

# Conserving the brown hare



A practical guide produced by  
The Game Conservancy Trust  
for farmers, landowners and local  
Biodiversity Action Plan Groups  
[www.gct.org.uk](http://www.gct.org.uk)

Kindly sponsored by



THE GAME  
CONSERVANCY  
TRUST

# An animal of the open country

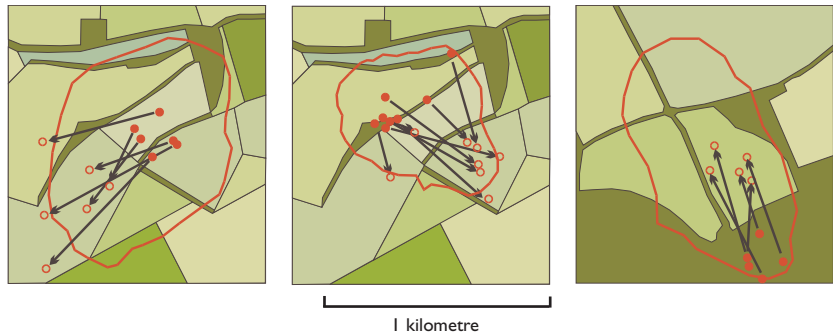


Brown hares came to Britain during or slightly earlier than Roman times. (Laurie Campbell)

The brown hare's origins in the British countryside are obscure, but palaeontology suggests that it was not in our native fauna at the end of the ice age while the land bridge to the continent was connected. At that time our hares were mountain hares, a species now largely confined to the highlands of Scotland. The brown hare did not appear until the Roman times or perhaps a little earlier (2000 years ago)<sup>1</sup> by which time much of the lowlands were already being farmed. It is even possible that the Romans introduced hares, for sport-coursing was a popular form of hare hunting in Roman Gaul at this time.

Hares like the open country, and in western Europe arable farmland is their natural habitat. Originally they evolved on the grassland steppe of central Asia and spread west as early Neolithic man cleared the primeval deciduous forest.

Hares are mainly nocturnal animals moving over wide areas to graze on young grasses, cereals and herbs<sup>2</sup>. They feed at night and mainly rest during the day while they digest the previous night's forage.

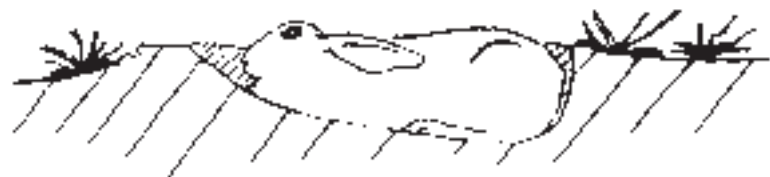


The ecology of hares on open farmland. Three hares on a Hampshire farm showing the core areas of their home ranges (red line) and some typical daily movements between day-time resting areas (solid red circles) and night-time grazing area (open red circles)<sup>5</sup>. The dark green habitat represents woodland and other colours arable and grass fields. Hares often use nearby woodland for day-time shelter in winter.

Living in the open, hares are potentially exposed to predators like foxes. To protect themselves they depend on cryptic colouration and remaining still - often in shallow depressions (or 'forms') in the ground. Hares have huge eyes and ears and can usually detect predators long before they are seen themselves. Hares rely on running fast to put distance between themselves and danger.

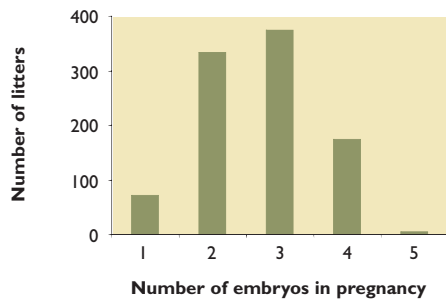


Mountain hares are smaller than brown hares, have grey fur which goes white in winter and have shorter legs and ears. Mountain hares inhabit the heather moors of Scotland and there is a small population in the English Peak District. (Laurie Campbell)



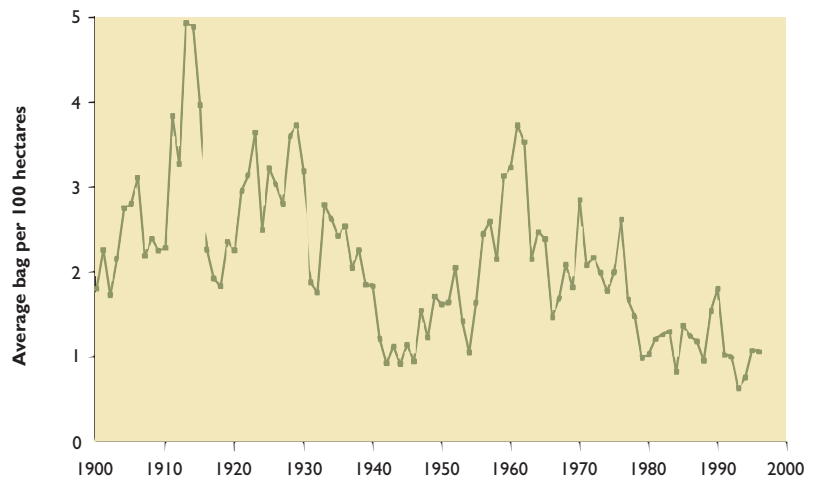
A brown hare in its shallow form has most of its body concealed below ground level. Hares can be completely inconspicuous in the shortest of arable crops when they are dug into their forms in this way.

# The hare's changing fortunes



Numbers of embryos per pregnancy (litter size) of hares culled in Scotland between 1960-73. Most females have two or three young per pregnancy<sup>3</sup> A pregnancy lasts 43 days and most young are weaned after another 30 days.

Hares can be prolific breeders and may become pregnant as early as February. A female can produce three or even four litters of three or more leverets a year until September. At birth the female leaves her young together in the open but over the following days they move apart so they are usually found singly<sup>4</sup>. After sunset the female returns to their birth place and suckles them for a few minutes. One visit per day is all the youngsters get from birth until they are fully weaned.



Trend in the numbers of brown hares shot from a sample of English estates during the 20th century. Data from The Game Conservancy Trust National Gamebag Census



Young leverets are very vulnerable to predation and they rely on cover to keep them out of sight. Grass cutting and grazing can often expose them to foxes and other predators. (Chris Knights)

The hares' breeding success is partially dependent on the summer weather. Warm dry springs and summers allow females to have successive pregnancies and leverets survive well. Under wet and cold conditions breeding success is poor and leverets succumb to cold and diseases such as Coccidiosis.

Old estate game books show that in Victorian and Edwardian times many more hares were being shot each year than has been the case in recent years<sup>5</sup>. This bag record directly reflects hare abundance and we can conclude that hares are now far less abundant than they were three generations ago.

There are at least two important factors that have caused this reduction. Firstly, many predators are now more abundant than they were a century ago and, secondly, modern agriculture is less suited to hares than was traditional farming.

The main predator of the brown hare is the fox. Although foxes perhaps only rarely surprise and kill adult hares, they can systematically prey on and kill leverets to such an extent that a fox family can eat the entire production of the local hare population<sup>6</sup>. However, modern farming could make hares more prone to fox predation than traditional ley farming did.

# A Biodiversity Action Plan

Photo: Laurie Campbell



## How many hares on the farm?

Many hares pass unnoticed and on farms where they are present many farmers may not realise just how many they have. Hares are nocturnal for most of the autumn and winter so most that are seen will have been disturbed.



Counting hares at night in winter with a spot-light and binoculars.

The best way to assess numbers is by spotlight count. At night hares are active and their eye-shine in a spotlight beam makes them visible. After dark in winter and using a pair of binoculars (7x50) aligned with the spotlight, each field is scanned for hares. Knowing the area that can be seen with the spotlight in each field it is straightforward to calculate the number of hares on the farm. Anything above 40 hares per 100 hectares (250 acres) is a high density.



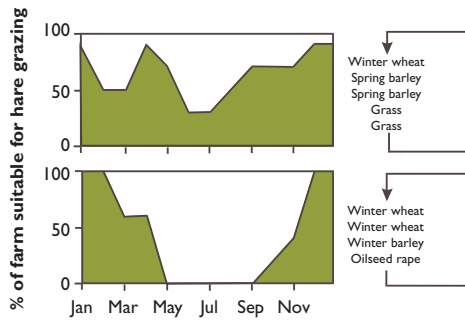
Brown hare habitat in Britain. The yellow area is optimal habitat with a high proportion of arable farmland. Green is less optimal ground where livestock rearing outweighs arable farming in importance. Grey areas are unsuited to brown hares for a variety of reasons. (From CEH Land Cover and OS Geographic reference maps).

The brown hare was one of the first animals to be considered in the Biodiversity Action Plan (BAP) programme. It was chosen, not because it was rare, endangered or under any kind of threat, but because it was once very common, was widespread and had declined significantly during the post-War period. It has been estimated that numbers have dropped by about 75% since the War; a pattern that is also typical of many other European countries. A recent survey suggested that wintering numbers in Britain may be around 800,000<sup>7</sup>. The BAP plan proposed that measures should be taken to improve numbers so that by 2010 our countryside should support at least two million animals in winter:

An analysis using the map above shows that there is plenty of suitable farmland for hares. However, farm mechanisation and modern crop husbandry has reduced hare breeding success and increased the mortality of leverets and adults alike.

Although the EU Common Agricultural Policy needs reform to improve conditions for wildlife, there are measures that farmers can take which will increase hare survival. Many of these measures are grant-aided through the Agri-environment Schemes.

# How farming changes have affected hares



Food supply for hares on a traditional post-War ley farm compared with a modern one. Under the ley rotation the sequence of cereals was followed by grass, which produced a crop pattern providing forage for hares year round. A modern rotation with break crops instead of grass provides no grazing in summer.

The mid-Victorian countryside probably provided the best habitat for hares. The 'patchwork quilt' landscape consisted of a mix of cereals, root crops, and grass with livestock. The small fields allowed hares to shift between them, grazing different crops and grass when conditions were right. In summer long cereals provided cover for adults and leverets and the ley grass and pastures good grazing conditions. In winter the root crops and winter cereals provided cover and forage.

Today's farmland is less mixed and more polarised with arable lands dominating the east and southern counties, livestock rearing and dairying the west. Modern arable systems make life difficult for hares in three ways.

- There is no continuity of grazing. In the absence of grass, oilseed rape and winter cereals provide enough food in winter but by early summer these crops are too mature to allow grazing and hares then have to eke out grazing along field boundaries, tracks and roadsides.
- Big fields mean they have to move further. Hares need to move between fields to get the best grazing in the right season.
- Organising fields in blocks compounds the effects of large fields.



The pattern of fields on a Dorset farm in the 1940s (left) compared with the 1980s (right). Many fields have been combined and there is a tendency for those in the same crop to be blocked together. In the 1940s this farm had approximately 40 hares per 100 hectares whereas in the 1980s it had fewer than 10.



Old-fashioned farming systems were much more amenable to hares than modern ones.

On livestock farms the problems are lack of cover and high mortality of leverets through predation and grass-cutting machinery.

Hares dislike pastures with high densities of livestock so they are most often found in fields without stock or where the stocking densities are very light. Very often as farmers move their stock from field to field hares move too, frequenting those pastures where the stock is absent.

Hares need cover to hide from predators and intensive livestock farmers' meadows are cut more often than in the past. This leaves leverets especially exposed to predation by foxes as well as subject to high mortality from modern grass cutting mowers.

# What farmers can do

## DOS AND DON'TS FOR FARMERS

- 4 Hares like a 'patchwork quilt' farmland. Break up large blocks of cereal as much as possible.
- 4 Use set-aside as a wildlife habitat. A series of 20-metre strips is ideal if it is planted under the Wild Bird Cover Option.
- 4 On arable farms, mown grass strips will provide summer grazing. Run them across open fields rather than alongside hedgerows where predators may lie in wait.
- 4 Hares need quiet, undisturbed cover for raising leverets. On livestock farms leave some areas of grass uncut and ungrazed for leverets to hide in.
- 4 When making silage, cut the field from the centre outwards rather than from the outside in, so that hares can escape the machinery into neighbouring fields.
- 4 Planting game crops for pheasants will provide cover and food for hares.
- 8 Don't use herbicides such as paraquat, which are known to kill hares.
- 8 Don't shoot hares in late winter unless you are sure crops are being damaged. A February hare shoot can remove 60% of the breeding stock.
- 8 Don't let poaching jeopardise the hare population. Contact the local police Wildlife Liaison Officer to get help on this.



Farmers can help to conserve hares by improving cover and grazing conditions.

On arable farms cereal crops provide abundant cover in summer, but in winter, provided the character of the landscape remains open, game crops, hedgerows and small woodlands will benefit hares. However, grazing conditions are often very poor on arable farms in summer when the crops have lengthened. On these farms the little remaining grass along field boundaries and tracks may be the only grazing available for adults and leverets alike. Providing more grass in the form of wide strips or patches of pasture is the best way to improve habitat on arable farms. It can be achieved at minimum cost with the judicious use of set-aside.



Photo: Laurie Campbell

On livestock farms cover is usually the limiting factor. Most areas of grass are either grazed or cut for silage in summer. There may be few areas where leverets can hide and they may be very exposed to foxes which patrol the fields at night. Keeping some areas such as banks, ditch sides and other features fenced off from livestock will allow the tall grass to develop.

High numbers of foxes on any farm will limit hare numbers. Grass cutting also kills many leverets, so steps should be taken, if possible, to cut in a way that reduces this risk to a minimum.

# Entry Level Stewardship for hares



EF2 - This bird-seed mixture of kale, triticale and quinoa provides food for hares in summer and cover in winter.



EE1-6 - Buffer strips can be used and are good on both arable and livestock farms. On arable land wide strips can be half mown to provide some grazing as well as cover.



EG5 - A brassica fodder crop like stubble turnip provides food and cover for hares in autumn on mixed farms.

Many farms have enough hares and will not want to encourage them further. These are often farms on light arable land and many have gamekeepers who keep fox numbers in check. On these areas there is no need to take special measures to conserve hare stocks.

Where hares are scarce, the new English Entry Level Stewardship (ELS) scheme can be used to improve their chances.

## Arable farms

Any scarcity of hares on arable farms is usually caused by lack of summer grazing exacerbated by fox predation. In summer, mature crops force hares and leverets out to the field boundaries and track sides where they forage for herbs and grasses, but where they are easy for a patrolling fox to find and pick off.

On these farms, ELS options should aim to improve summer grazing across the farm. Special sowings of bird seed mixes (EF2 or, on set-aside land, EF3) suit this purpose well. Spring sown, they will be short in early summer and contain a variety of annual weeds. Good mixtures are kale, triticale and quinoa, or linseed, triticale and millet. On light land EF11 (six metre uncropped, cultivated field margins) are a good option, as are EF10 (conservation headlands without fertiliser). These require no special sowings. Grass buffer strips (EE1-3) are popular with farmers, but the best of these is the six metre strip (EF3) where three metres are cut annually.

## Livestock farms

Hares are often very scarce or absent on livestock farms, but this is not usually due to lack of food. Mostly it is caused by high mortality. Frequent grass cutting and exposure to predators like foxes and buzzards can mean that very few leverets survive their first few weeks. The main aim, therefore, is to provide cover where hares can hide. The best ELS option for this is EK1 (unmanaged field corners). These areas are ungrazed, unfertilised and only cut every five years. They make ideal patches of cover for hares and perfect places for leverets to hide. Make the patches as big as possible under the rules. Using these patches adjacent to low and very low input grass (options EK2 and EK3) is a good idea. Buffer strips (EE4-6) of unmown and unfertilised grass is a good cover option for hares on intensively managed grass.

## Mixed farms

Some ELS options are designed to encourage mixed farming and will suit hares. Mixed farms in general are good for hares. EG1 (undersown spring cereal) re-creates part of the ley rotation and is perfect for hares. Stubble turnips (EG5) are also an excellent crop for this species in the late summer or autumn.

## Stewardship in Wales - Tir Cynnal

ELS in Wales operates differently from England as payments are graded according to the size of the farm, and the farmer must ensure that 5% or more of his land consists of wildlife habitat. Where a farm's wildlife habitat falls below this, new habitats can be created from a range of options. Where livestock grazing predominates, the best options for hares are ones that provide cover and new growth, thus wild bird cover crops and unsprayed root crops are good choices in most areas. For all-grass farms, reverting some of the improved grass back to unimproved by stopping fertiliser is a good idea.

## Scotland - the Rural Stewardship Scheme

In Scotland environmental stewardship is discretionary, but plans that support Biodiversity Action Plan species and habitats, or protect designated sites get more points and higher priority. Many of the options available in England and Wales are available in Scotland too. It is best to get professional advice before applying for Rural Stewardship.

# Common questions; References

The first edition of this guide was prepared with support from the Association of Masters of Harriers, and with the help of Desmond Hobson. The second addition is sponsored by Biffa Waste Services Ltd, biodiversity champion of the brown hare Biodiversity Action Plan.



We acknowledge the support of English Nature in the preparation of this guide.



[www.gct.org.uk](http://www.gct.org.uk)

Registered Charity No. 1112023

Stephen Tapper & Desmond Hobson

The Game Conservancy Trust  
Fordingbridge, Hampshire, SP6 1EF  
Tel: 01425 651021  
Email: [stapper@gct.org.uk](mailto:stapper@gct.org.uk)

Front cover picture: Chris Knights

Design and layout: Sophia Miles/Louise Shervington  
Printing: The Roman Group, Bournemouth

© The Game Conservancy Trust Limited 2002, revised 2006.

No reproduction without permission.

All rights reserved.



Game Conservancy Limited's Advisory Service will give professional advice on all aspects of game management including brown hares.

For more information contact:  
01425 651013

## THREE COMMON QUESTIONS

- Q: **Why are hares not fully protected by law?** A: Hares damage crops and sometimes this can be severe, especially in horticulture. Farmers need the right to control hare numbers in these circumstances.
- Q: **Can I get financial help to conserve hares?** A: Certainly - the new arable options available within the Countryside Stewardship Scheme were developed by Defra in association with the RSPB, English Nature and The Game Conservancy Trust to help a range of farmland species including the brown hare.
- Q: **Is re-stocking a good idea? Hares could be taken from farms where they are common and released onto areas where there are few or where they are absent.** A: This can be done, but in most cases it is not a good idea. Hares are difficult to capture and handle and many don't survive after release. If there are already some hares present, however few, it is always better to improve their chances of survival and breeding rather than rely on imported animals. Only where hares are entirely absent should re-stocking be considered and, even then, one must be confident that habitat and other environmental conditions are suitable for them.

## Getting help

There is a brown hare conservation officer who can offer free advice to conservation bodies and farmers, on brown hare ecology and how best to conserve them.

Contact: Bernadette Higgins, Brown Hare Project Officer, Warwickshire Wildlife Trust, tel: 01676 525880 or email: [bernie.higgins@wkw.org.uk](mailto:bernie.higgins@wkw.org.uk)

## References

- 1 **Yalden, DW** (1991) History of the Fauna. In: *The Handbook of British Mammals*. Eds: GB Corbet & S Harris. Blackwell Scientific Publications, Oxford.
- 2 **Tapper, SC & Barnes, RFW** (1986) The influence of farming practice on the ecology of the brown hare (*Lepus europaeus*). *Journal of Applied Ecology*, **23**, 39-52.
- 3 **Hewson, R** (1964) Reproduction in the brown hare and mountain hare in north-east Scotland. *The Scottish Naturalist*, **71**, 81-89.
- 4 **Holley, AJF** (1992) Studies on the biology of the brown hare (*Lepus europaeus*) with particular reference to behaviour. PhD Thesis, University of Durham.
- 5 **Tapper, SC** (1992) *Game Heritage*. The Game Conservancy Trust, Fordingbridge, Hampshire.
- 6 **Reynolds, JC & Tapper, SC** (1995) Predation by foxes (*Vulpes vulpes*) on brown hares (*Lepus europeus*). *Wildlife Biology*, **1**, 145-158.
- 7 **Hutchings MRW & Harris, S** (1996) *Current status of the brown hare in Britain*. Report of the Joint Nature Conservation Committee, Peterborough.
- 8 **Stoate, C & Tapper, SC** (1993) The impact of three hunting methods on brown hare (*Lepus europeus*) populations in Britain. *Gibier Faune Sauvage*, **10**, 229-240.