



Long-eared Owl

Asio otus

1. INTRODUCTION

The long-eared owl is a widespread but scarce breeding bird in Britain. It was probably more common in the late 19th century, but numbers declined during the 20th century due to competition with increasing tawny owl populations (Holloway, 1996). It is the commonest owl on the Isle of Man and in Ireland, where tawny owls are absent (Greenwood *et al.*, 2003). Its conservation status is uncertain because its secretive nature makes census work very difficult, but a decline (24%) in its distribution between 1968-72 and 1988-91 was suggested by fieldwork for the two breeding atlases (Sharrock, 1976; Gibbons *et al.*, 1993). Populations in Britain and Ireland are largely resident (Williams, 2002), although some may make local seasonal movements. Long-eared owls (mostly females) from Fennoscandia and further east in Europe migrate to Britain and Ireland in winter (Williams, 2002). The species is semi-irruptive, with large numbers arriving in particular years. Female long-eared owls tend to be larger and darker than males but they cannot be separated reliably, nor can the species be aged reliably, in the field, by appearance. Males and females have different calls, however (described in Section 3.2.1 below). Both sexes can breed at one year old.

For further information on the biology and ecology of this species, Scott (1997) provides a comprehensive account.

Annual Cycle

Breeding Activity	Peak Period	Range	Duration (days)
Occupation of home range	March to April	All year*	
Laying	Early April	Late February to early June	1 to 10
Incubation	Late April	Late February to late June	25 to 30
Hatching	Early May	Late March to late June	
Young in nest	Late May	Late March to late July	21 to 27
Fledging	Early June	Late April to late July	At 28 to 35 days old
Juvenile dispersal		Late June to August	31 to 60 days after fledging

* Some birds at higher altitudes do not occupy home ranges continuously but rather from March or April onwards.

2. HABITAT, HOME RANGE, NESTS AND BREEDING

2.1 Habitat

Long-eared owls breed in a wide range of woodland and scrub habitats (Glue, 1977a), ranging from isolated trees to shelter belts, and small copses to large woods, where they tend to breed near the edge (Mikkola, 1983). In Ireland, the Isle of Man and some Scottish islands, deciduous woodlands are used but on the British mainland long-eared owls are mainly found nesting in coniferous woods (Cramp, 1985; Jardine, 2007). Small patches of woodland amongst open country are most often used and nesting ranges tend to be associated with moist habitats such as wet heath or marsh (Scott, 1997). The species generally favours low-lying districts below 150 m ASL (Scott, 1997) but they have been found breeding in southern Scotland at 200–540 m ASL (Village, 1981) and breeding at this altitude may be widespread in Scotland.

2.2 Home range

The limits of the home range in long-eared owls are imprecise. They defend a nesting territory but generally hunt over a much more extensive area, the size of which varies with food supply. In upland areas of Britain, field voles, which fluctuate cyclically in numbers, are the main prey of long-eared owls. Studies in Scotland found 9–18 pairs (including non-breeders) in an area of 10 km² (Village, 1981) and hunting distances of over 2.5 km from the nest (Cramp, 1985). On Eskdalemuir, low vole numbers resulted in fewer pairs occupying home ranges than in years when voles were more abundant (Village, 1981). In southern Britain, pairs are thought to remain mostly in their home ranges all year, whereas further north there is a greater tendency to form communal roosts outside the breeding season (Mikkola, 1983; Cramp, 1985).

2.3 Nest sites

Nests are usually in trees but occasionally on the ground. In Britain, the majority of trees used for nesting are conifers (about 75%), with nests at an average height of 7.5 m (Glue, 1977a). The commonest conifers used are pines (48% of all tree nests), followed by fir and spruce (12%), and larch (10%). Nests in deciduous trees tend to be lower, at about 5 m, with hawthorns (14%) and willows (3%) used most frequently. Ground nesting may occur when suitable tree nests are not available (Glue, 1977a). They may be placed in dead bracken, in brambles below trees in woods, in heather on open heath or clear felled areas in coniferous plantations (before the area has grassed over). Occasionally, hollow cavities in trees may be used.

2.4 Nests

The eggs are normally laid in the old tree nests of another bird (usually magpie or crow, together accounting for 78% of long-eared owl nests; Glue, 1977a) or, occasionally, in a squirrel's drey. Nests of magpies are often preferred to those of other birds because they give greater cover. If the chosen nest is an open cup, it will normally be situated below the canopy so that the owl is not exposed (Henrioux, 2002). Long-eared owls will readily accept open-fronted nest boxes designed for kestrels (Scott, 1997) or wicker baskets (Garner & Milne, 1997).

2.5 Clutch size and incubation

Most clutches are laid between mid-March and the end of April, with a mean laying date of 10th April (n=70, BTO Nest Record Scheme data); birds may lay as early as the end of February, and up to early June (Glue, 1977a). Eggs are laid at 2-day intervals (Cramp, 1985) and, in Britain, the clutch size varies from 1–6 eggs. The BTO Nest Record Scheme gives an average

of 3.8 eggs ($n=163$). Food abundance can influence laying which tends to occur earlier in years when voles are plentiful (Wijnandts, 1984); in poor vole years a greater percentage of females did not lay and those that did laid smaller clutches (Village, 1981). If a clutch of eggs is lost, long-eared owls will relay in the same nest or a nearby nest. A second brood may occasionally be attempted after a successful first brood (Glue, 1977a). Incubation starts with the first egg and lasts 25–30 days (Witherby *et al.*, 1940) with an average of 28 days (Scott, 1997). The female incubates the eggs and broods small chicks, although the male has been observed to incubate or brood for short periods (Glue, 1977a). The male begins to feed the female before laying and during incubation, delivering 0–6 (mean 2.8) prey items per night with less prey delivered on rainy nights (Wijnandts, 1984).

2.6 Brood size and fledging

The eggs hatch asynchronously and, depending on food availability, the youngest chicks may not survive. The young are brooded continuously by the female for the first week. Wijnandts (1984) gives average prey delivery rates per night during the period that young are in the nest of 4.1 in the first week, 5.3 in the second, 6.5 in the third and 7.4 in the fourth. Higher rates of 20–24 small animals per day have been reported for chicks of about 1 week old (Cramp, 1985). The male provides most of the food for the young but the female may assist with hunting once the young do not require continuous brooding and when they have left the nest. Most feeding visits are made at night although owls may be seen hunting during the day (Mikkola, 1983). The chicks remain in the nest until they are 21–24 days old, occasionally up to 27 days old. They then move to nearby branches, if from a tree nest, or into cover, if on the ground (Glue, 1977a). At this stage, the young make themselves extremely obvious by loud food-begging calls which resemble ‘a gate creaking on unoiled hinges’ (Scott, 1997) and can be heard over 1 km away. They fledge at 28–35 days old (Scott, 1997) but are thought to be dependent on the adults up to the age of 60–70 days (Mikkola, 1983; Cramp, 1985).

3. SURVEY TECHNIQUES

CAUTION *Female long-eared owls are sensitive to intrusion during egg laying (Mikkola, 1983), hatching and when there are small young in the nest, and may desert if disturbed during these times. Care should be taken to avoid flushing long-eared owls from a nest with unknown contents. Nests with larger young will have faecal droppings on the edge of the nest and pellets and droppings below the tree; there may also be down and large young can often be observed from below. Appropriate health and safety precautions should be taken if working at night and if nest inspection visits involve climbing (see Section 7.10 of Introduction).*

3.1 Visit schedule

The species is listed on Schedule 1 in Northern Ireland (see Section 7.1.1 of Introduction) and the Isle of Man. A visit schedule is difficult to establish for this species because of the wide variation in laying dates. Long-eared owls are largely nocturnal. They can be located by their calls during the breeding season, when they may be very vocal, but are quite silent for much of the rest of the year (Cramp, 1985). Compared with other owls, the voice of the long-eared owl does not carry far (Cramp, 1985), with the exception of the male advertising call and the calls of young.

Visit 1	February to March	To check for occupancy (locate territorial males, find roosts)
Visit 2	Early April to late May	To locate territorial males and nests (extreme care should be taken not to flush the owls from the nest)
Visit 3	May to June	To check for young
Visit 4	June to early July	To count fledged young (several visits may be required)

3.2 Signs of occupancy

3.2.1 Locating home ranges

Fieldworkers should visit their survey area between February and the beginning of May to locate calling territorial males. The visits should be made between dusk and two hours after sunset (Clark & Anderson, 1997) although it is possible that long-eared owls may call later in areas where tawny owls are present.

Male long-eared owls call sporadically during October, November and December. This song builds up through January to March and April before declining into May (Scott, 1997) but may continue into June. Long-eared owls are inhibited from calling by high winds and heavy rain, although they are evidently not affected by lunar phase, cloud cover or ambient temperature (Clark & Anderson, 1997). The males' quiet 'hoo-hoo-hoo-hoo' song can be heard up to 100-150 m away in calm conditions although some observers have picked the call up at greater distances (Cramp, 1985). In the eastern Highlands, call playback surveys, in still conditions, detected long-eared owls at up to 1 km away. The female nest call has been described as 'shoo-oogh' or as 'vaoo' ('a' as in 'crake'). It is said not to end abruptly but slowly die away and to have the quality of the sound produced by blowing through a comb and paper (Mikkola, 1983).

Before nest-site selection the male will use his advertising song from anywhere in the nesting territory, often from a high perch. It is usually repeated 20 to 30 times (although from less than 10 to more than 200 has been reported; Cramp, 1985), before the male makes his wing-clapping flight display. The calls may be spaced at regular intervals, or at varying intervals between two and eight seconds (Mikkola, 1983). A prolonged call sequence from a male may imply that he does not have a mate and consequently, there will be no display flights. The female will respond irregularly to the males hoot. By late February, when the nest-site has been selected, the female calls in duet with the male, at about 8 second intervals, from on or close to the chosen nest. When the male stops singing after his call sequence, he performs his wing-clapping display flight to join the female, who now calls more rapidly at intervals of 5 decreasing to 2 seconds. Following a period of silence, the male returns to a high song perch to start singing again, and the female begins her calling again.

The display flight involves zigzagging, dipping and rising through the trees or sometimes over the tree tops, the generally deep slow wing beats interspersed with occasional loud wing claps below the body (Cramp, 1985). These displays are most intense during the period when the nest site is being selected and decline thereafter (Cramp 1985). If a female calls without a male responding, it is probable that she does not have a mate.

Territorial males can be located by broadcasting their call, although this technique has not been fully evaluated. This should be attempted on calm, dry nights from February to the end of April. The position of the calling owl should be noted on a map and the location can be fixed more precisely by taking bearings from two locations. Note that male long-eared owls tend not to respond to broadcast calls if tawny owls are present in the area.

Long-eared owls moult in mid-summer, and the presence of moulted flight feathers can help to identify occupied home ranges.

3.2.2 *Locating roosts*

Searches for roosts can aid in identifying occupied territories. Long-eared owls prefer to roost in trees or bushes, although they will roost on the ground (Mikkola, 1983). An accumulation of fresh pellets and faecal droppings will be found at an active roost site. Pellets and droppings can also be found on perches which are often on fence posts adjacent to a wood or copse.

3.2.3 *Recognition of signs*

Together with other signs, such as moulted feathers, pellets can add to the evidence for occupancy. Long eared owl pellets are elongated, irregular and grey in colour, containing mostly small mammal remains (fur and bones), sometimes birds (feathers and bones) and invertebrates (Mikkola, 1983; Cramp, 1985; Brown *et al.*, 1983). Average sizes of 33-50 mm long (range 20-62) and 19-21 mm in width (14-27) are given based on studies in Britain and Ireland (Glue & Hammond, 1974; Mikkola, 1983; Cramp, 1985). Tawny owl pellets are similar to those of long-eared owls but tend to be larger; and short-eared owl pellets are also similar in size. Only material from a roost or nest where a long-eared owl has been identified should be used for specific prey analyses (Glue & Hammond, 1974).

3.2.4 *Evidence for occupation*

A male calling from the same locality over several visits indicates that a nesting territory is occupied. Female calls, moulted feathers and active roosts found during the breeding season provide supporting evidence.

3.3 Evidence for breeding

Some long-eared owls may not lay eggs after establishing a nesting territory. A study in Scotland found that an average of 17% of pairs did not breed each year (Village, 1981). Breeding must be established by locating an active nest (with appropriate care bearing in mind the risks associated with disturbance) or by detecting recently fledged young.

3.3.1 *Locating active nests*

Remember that long-eared owls should not be disturbed when they are laying or near hatching. Intensive searches for nests should be delayed until such time as chicks are likely to have hatched. Because of the variation in the timing of breeding, caution should be employed in all visits before late June. All nests that are at least the size of a woodpigeon's nest in the vicinity of active roosts should be checked. If long-eared owls are occupying the nest, pellets and faecal droppings will be found below it. If there are no suitable nests in trees, the owls will nest on the ground. The nest can also be found by listening for the call of the female at night (with care with respect to disturbance). In addition to the call described in 3.2.1 above, the female may give a soft, sighing hoot (like heavy breathing) from the nest, which is only audible to about 15 m. The distance between the nest and the edge of the wood can be paced out so that it can be re-traced during daylight. Some females will look down over the nest rim when the nest is approached. The distinctive 'squeaky-gate' begging call of chicks may also be used to locate nests, particularly in the early morning at first light, and after a wet night.

3.3.2 *Evidence of fledging*

The best estimate of brood size at fledging is the number of large young (21 days old) in the nest but this is difficult to obtain. As the young hatch asynchronously, the age of young in a large brood can vary from newly hatched to those about to leave the nest. Repeat visits are required to ensure that all of the young survive until they are old enough to leave the nest.

Young remain in the immediate vicinity for up to two months after they have left the nest. Their begging calls can be used to attempt to count the young soon after they have fledged by locating each individual as it calls for food.

3.4 Evidence for non-breeding

If no nest or fledged young are found in an occupied home range then non-breeding is likely. Separating early breeding failure from genuine non-breeding is particularly difficult for this species, which is sensitive to disturbance early in the nesting cycle.

3.5 Ageing and sexing young

Long-eared owl young can be sexed after eight days, when the flight feathers have started to grow. On males, the inner web of the secondaries is white, particularly towards the outer portion (Baker, 1993). Females have a buff inner web to the secondary feathers. The young can be aged approximately from feather development and their behaviour (Table 8). Wijnandts (1984) presents a growth curve for body weight of nestings from the Netherlands, otherwise detailed criteria for ageing based on measurements have not been located.

Table 8. Development of young long-eared owls (from Mikkola, 1983; Scott, 1997).

Age of chicks (days)	Description of chicks
1 to 4 days	Small with sparse down, fine and white. Eyes not yet open. Inactive.
5 to 8 days	Down thickens, brown flecks appear on the breast and wings. Primaries and secondaries start to develop. Eyes open, irides bright yellow with opaque bluish pupils, which gradually darken. Egg tooth disappears. Inactive.
8 to 10 days	Chicks begin to defend themselves (bill-snapping) and move away if approached. Blackish feathers develop at each side of the bill.
10 to 12 days	Mask darkened to almost black. Irides begin to turn orange. Breast is light grey with nine horizontal stripes. Ear tufts obvious. Young will 'defend' themselves by erecting their feathers, raising their wings and hissing.
13 to 24 days	Growth continues. Wing feathers well developed.
24 to 30 days	Tail and wing feathers well grown. Young start to fly. Body feathers appear through down.
30 to 35 days	Fully feathered. Down is gradually lost. Feathers appear 'loosely constructed'. Facial disc dark brown.

4. SURVEYS OUTSIDE THE BREEDING SEASON

Long-eared owls may be surveyed in winter by locating resident territorial males in January/February or by locating winter roosts. In southern Britain, pairs of long-eared owls are thought to remain mostly in their home ranges all year, whereas further north there is a greater tendency to form communal roosts outside the breeding season (Mikkola, 1983; Cramp, 1985; Scott, 1997). Long-eared owls may occasionally roost in association with short-eared owls. Roosts have been reported from small coniferous woods, scattered Norway spruce amongst young beech trees, thickets of hawthorn and scrub willow amongst reeds. Communal roosts, which may contain as many as 20 owls, can be found by searching suitable sites, particularly near the coast, in areas where long-eared owls have been seen hunting. There will be an accumulation of pellets and faecal droppings below the trees (Glue & Hammond, 1974). Any disturbance of potential roost sites should be carried out as close to dusk as possible so that birds are not forced to leave roosts for long periods during daylight.