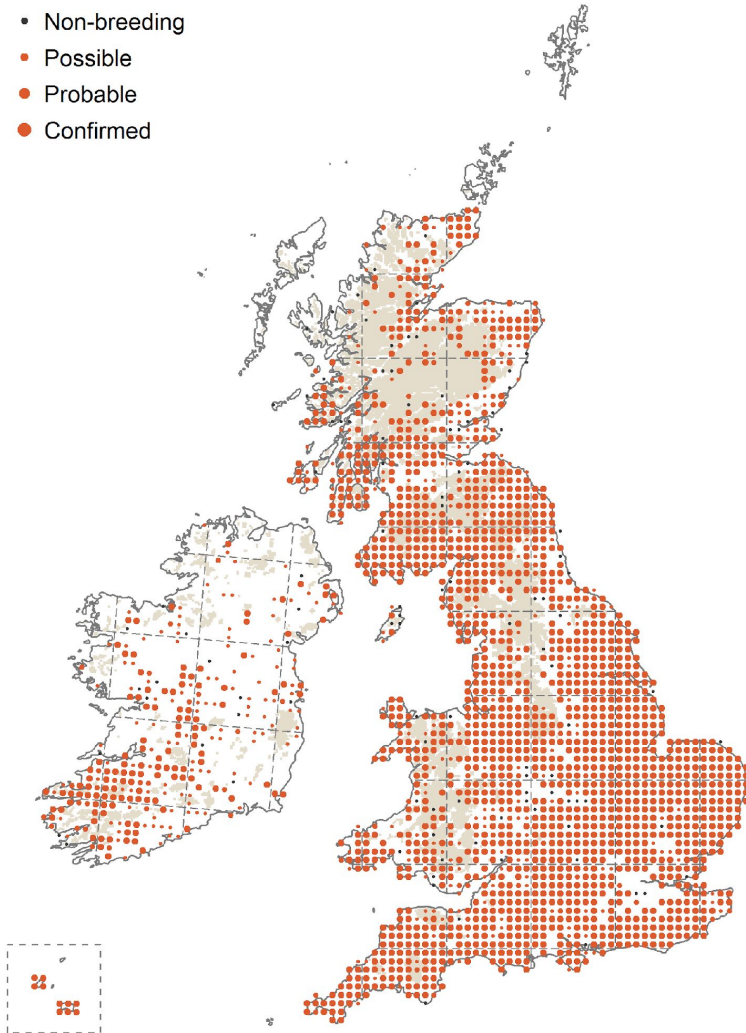
- Decline ascribed to intensification:
 - loss of small scale tillage,
 - switch from hay to silage,
 - removal of hedgerows.
- > 85% of carcasses (2007-2015) had
- Not known if any of the following were:
 - cause of fatalities, or
 - co-incidental to fatalities



The Barn Owl

Breeding Distribution 2008–11

- Non-breeding
- Possible
- Probable
- Confirmed



The Bird Atlas (2007–2011) a joint BTO, BWI & SOC survey, map reproduced with kind permission of the BTO

Wild small mammals and pest rodents as prey of Barn owls



Prey Species as % of diet within Bank Vole Range



- Field Mice, (44.1%), Brown Rat (24.8%) and Bank Voles (18.8%) = 88.7% of diet
- Barn Owl contamination - prey fed on rodenticides
- Stronghold population in SW – may reflect Bank Vole distribution [30-70% of diet] (Earnsworth, K *et al*)

Wild small mammals and pest rodents as prey of Barn owls



Prey Species as % of diet outside Bank Vole Range

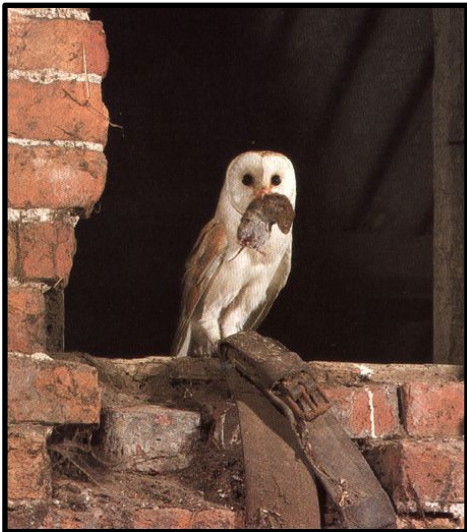


C.M. Small, 1987

- Field Mice, (60.4%), and Brown Rat (23.7%), = 84.1% of diet
- Barn Owl contamination, likely to have resulted from taking prey that has fed on rodenticides

Low-level Residues – Barn Owls

- > 85% of barn owl carcasses had residues, as in the UK, but in Ireland residue content higher (>3x)
- Brodifacoum in 74% of carcasses, flocoumafen in 58% of carcasses
- Difference may be attributed to feeding patterns & rodenticide usage patterns – in Ireland no Field Voles, Bank Voles only common in South West
- Concern that incidence of residues may be increasing
- Less rodenticide contamination in regions where Bank Vole



The Red Kite

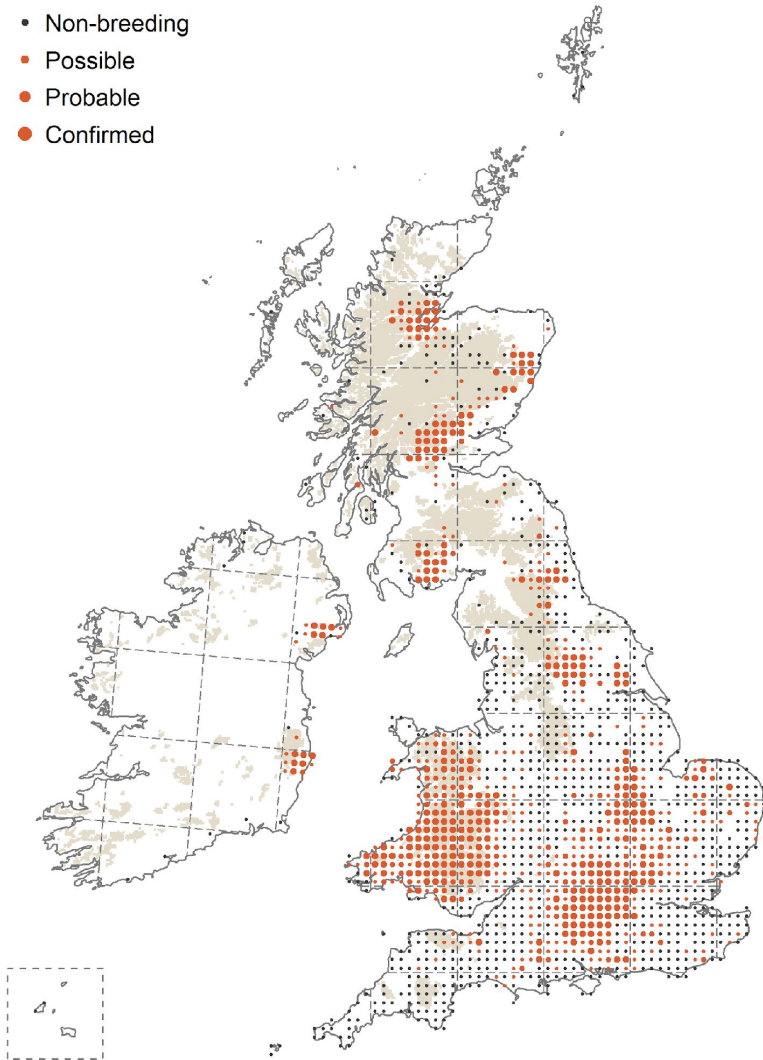
- Wide and varied diet
 - small mammals, birds, young hares & rabbits
 - carrion (including dead rats)
 - earthworms
- **Re-introduction Programme**
 - **Golden Eagle Trust & National Parks & Wildlife Service**
 - **Release sites in Wicklow, North Dublin and Down**



The Red Kite

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Low-level Residues – Red Kites



- Re-introduced to sites in Wicklow, and North Co. Dublin – similar programme in Northern Ireland
- At forefront of recent concern about anticoagulants from conservation bodies
- Deaths of individual birds may impact growth of new colonies
- 14 contained residues of alphachloralose, 13 contained residues of brodifacoum
- Contamination *via* consumption of bodies of rats and mice

Low-level Residues – Kestrels

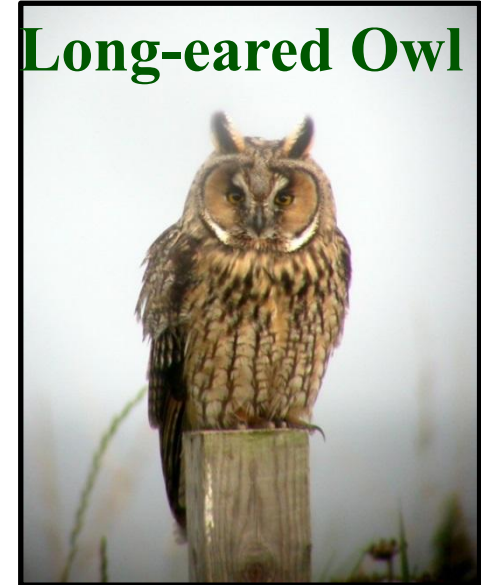


- The Irish Kestrel population may be declining – cause is unknown: Amber-listed Bird of Conservation Concern
- Although evidence is absent, suspicion is turning towards use of anticoagulants among other factors
- 67% of UK Kestrels carry anticoagulant residues
- Contamination *via* target and non-target small mammals
- Other species increasing – Peregrine Falcon, Red Kite, Buzzard

Other raptor species that prey on small mammals and pest rodents



Hen Harrier



Long-eared Owl



Peregrine Falcon

Low-level Residues – Stoats



- University of Bristol study on game estates in UK
- Use of rodenticides likely to be substantial on such estates
- 23% of stoats contaminated (coumatetralyl, bromadiolone, brodifacoum)
- Main route of contamination thought to be *via* non-target rodents and rodenticide use at pheasant rearing pens and feeders

The Pine Marten

***Martes martes* (Pine Marten) (Cat Crainn)**

- Population recovering after significant declines
- Mainly inhabits forests but also found in farmland
- Arboreal, agile climbers with a wide omnivorous diet - includes berries, fruit, small mammals, invertebrates and birds
- Will feed on target and non-target rodents



Summary - Low Level Residues

- Low-level residues of anticoagulants found in variety of species, many of high conservation concern
- Residues occur in a high proportion of populations
- Barn Owl population has declined 40% in last 40 years – SGAR contamination may be linked to the decline
- Diet studies suggest that contamination occurs BOTH from taking non-target small mammals (field mice and voles) AND from taking target rats and mice
- Likely source of contamination is from use of rodenticides
- Use rodenticides responsibly to minimise contamination