

Brown hare

The brown hare *Lepus europaeus* is one of the best-known British farmland mammals. It can weigh up to 4 kg, this more than twice that of a rabbit. Brown hares have distinctly long, black-tipped ears and a 'tall and leggy' appearance that gives them a distinctive loping gait when running fast. The tail is held down when running so that the black dorsal surface is visible.

Key points

- Brown hares are more common in eastern counties, and on arable farms.
- Their population seem to be stable, but the BAP target is to double their number by 2010.
- They prefer a mix of arable and grassland fields (and some woodland) a mixture of vegetation height, and some large uniform fields.
- Of the Entry Level Scheme options, over-wintered stubbles are most likely to benefit brown hares.

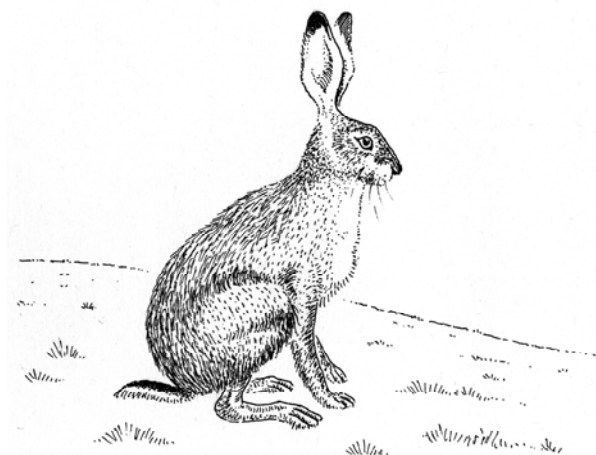
Biology and distribution

The origins of the brown hare are the subject of some speculation. Although traditionally considered to be a native species or introduced by the Romans, there are no records of its occurrence in Britain before Norman times, which is surprising considering its value as a food item. However, whether native or an ancient introduction, the brown hare must now be considered a fully integrated member of our mammalian fauna. They are widespread on low ground throughout England, Wales and Scotland, with arable farmland being their favoured habitat. In upland areas of Scotland and in the Peak District of England, they are replaced by the smaller mountain hare *Lepus timidus*.

Behaviour and feeding

Brown hares are mainly nocturnal, preferring to feed at night in open countryside with short vegetation. Young grasses, herbs and arable crops form the bulk of their diet. During the day they lie up in shallow depressions called forms,

in vegetation or in ploughed fields, keeping very still and relying on their cryptic colouration to avoid being seen by predators. They often use woodland for day-time shelter in winter. While in their forms they digest the previous night's forage by the re-ingestion of soft droppings. Hard droppings, the contents of which have been digested twice, are produced at night.



Brown hare by Alan Britton

Breeding

Mating and breeding can take place almost all year round and the familiar boxing and chasing occur throughout the breeding season, but are most easily seen in March and April. Most boxing is actually a doe fighting off the unwanted sexual advances of a buck. When a doe is ready to mate she allows a buck to approach and mate with her. The gestation period is approximately 42 days. About three litters are born each year to each doe, usually between February and October. Litter sizes

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range from one, early and late in the season, to four at the peak of the season. Unlike young rabbits, young brown hares, known as leverets, are born fully-furred and active. A few hours after giving birth, the doe moves away from her offspring and thereafter visits them only to suckle. Leverets gradually disperse from their birthplace but meet up there each night after sunset to await the doe. She visits to feed them for only a few minutes each day. Leverets start eating grass and other vegetation about 12 days after birth and are weaned at around 30 days.

Breeding success is partially dependent on summer weather, with poorer survival in cold and wet conditions. Average life expectancy is approximately three years.

Causes of death

Brown hares are subject to a range of diseases and parasites, but are not affected by myxomatosis. They are killed on roads, and by farm machinery, particularly during grass cutting operations. Around 300,000 brown hares are shot each year in Britain, principally in the arable east. Brown hares have also been hunted with beagles and coursed with greyhounds. However, most use of dogs to hunt hares, and all hare coursing, is prohibited by the Hunting Act 2004. Although birds of prey frequently take leverets, the main natural predator of adult and juvenile brown hares is the fox.

Population

Although still considered to be abundant, declining numbers of brown hares recorded in game bags in the 1960s and 1970s in Britain and elsewhere in Europe led to concerns about the status of their populations and impact of agricultural intensification and a decline in mixed cropping. Brown hares are now much more common in the eastern half of the country, where farming has become predominantly arable, than in the pastoral west.

Legislation and status

Biodiversity Action Plan (BAP) species

As a common species that has declined significantly in abundance during the last one hundred years, the brown hare has a UK

Biodiversity Action Plan (BAP) - published in 1995. The two objectives of the plan for the brown hare are to (i) maintain existing population, and (ii) expand existing populations, doubling spring numbers in Britain by 2010. There were estimated to be between 817,500 and 1,250,000 brown hares in Britain (BAP 1995). Since then, numbers have remained relatively stable. However, we are still a long way from attaining the more ambitious goal of doubling numbers by the end of the decade. Add link to relevant UK BAP page

As part of its contribution to the achievement of the BAP target for the brown hare, Defra has funded research into the ecology of the brown hare in lowland farmland. Recent research at the Universities of Bristol and York has contributed to the guidelines for the management of the brown hare in lowland farmland.

Protection

There is no closed season for brown hares. The Hare Preservation Act 1892 provides limited protection by forbidding the sale of adult brown hares or leverets during their main breeding period. This is specified in the Act as being between 1 March and 31 July, inclusive. Furthermore, the Game Act 1831 makes it an offence for any person to kill or take any game (including hares) on a Sunday or Christmas Day.

Under the Ground Game Act 1880, tenant farmers have the statutory right to kill brown hares and rabbits (ground game) on their land at any time of year. Under the same legislation, as amended by the Ground Game (Amendment) Act 1906, occupiers or authorised persons may only take and kill brown hares (and other ground game) on moorland or unenclosed land between 1 September and 31 March inclusive. Detached portions of moorlands and unenclosed lands adjoining arable lands are not included where the land in question is less than 25 acres (10 hectares).

The use of self-locking snares, bows, crossbows, explosives (other than firearms ammunition) and live decoys against brown hares is strictly prohibited. Free-running snares are permitted subject to the requirement that the

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snare is checked at least once a day. While the Pests Act 1954 provides for the use of approved spring traps for brown hares, no such traps are currently approved. The use of poisons against brown hares is prohibited.

Mutilating, kicking, beating, nailing or otherwise impaling, stabbing, burning, stoning, crushing, drowning, dragging or asphyxiating brown hares, or other mammals, with intent to inflict unnecessary suffering are offences under the Wild Mammals (Protection) Act 1996.

The Hunting Act 2004 outlaws all hare coursing and prohibits all hunting of wild mammals with dogs in England and Wales, except where it is carried out in accordance with the conditions of the few tightly drawn exemptions intended to allow certain necessary pest control activities to continue. These exemptions, which require the consent of the occupier or owner of the land, include:

- Stalking and flushing out with up to two dogs, provided that the wild mammal is shot as soon as possible after it is flushed from cover.
- Using dogs to retrieve a hare which has been shot.
- Using up to two dogs to search for an injured animal, provided that appropriate action is taken to relieve the animal of its suffering as soon as possible after it is found and that it was not deliberately injured in order for it to be hunted under this exemption.
- All the specific conditions of each exemption must be complied with if the hunting is to be lawful.

Problems

Problems with brown hares fall into two categories:

- The possible decline in brown hare numbers.
- Damage to agricultural, horticultural and forestry crops.

Solutions

Managing farmland for the benefit of brown hares

The ideal farmland for brown hares should have:

- A mixture of arable and grassland fields and woodland.
- A mixture of tall and short vegetation.
- Some large uniform fields.

On mainly arable farms, brown hares thrive where there is:

- Some wheat.
- Some beet.
- Some set-aside or other fallow land.
- Some grassland.

On mainly pastoral farms, brown hares benefit from:

- Some woodland (but not large areas).
- Some improved grass.
- Some fields without livestock in the autumn and winter.
- Some arable crops (particularly wheat and beet).

Before making changes to farmland management you should consider the effect on other wildlife. The provision of set-aside, other fallow land and woodland also benefits many other mammals, birds, invertebrates, and plants. However, you may want to consider the following:

- Avoid removing hedgerows to create larger fields (Hedgerow Regulations may apply).
- Avoid damaging unimproved grassland by ploughing or otherwise improving it, or by planting woodland on it (an Environmental Impact Assessment will be needed).
- Consider breaking up large blocks of cereals – mown grass strips running across fields will provide summer grazing for brown hares. These may be safer for brown hares than ones next to hedgerows where predators can hide.
- Beetle banks may provide cover for brown hares.
- Use set-aside to create wildlife habitat. 20 metre wide strips are ideal if planted up with wild bird cover. Not only does this benefit brown hares but also songbirds and game birds.

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- Planting game cover and wild bird seed crops will also provide cover and food for brown hares.
- On livestock farms, try to leave some areas uncut and ungrazed for leverets to hide in.
- When making silage, cut the field from the centre outwards rather than from the outside in, thereby allowing brown hares (and a range of other species) to escape into neighbouring fields.
- Only shoot brown hares in late winter and during their breeding season if it is really necessary to prevent significant crop damage.

The new Environmental Stewardship scheme which has replaced the Countryside Stewardship scheme and Environmentally Sensitive Areas has various options that may directly or indirectly benefit brown hares.

Under Entry Level Stewardship (ELS) the following options may benefit brown hares:

Options for buffer strips and field margins

- EE01-03 2, 4 and 6 metre buffer strips on cultivated land
- EE04-06 2, 4 and 6 metre buffer strips on intensive grassland

Options for arable land

- EF01 field corner management
- EF02 wild bird seed mixture
- EF03 wild bird seed mixture on set-aside land
- EF06 over-wintered stubbles
- EF07 beetle banks
- EF08 skylark plots
- EF09 conservation headlands in cereal fields
- EF10 conservation headlands in cereal fields with no fertilizer
- EF11 6 metre uncropped, cultivated margins on arable land

Options to encourage a range of crop types

- EG01 under sown spring cereals
- EG02 wild bird seed mixture in grassland areas
- EG04 cereals for whole crop silage followed by over-wintered stubbles

- EG05 brassica fodder crops followed by over-wintered stubbles

Options for lowland grassland outside the LFA

- EK01 take field corners out of management
- EK02-03 manage permanent grassland with low and very low inputs

Options for the Uplands (LFA Land)

- EL01 field corners management
- EL02-03 manage permanent in by grassland with low and very low inputs

Of the above, the over-wintered stubble options are likely to have the most benefit for brown hares. A similar range of options are available for the **Organic Entry Level Stewardship** (OELS) which replaces the Organic Farming Scheme. Some options are also available under **Higher Level Stewardship** (HLS). These include:

Arable options

- HE10 floristically enhanced grass margins
- HF12 enhanced wild bird seed mix plots
- HF13 fallow plots for ground-nesting birds
- HF14 unharvested, fertilizer-free conservation headlands (rotational)
- HF15 reduced herbicide, cereal crop management preceding over-wintered stubble and a spring crop (rotational)
- HF16 cultivated fallow plots for ground-nesting birds as an enhanced set-aside option
- HF17 fallow plots for ground-nesting birds as an enhanced set-aside option
- HF18 reduced herbicide, cereal crop management preceding enhanced set-aside (rotational)
- HF19 un-harvested, fertilizer-free conservation headlands preceding enhanced set-aside
- HG06 fodder crop management to retain or re-create an arable mosaic (rotational)
- HG07 low input spring cereal to retain or re-create and arable mosaic

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Lowland grassland options

- HK06-08 maintenance, restoration or creation of species-rich, semi-natural grassland
- HK15-17 maintenance, restoration or creation of semi-improved or rough grassland for target species

Controlling brown hare numbers

If brown hare numbers need to be controlled, the recommended, and most widely used, method is shooting. Shooting is also the principal method for hunting brown hares as a quarry species. As noted above, most hunting of hares with dogs is prohibited by the Hunting Act 2004.

Questions and answers about brown hares

1. Are numbers of brown hares still declining?

Not known. Brown hares are decreasing on 42 per cent of farms and increasing on 22 per cent. Farms that are mainly arable are the most likely to have increasing numbers of brown hares.

2. Are brown hares more common in arable or pastoral farmland?

Arable. Brown hares are seen much more frequently on farms that are mainly or completely arable than on pastoral farms. They are also particularly common in areas where fields are large.

3. Do brown hares in arable farmland have more leverets than hares in pastoral farmland?

Maybe. So far there is no real evidence for any difference in litter sizes or numbers of litters between the two types of farmland, but more research is needed in this area.

4. Do leverets have a lower chance of survival in pastoral farmland than in arable farmland?

Probably. Adult does in pastoral farmland are less likely to be producing milk than those in arable areas. This suggests that, either the survival of leverets is lower in pastoral than in arable farmland, or that does in pastoral areas suckle their young for shorter periods of time,

which is also likely to result in the reduced survival of leverets.

5. Why are brown hares in arable farmland able to breed more successfully than those in pastoral farmland?

Brown hares in arable farmland are able to breed more successfully because they are in better condition. They are bigger, fatter and heavier than brown hares from pastoral farmland.

6. Are brown hares in arable farmland in better condition because they have a better diet?

No. There is no evidence to suggest that brown hares in arable farmland are able to obtain a better quality diet than those in pastoral farmland. Brown hares in pastoral areas live in relatively small areas of farmland (10 to 70 hectares, mean 'home range' 34 hectares), and are able to find all the food they need there. It seems that those in pastoral areas are unable to maintain good body condition because they are using up more energy. This may be a result of having to move around more because they are disturbed more often by predators or humans, or they may be experiencing poorer climatic conditions (most pastoral farmland in the west is wetter than arable farmland in the east).

7. Do brown hares in arable farmland live longer than those in pastoral farmland?

No. The average lifespan for brown hares in arable farmland is about 2.7 years for arable land class 'a', 2.5 years for arable land class 'b' and 2.5 years in pastoral farmland.

8. Can the structure of the farmland habitat help reduce predation by foxes?

Yes. Features of the habitat may help brown hares avoid being caught by foxes. Higher numbers of brown hares in farmland are associated with larger fields and cover, in the form of fallow land or woodland.

9. Does the presence of livestock in grassland make a difference to brown hares?

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Yes. Active and inactive hares select pasture grazed by cattle and fallow land in preference to arable crops throughout the year, except during the winter when crops were suitable as forage. Sheep pasture is one of the least selected habitats as sheep grazing produces a short turf that is unsuitable for brown hares to lie up in.

10. Do brown hares use different habitats at different times of the year?

Yes and no. Brown hares select cattle pasture at all times of year. They select habitats with taller vegetation during the spring and summer. The main conclusion is that they select habitat for heterogeneity (variation) both within and between fields.

11. Are brown hare numbers in pastoral habitats limited by the nutritional quality of their habitat?

No. Brown hares do not select habitats of high nutritional quality over those of low nutritional quality. The pastoral habitat is fairly stable in terms of nutritional quality through the year, suggesting that hare populations are not limited by forage quality.

Grant schemes

If you carry out farmland management to benefit brown hares, you may be eligible for a grant.

The following schemes are available under the Defra England Rural Development Programme:

- Energy Crops scheme.
- Environmental Stewardship scheme.

For further information and local contact details, contact the Defra Helpline on 08459 335577 or email helpline@defra.gsi.gov.uk.

The Forestry Commission's Woodland Regeneration Grant and English Woodland Grant Scheme help fund the planting of woodlands on farmland. For details telephone 01223 346004. Forestry Commission Grants and Licences.

Further information

Other sources of information

The following organisations are able to offer advice on managing farmland for brown hares and other wildlife. They may also be able to offer help in applying for grants. They are lead partners in the BAP for the brown hare.

The Game Conservancy Trust, Address: Fordingbridge, Hampshire, SP6 1EF. Tel: 01425 652381 Web: www.gct.org.uk Email: info@gct.org.uk

The Mammal Society, Address: 2B Inworth Street, London, SW11 3EP. Tel: 020 7350 2200 Web: www.mammal.org.uk Email: enquiries@mammal.org.uk.

Further reading

ANON. 1995. *Biodiversity: the UK action plan*. London: HMSO.

CORBET, G.B. & HARRIS, S. 1991. *Handbook of British mammals (3rd edition)*. Oxford: Blackwell.

HUTCHINGS, M.R. & HARRIS, S. 1996. *The current status of the brown hare *Lepus europaeus* in Britain*. Peterborough: JNCC.

Mammal Society Fact sheet on the brown hare [Online]. URL: www.abdn.ac.uk/mammal/brown_hare.shtml [Accessed 17 May 2007].

PARKES, C AND THORNLEY, J. 1987. (revised 1997). *Fair Game. The Law of Country Sports and the Protection of Wildlife*. London: Pelham Books.

SMITH, R.K., VAUGHAN JENNINGS, N. AND HARRIS, S. 2005. A quantitative analysis of the abundance and demography of European Hares *Lepus europaeus* in relation to habitat type, intensity of agriculture and climate. *Mammal Review*. 35(1), 1-24

SMITH, R.K., VAUGHAN JENNINGS, N., ROBINSON, A. AND HARRIS, S. 2004. Conservation of European hares *Lepus europaeus* in Britain: is increasing habitat

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heterogeneity in farmland the answer? *Journal of Applied Ecology*. 41, 1092-1102.

TAPPER, S. & HOBSON, D. 2002. *Conserving the brown hare*. Fordingbridge: Game Conservancy Trust. URL: www.gct.org.uk/brownhare [Accessed 17 May 2007].

TAPPER, S. 1987. *The brown hare*. Aylesbury: Shire Publications Ltd.

Information on the University of Bristol's Mammal Research Unit [Online]. URL: www.bio.bris.ac.uk/research/mammal/index.html [Accessed 17 May 2007].

VAUGHAN, N., LUCAS, E.A., HARRIS, S., AND WHITE, P. 2003. Habitat associations of European hares *Lepus europaeus* in England and Wales: implications for farmland management. *Journal of Applied Ecology*. 40, 163-175.

More details about the work described in this leaflet, including information about scientific publications relating to this research, can be obtained from the Mammal Research Unit, School of Biological Sciences, University of

Bristol, Woodland Road, Bristol BS8 1UG, UK. Tel: 0117 9287593.

The full text of the Hunting Act 2004 can be obtained from The Stationery Office, Tel 0870 6005522, or from the HMSO website: www.hmso.gov.uk/legislation/uk.htm

In addition, a leaflet about the Act and a short summary of its provisions are available from the Defra website www.defra.gov.uk or the Defra publication centre Tel: 0845 9556000.

Natural England contact details

The National Programme Delivery Wildlife Management & Licensing Service:

Address: Wildlife Licensing Unit, Natural England, Burghill Road, Westbury-on-Trym, Bristol BS10 6NJ.
Telephone: 0845 6014523
E-mail: wildlife@naturalengland.org.uk

This leaflet is based on the Brown Hare Technical Advice Note produced by the Defra Rural Development Service (RDS) with contributions from Nancy Vaughan Jennings of Bristol University.