Hystrix, (n.s.) 8 (1-2) (1996): 43-53

THE STATUS AND DISTRIBUTION OF MAMMALS IN BRITAIN

ANTHONY J. MTTCHELL-JONES

English Nature, Northminster House, Peterborough PE1 I UA, UK

ABSTRACT – Being an island, Britain has a relatively impoverished native mammal fauna compared with mainland Europe. This has been farther reduced by human activity, though other species have been introduced to raise the total number to 55. The distribution of most species is reasonably well known, but information about status is generally poorer and baseline surveys are still needed for most species. Human activity has strongly influenced the status and distribution of many species, particularly those that are sporting quarry or are considered to cause damage to human interests.

Key words: Britain, Mammals, Distribution, Conservation

INTRODUCTION

The history of mammals in Britain reflects a complete spectrum of human attitudes towards them, ranging from exploitation and persecution to almost complete ignorance. In consequence, our knowledge of historical changes in the status of individual species is extremely variable, though mostly rather poor. The cryptic and often nocturnal habits of most species makes them difficult to study or count, so high-quality data on the absolute abundance of all species are lacking and for many species, our knowledge of their distribution, relative abundance or ecology is still extremely poor.

This lack of knowledge of the status and distribution of mammals is equally acute at the European and world levels, and few data are available to assist in putting Britain's mammals into European or world contexts. Consequently, this review relies to a much greater extent than desirable on informed estimates derived from a variety of sources.

Distribution maps have been published by the Institute of Terrestrial Ecology for all species, using records collected over many years (Arnold, 1993). Data for these maps have come from a variety of sources, including some national surveys, but the majority come from records collected on an opportunistic basis. Just over 155,000 records are now included in this database, with the majority being collected between 1959 and 1988. For species which are widespread, common, easy to observe and not changing in status, these maps probably now reflect their distribution quite accurately, but they are less good for species which are rare, have a limited or changing distribution or are difficult to observe.

For most species, the rate of information collection on an unstructured basis is generally too low to track relatively rapid changes in distribution, as insufficient observations are available to produce separate accurate maps at appropriate intervals.

Such maps are not, therefore, good sources of information about rapid changes in the distribution of species, though they are a fundamental resource for mammalogists.

More detailed surveys have been carried out for a small number of species, though often on a sampling basis. Many of these surveys were primarily structured so as to provide indices of abundance but they also produce distributional data. **As** these surveys have generally been carried out over a short period (one to three years), they form the basis for a system of monitoring changes in gross distribution it' the survey is repeated at suitable intervals.

For a few species, distribution records can be collected as a by-product of other activities. In recent years, the number of records of bats has increased sharply as a result of the consultation requirements of the Wildlife & Countryside Act, so that these maps, once some of the poorest, are now greatly improved. Other potential sources of records include pest control and game-bag records, though both these activities tend to concentrate on species of low conservation significance.

Recently, Harris et al. (1995) have published population estimates for all British mammals. Though valuable, the poor reliability that is attached to the majority of these estimates emphasises the difficulty of obtaining accurate information on the majority of species.

BRITAIN'S MAMMALS

Compared with continental Europe, Britain has a relatively impoverished mammal fauna as several species, such as the garden dormouse *Eliomys quercinus* and the beech marten *Martes foina*, now found on the western edge of the continental mainland, failed to recolonise Britain after the last ice age. However, the number of species found in northern France, Belgium and the Netherlands but not in Britain (Tab. 1) is perhaps less than often supposed. In addition, a number of species have been eliminated completely from Britain by human persecution (wolf *Canis lupus*, bear *Ursus arctos*) or over-exploitation (wild boar *Sus scrofa*, beaver *Castor fiber*) and others have had their natural range substantially reduced (pine marten *Martes martes*, polecat *Mustela putorius,* wildcat *Felis silvestris).*

Table 1 Species occurring in north-west France. Belgium and The Netherlands but not in Britain

Millet's shrew	*Sorex coronatus*	not with *S. araneus*
Bi-coloured white-toothed shrew	*Crocidura leucodon*	
Greater white-toothed shrew	*Crocidura russula*	occurs on Channel Ides
Pond bat	*Myotis dasycneme*	
Geoffroy's hat	*Myotis emarginatus*	a southern species
European **mink**	*Mustela lutreola*	extinct over much of Europe
Beech marten	*Martes foina*	common in western Europe
Common pine vole	*Microtus subterraneus*	a southern and central specie?
Root vole	*Microtus oeconomus*	occurs in Netherlands
Common vole	*Microtus arvalis*	occurs as Orkney vole
Garden dormouse	*Eliomys quercinus*	common in western Europe

In addition, the lesser white-toothed shrew *Crocidura suaveolens* occurs only on the Isles of Scilly but is widespread in Europe. This table does not include species, such as the wild boar, wolf and beaver, that have become extinct in Britain in historic times, nor the fat dormouse *Myoxus glis*, which is protected in Europe but a localised introduction in England.

However, the total number of species has been increased through introductions, both ancient and modern. This makes it difficult to give a definitive figure for the number of mammalian species considered to be present in Britain, but the following are included:

- All extant native species breeding on land.
- Introductions with known current breeding populations maintaining themselves in the wild.

The following are not included:

- Feral species, such as domestic cat *Felis catus*, ferret *Mustela furo* and feral goat *Capra hircus.*
- Escaped pets, such as hamsters *Mesocricetus auratus* and gerbils *Meriones unguiculatus*, which probably cannot maintain themselves in the long term.
- Cetacea. These need separate consideration.

Applying these criteria gives the numbers listed in Tab. 2 and Appendix 1.

Table 2 The total number of mammal species in England, Scotland and Wales, excluding Cetacea, feral species and exotic escapes.

AREA	NUMBER OF SPECIES
Europe (inc. introductions)	235
Great Britain	55
England	53
Scotland	41
Wales	44

A list of all species currently occurring in Britain and considered in this review can be found in Appendix 1. Lists of vagrants and extinct species can be found in later sections.

RANGE

Although the differences between continental and maritime climates complicate the picture, a small number of species occur at or near the normal northern or southern limits of their Palearctic range in Britain. These are shown in Tab. 3. The natural range of the wildcat includes all mainland Britain, but it has been eliminated from England and Wales by human persecution.

Table 3 (a) Mammals reaching the northern or southern edge of their Palaearctic range in Britain or (b) apparently climatically limited within Britain

NORTHERN EDGE	SOUTHERN EDGE
(a)	
Rhinoluphus hipposideros	*Phoca vitulina*
Rhinolophus ferrumequinum	*Halichoerus grypus*
Nyctalus leisleri	*Lepus timidus*
Eptesicus serotinus	
Plecotus austriacus	
Felis silvestris	
(b)	
Myotis mystacinus	
Myotis brandti	
Myotis bechsteini	
Nyctalus noctula	
Barbastella barbastellus	
Apodemus flavicollis	
Micromus minutus	
Muscardinus avellanarius	

In addition, a number of species appear to be climatically limited within Britain as they rarely occur north of the Scottish border despite the fact that they are found at higher latitudes in continental Europe. However, it is sometimes difficult to separate climatic and habitat factors here as northern Britain is dominated by upland areas, which are generally poorer for mammals.

The current distribution of mammals within Britain is influenced by 4 major factors:

Climate: some species appear poorly adapted to Britain's maritime climate with its mild winters and cool summers. Such species are typically confined to the southern or south-eastern part of Britain but may occur further north on the continent. Examples include common dormouse *Muscardinus avellanarius* and harvest mouse *Micromys minutus*.

Altitude: all Britain's mammals except the arctic hare *Lepus timidus* are essentially lowland species. In consequence, their natural distribution tends to be skewed towards England with its higher proportion of lowland. For some species, notably the wildcat, pine marten and red deer *Cervus elaphus*, their natural distribution has been highly modified by human influence, so that populations in the lowlands are either absent or greatly reduced.

Habitat: Most of Britain's mammals are primarily woodland species but have adapted to live in an environment that has been heavily modified by man. In the process, species that are typical of extensive mature deciduous forest, such as Bechstein's bat *Myotis bechsteini*, have become less common whereas more adaptable or less specialised species, such as the pipistrelle *Pipistrellus pipistrellus*, have probably benefited

Human influence. Apart from a major influence as a habitat modifier, man has also affected the status and distribution of many species more directly, resulting in

the extinction of several. Predators, traditional sporting quarry and species with high-quality fur have been particularly affected. For example, the disappearance of the pine marten, polecat and wildcat from much of lowland Britain can be attributed directly to human .persecution during the 19th century, though the pine marten was already rare as a victim of the fur trade (Langley and Yalden, 1977). In earlier times, both the wolf and the bear were eliminated largely because of their perceived threat to domestic stock; the beaver was hunted to extinction for its fur and the wild boar suffered the same fate as a food item, a sporting quarry and a threat to agriculture.

INTERNATIONALLY IMPORTANT POPULATIONS

Determining Britain's internationally important species is difficult as few data are available on the distribution and population sizes of most mammals, so that it is impossible to give estimates for the percentage of the world or European population found in Britain. However, it is believed that Britain's populations of the following species are internationally significant in at least a European context.

Grey seal: Approximately 50% of the world's grey seal population breeds around the British coast. Between 1990 and 1991, the British population showed an overall increase of 9.9% (Anon., 1992)

Otter: Declined or extinct in many western European countries, including Sweden. The British population is now recovering from a crash in the 1950 - 1960s (Strachan et al 1990).

Lesser horseshoe bat: Extinct or very rare in Germany, Netherlands, Belgium and Poland. The British Isles have the most northerly European populations. The populations in England and Wales appear to be stable or increasing.

Natterer's bat: England has one of the largest hibernation sites for this species in Europe (Stebbings, 1993).

VAGRANTS **AND** EXTINCTIONS

Except for Cetaceans, the only truly vagrant mammals are seals and bats. A number of species have been recorded and are shown in Tab. 4.

Table 4 Vagrants recorded in England since 1900.

Harp seal	*Phoca groenlandica*	migratory. breeds on ice
Ringed seal	*Phoca hispida*	
Hooded seal	*Cystophora cristata*	solitary, ice breeder
Walrus	*Odobenus rosmarus*	northern distribution
Mouse-eared bat	*Myotis myotis*	see also extinctions
Particoloured bat	*Vespertilio murinus*	migratory European species
Northern bat	*Eptesicus nilssoni*	single record. northern species
Nathusius pipistrelle	*Pipistrellus nathusii*	migratory, may colonise England'?
Savi's pipistrelle	*Pipistrellus savii*	single record, southern **sp.**

In addition, there is an intriguing record of six garden dormice being killed by a cat in Dover in 1991. This species has also been recorded as a subfossil from a Roman site in York and could conceivably be native to Britain. It is a widespread species in Europe which could well colonise England if given the opportunity.

Extinct mammals have already been referred to in earlier sections. Those becoming extinct in historic times are listed in Tab. 5, together with the century or year of their last known occurrence in the wild in Britain (Clutton-Brock, 1991).

Table 5 Native mammal extinctions in Britain in historic times, with century or date of extinction

SPECIES	DATE	NOTES
Garden dormouse	?	widespread in Europe. Roman York record.
Aurochs	1C	extinct
Brown bear	10C	threatened in Europe
Beaver	16C	last record from Scotland; rare in W. Europe
Wild boar	13C	still widespread in western Europe
Wolf	18C	last record from Scotland. threatened in Europe
Mouse-eared bat	1991	first records from 1950s; failed colonisation'!

INTRODUCTIONS, ANCIENT AND MODERN

Britain has a long history of mammal introductions and reintroductions. Some species are now so well established that they have reached an ecological balance whilst other more recent introductions may still be spreading or interacting with native species. Differentiating between the two groups **is** difficult, but the end of the 19th century is often taken as a convenient division. Using this criterion, the black rat, rabbit, fallow deer and brown rat could be considered **as** fully naturalised whilst the remaining species listed in Tab. 6 are still in the process of establishment.

The origins of the brown hare are the subject of some speculation. Although traditionally considered to be a native species, there are no records of its occurrence in Britain before Roman times (Tapper, 1991), which is surprising considering its value as a food item. However, whether native or ancient introduction, the brown hare must now be considered a fully integrated member of our mammalian fauna.

The black rat, a Roman or Mediaeval introduction, was the only *Rattus* species in Britain until the introduction of the brown rat in the 18th century. The latter, which has a more northern distribution, has now almost completely replaced the black rat, which survives only in buildings in a few ports.

As well as the species referred to above, there have been many other escapes and attempted introductions or reintroductions. During this century, two species of rodents, the musk rat *Ondatra zibethicus* and the coypu *Myocastor coypus,* both became established as the result of escapes from fur farms but were later exterminated by coordinated campaigns by the Ministry of Agriculture.

Table 6 Introductions, deliberate and accidental, of wild matnmals to England which have persisted for more than 50 years.

SPECIES	DATE OF INTRODUCTION	CURRENT STATUS
House mouse	Neolithic	ubiquitous
Ship rat	Viking	largely replaced by the brown rat
Brown hare	Norman?	ubiquitous, possibly native
Rabbit	Norman	ubiquitous
Fallow deer	Norman	well-established
Brown rat	18th C.	now the common rat species
Sika deer	1860-1920	spreading; hybridizes with red deer in some places
Grey squirrel	1876-1920	spreading; replacing red squirrel in most areas
Mountain hare	1880	native to Scotland
Muntjac	1900-1937	spreading fast
Fat dormouse	1902	spreading very slowly
Coypu	1929-	now extirpated
American mink	1929-	spreading fast
Chinese water deer	1930-	spreading slowly
Red-necked wallaby	1940	close to extinction?

A number of feral species also occur in the wild in England. These are the ferret *Mustela furo,* the feral goat *Cnpra hircus* and the domestic cat *Felis catus*. Of these, the feral goat is probably the best established, with populations persisting since the 19th century. The current status of the feral ferret is uncertain, though it is certain that this species (if it is such) has interbred with the polecat. The feral cat is believed to be widespread, though the definition of feral here is difficult as many cats become 'feral' for part of their lives but rely partly or wholly on humans at other times.

DECLINING SPECIES

Although good data are lacking for most species, there is evidence that some species are declining in numbers. The majority of these (mostly bats) are already legally protected, but a few species are unprotected and may require some conservation action in the near future. Species where there is reasonable evidence for a current decline or a decline in the recent past are shown in Tab. 7. For some rare species, such as Bechstein's bat or barbastelle, there are insufficient records to reach any conclusion about their past and current status.

Although the ship rat is probably one of England's most endangered mammals, it would be difficult to justify any conservation action for a species which is perceived as a pest and which, in any case, appears to survive only within buildings and with occasional 'topping up' from ships.

Table 7 Species in England which are believed to be declining or have declined in recent times (native and naturalised).

SPECIES	STATUS IN ENGLAND
Hedgehog	Declining, still widespread
Greater horseshoe bat	Declined, declining, rare
Lesser horseshoe bat	Declined, rare
Whiskered bat	Declined, declining
Natterer's bat	Declining
Serotine	Declining?, restricted distribution
Noctule	Declined, declining?. widespread
Pipistrelle	Declining?, most common hat species
Brown long-eared bat	Declining?, 2nd most common bat species
Brown hare	Slow decline, widespread
Harvest mouse	Declining?, widespread
Field vole	Declining?, widespread
Red squirrel	Disappeared from much of England
Water vole	Declined, declining
Ship rat	Virtually extinct on mainland Britain
Common dormouse	Declined
Pine marten	Declined, virtually extinct
Otter	Declined, increasing
Common seal	Declined, increasing
Grey seal	Declined, increasing

DISCUSSION

Although the distribution and status of Britain's mammals is probably reasonably well-known by European standards, there is still a considerable lack of information, especially when they are compared with the birds, probably the best studied vertebrate group. For most species, there is very little information about abundance and population changes, so statements about status are often made on the basis of informed opinion rather than scientific study (Harris et al., 1995). In this respect, the recent national badger survey (Cresswell et al, 1990) is exceptional as it enabled an estimate of the total number of badgers to be made, based on extrapolation from a national sample survey. Similar sampling surveys of otter (Lenton et al, 1980; Strachan et al 1990), water vole (Strachan and Jefferies, 1993), pine marten, brown hare and bats have been carried out or are being completed, but the structure of these does not permit the calculation of absolute abundance. Nevertheless, such surveys provide an index of relative abundance and thus a mechanism for determining changes in relative abundance over time, which is the primary requirement for any scientifically-based conservation programme. Further surveys of this type are urgently required to provide baseline indices of abundance against which further changes can be measured.

REFERENCES

Anonymous, 1992. Report of the Sea Mammal Research Unit 1990-1992. NERC, Swindon

Arnold, H.R., 1993. Atlas of mammals in Britain. HMSO, London.

Cresswell, P., Harris, S. and Jefferies, D. J., 1990. The history, distribution, status and habitat requirements of the badger in Britain. Nature Conservancy Council, Peterborough

Clutton-Brock, J., 1991. Extinct species. in The handbook of British mammals, G B Cbrbet and S Harris (Eds.) Blackwell Scientific.

Harris, S., Morris, P., Wray, S. and Yalden, D., 1995. **A** review of British mammals: population estimates and conservation status of British mammals other than cetaceans. Joint Nature Conservation Committee, Peterborough, UK: 168 pp.

Langley, P.J.W. and Yalden, D. W., 1977. The decline of the rarer carnivores in Great Britain during the nineteenth century. Mammal Review **7:**95-116

Lenton, E.J., Chanin, P.R.F. and Jefferies, D. J., 1980. Otter survey of England 1977-79. Nature Conservancy Council, London.

Stebbings, R.E., 1993. The Greywell Tunnel: an internationally important site for bats. English Nature, Newbury.

Strachan, R., Birks, J. D. S., Chanin, P.R.F. and Jefferies, D. J., 1990. Otter survey of England 1984-1986. Nature Conservancy Council, Peterborough.

Strachan, R. and Jefferies, D. J., 1993. The water vole *Awicola terrestris* in Britain 1989-1990: its distribution and changing status. Vincent Wildlife Trust, London.

Tapper, S. C., 1991. Brown hare (*Lepus europaeus*) in The handbook of British mammals, G B Corbet and S Harris (Eds.) Blackwell Scientific.

Appendix 1: Mammals in Britain

SPECIES		STATUS IN BRITAIN	PRESENT IN ENG	SCOT	WALES
MARSUPIALIA					
Red-necked wallaby	*Macropus rufogriseus*	rare,introd 20C	Y	Y	
INSECTIVORA					
Hedgehog	*Erinaceus europaeus*	very common	Y	Y	Y
Mole	*Talpa europaea*	very common	Y	Y	Y
Common shrew	*Sorex araneus*	very common	Y	Y	Y
Pygmy shrew	*Sorex minutus*	very common	Y	Y	Y
Water shrew	*Neomys fodiens*	common	Y	Y	Y
Lesser white-toothed shrew	***Crot**idura suavolens*	locally common (island)	y		
CHIROPTERA					
Greater horseshoe bat	*Rhinolophus ferrumequinum*	rare. endangered	y		Y
Lesser horseshoe bat	*Rhinolophus hipposideros*	rare. endangered	y		Y
Whiskered bat	*Myotis mystacinus*	widespread, vulnerable	y	y	y
Brandt's bat	*Myotis brandtii*	widespread, vulnerable	y	y	y
Natterer's bat	*Myotis nattereri*	widespread, vulnerable	y	y	y
Bechstein's bat	*Myotis bechsteinii*	very rare, endangered	y		
Daubenton's bat	*Myotis dnubentoni*	widespread, vulnerable	y	y	y
Serotine	*Eptesicus serotinus*	local, vulnerable	Y		Y
Leisler's bat	*Nyctalus leisleri*	rare, vulnerable	Y	Y	Y
Noctule	*Nyctalus noctula*	common. vulnerable	Y	Y	Y
Pipistrelle	*Pipistrellus* ***pipistrellus***	very common, vulnerable	y	y	y
Barbaatelle	*Barbastella barbastellus*	very rare, endangered	y		Y
Brown long-eared bat	*Plecotus auritus*	common, vulnerable	y	Y	Y
Grey long-eared bat	*Plecotus austriacus*	very rare, endangered'!		Y	
LAGOMORPHA					
Rabbit	*Oryctolagus cuniculus*	very common, introd 11C	y	y	y
Brown hare	*Lepus europaeus*	common. introd'!	y	Y	Y
Mountain hare	*Lepus timidus*	locally common, introd 19C	y	y	
RODENTIA					
Red squirrel	*Sciurus vulgaris*	local, vulnerable	y	y	y
Grey squirrel	*Sciurus carolinensis*	common, spreading, introd 19C	Y	Y	Y
Bank vole	*Clethrionomys glareolus*	very common	Y	Y	Y
Field vole	*Microtus agrestis*	very common	Y	Y	Y
Orkney Vole	*Microtus arvalis*	locally common (island)			Y
Water vole	***A**rvicola terrestris*	locally common. vulnerable	Y	Y	Y
Wood mouse	*Apodemus sylvaticus*	very common	Y	Y	Y
Yellow-necked mouse	*Apodemus flavicollis*	locally common	Y		Y
Harvest mouse	*Micromys minutus*	locally common	v		Y
House mouse	*Mus domesticus*	common	Y	Y	Y
Ship rat	*Rattus rattus*	commensal, endangered. introd 1C	Y	Y	
Brown rat	*Rattus nowegicus*	common, introd 18C	Y	Y	Y
Fat dormouse	*Myoxus glis*	local, introd 20C		Y	
Common dormouse	*Muscardinus avellanarius*	uncommon, vulnerable	Y		Y
CARNIVORA					
Fox	*Vulpes vulpes*	common	Y	Y	Y
Pine marten	*Martes martes*	uncommon, vulnerable	y	y	y
Stoat	*Mustela erminea*	common	Y	Y	Y

Weasel	*Mustela nivalis*	common	Y	Y	Y
Polecat	*Mustela putorius*	locally common. spreading	Y		Y
Badger	*Meles meles*	common	Y	Y	Y
Otter	*Lutra lutra*	uncommon, spreading, vulnerable	y	y	y
Mink	*Mustela vison*	common. spreading, introd 20C	Y	Y	Y
Wildcat	*Felis silvestris*	local. uncommon		Y	
PINNIPEDA					
Common seal	*Phocn vitulina*	locally common	Y	Y	Y
Grey seal	*Halichoerus gryphus*	locally common	Y	Y	Y
ARTIODACTYLA					
Red deer	*Cervus elaphus*	common	Y	Y	Y
Sika deer	*Cervus nippon*	locally common, introd 20C	Y	Y	
Fallow deer	*Dama dama*	locally common, introd 12C	Y	Y	Y
Roe deer	*Capreolus capreolus*	common, spreading	Y	Y	Y
Muntjac	*Muntiacus reevesi*	common, spreading, introd 20C	Y		Y
Chinese water deer	*Hydropotes inermis*	local, introd *20C*		Y	
COUNTRY **TOTALS**			53	41	44

TOTAL **SPECIES** = 55