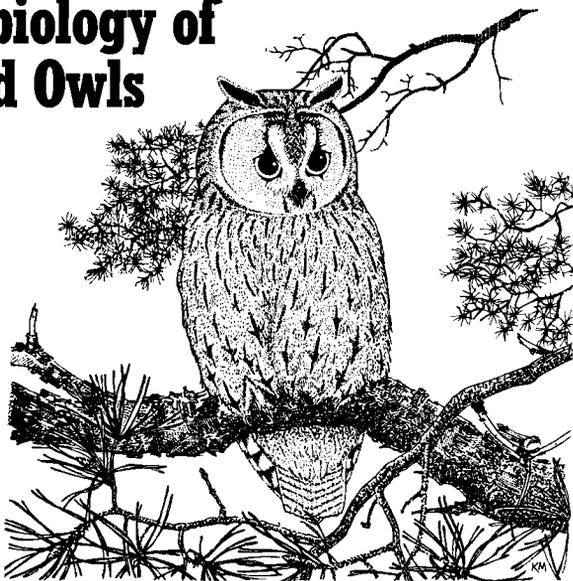


# Breeding biology of Long-eared Owls

David E. Glue

**The Long-eared Owl is notoriously elusive during the nesting season. As with other owls, published information on its breeding biology is sparse**



This paper draws on details from four sources: (1) 218 cards submitted to the British Trust for Ornithology's Nest Records Scheme during 1942-74; (2) 107 nests in northern England during 1904-44, meticulously recorded in the diaries of the late Arthur Whitaker; (3) my observations on behaviour at four breeding sites in Hampshire and Berkshire; and (4) comments from Derick Scott based on 116 nests during 1954-76.

## **Distribution of records**

In many areas, the breeding status of the Long-eared Owl *Asio otus* is not clear, owing to the extreme difficulty of finding scattered pairs. During 1968-72, an extensive effort was made to confirm breeding in as many 10-km squares as possible for the *Atlas* (Sharrock 1976). Although incomplete, the results (fig. 1) showed that the Long-eared Owl is not scarce as a breeding bird in certain parts, occurring widely over much of eastern and lowland Scotland, northern England and the Isle of Man. In western Scotland, Wales and the rest of England, it is local, or even apparently absent from several regions, but is the commoner of Ireland's two owl species.

The scatter of the 218 BTO nest records reflects in part the distribution indicated by the *Atlas* (see table 1); but the species is under-recorded in parts of Ireland and Scotland, while observers have concentrated on nest-finding in certain areas where this owl is more widespread, for example, Northumberland (34 nests), Lancashire (32) and Aberdeen (16). The dating of the nest records indicates a marked increase in recording effort in recent years, as a result of *Atlas* fieldwork: 1942-52, 23; 1953-63, 61; 1964-74, 124. Whitaker's nests were confined to Yorkshire (61), Derbyshire (45) and Lincolnshire (1).

**Table 1. Regional distribution of British Trust for Ornithology nest record cards of Long-eared Owls *Asio otus*, 1942-74**

Regions are secondary divisions of the Euring code

	No. of counties	No. of nests	% of total nests
Southwest England	2	5	2.3
Southeast England	2	12	5.5
Eastern England	4	10	4.6
Central England	3	16	7.3
Northern England	5	99	45.4
Wales	3	4	1.8
Ireland and Man	5	18	8.3
Eastern Scotland	8	37	17.0
Western Scotland	4	17	7.8
<b>TOTALS</b>	<b>36</b>	<b>218</b>	<b>100.0</b>

**Table 2. Breeding habitats of 200 Long-eared Owls *Asio otus* in Britain**

Broad habitat type	No. of nests	%
<b>HEATH AND MOOR (66)</b>		
Small plantations, copses, or scattered trees on:		
Heather-grass moorland	38	19.0
Unimproved mosslands	19	9.5
Lowland heath and brecks	9	4.5
<b>WOODLAND (51)</b>		
Extensive blocks or fragmented areas of:		
Coniferous forest	30	15.0
Mixed or deciduous woods	19	9.5
Open parkland	2	1.0
<b>FARMLAND (48)</b>		
Small plantations, shelter-belts, or hedgerows on:		
Mixed farmland	17	8.5
Arable farmland	9	4.5
Hill pasture and rough grazing	8	4.0
Lowland meadows	7	3.5
Open downland	7	3.5
<b>COASTAL/WETLANDS (30)</b>		
Wooded clumps or scrub on:		
Coastal strip or dune slacks	19	9.5
Marsh, fen or swamp	11	5.5
<b>MISCELLANEOUS (5)</b>		
Conifer windbreaks, copses or scrub on:		
Waste ground (Ministry of Defence property)	3	1.5
Edge of built-up area	2	1.0
<b>TOTALS</b>	<b>200</b>	<b>100.0</b>

### Breeding habitat

The Long-eared Owl occupies a wide range of habitats (table 2) in a widespread yet highly localised breeding distribution. The factors currently restricting the population are not clear, but a shortage of preferred breeding sites (see below), persecution by man (especially egg-collecting, robbing of nests by schoolboys, shooting on kept land) and unsuccessful competition with the larger Tawny Owl *Strix aluco* probably

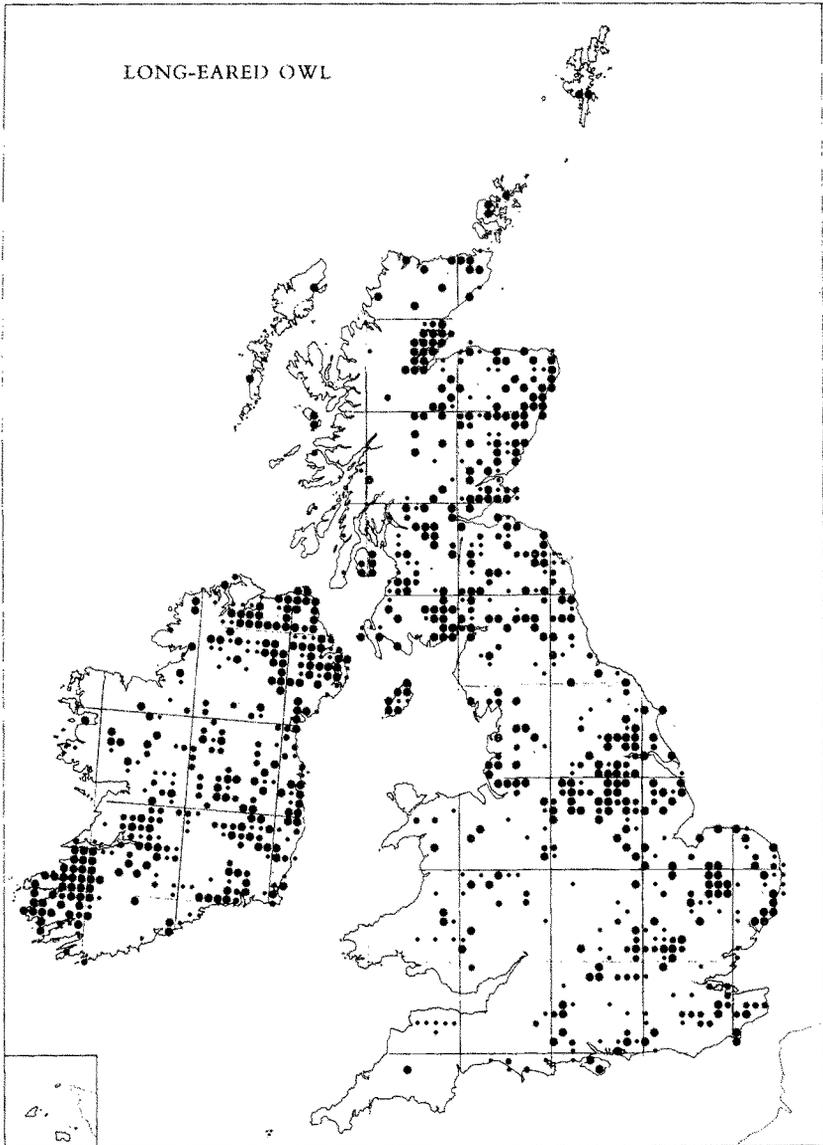


Fig. 1. Breeding distribution of the Long-eared Owl *Asio otus* in Britain and Ireland during 1968-72 (reproduced, by permission, from *The Atlas of Breeding Birds in Britain and Ireland*). The smallest dots indicate possible breeding, the next probable, and the largest confirmed breeding, within each 10-km square

all contribute. As the Tawny Owl has extended its range northwards this century, moving increasingly into suburban and coniferous habitats, so Long-eared Owl numbers have dwindled in many areas (Parslow 1973). The presence of Long-eared Owl remains in pellets of Tawny Owls and

other raptors (Mikkola 1976) provides further evidence of interspecific competition. Despite examples of competition between Long-eared Owls and Tawny Owls, Kestrels *Falco tinnunculus* and Sparrowhawks *Accipiter nisus* in this study, there is an equal number of cases of successful breeding by all four in relatively small areas of woodland.

In contrast to the Tawny, comparatively few Long-eared Owls inhabit extensive blocks of even-aged, coniferous or deciduous woodlands. Most breed in isolated plantations, shelter-belts, copses, thickets or overgrown hedges surrounded by open country, which often embraces moor, heath, marsh, rough grassland or farmland (table 2). Coastal woods or scrub on marshes, shingle or dune slacks are commonly used lowland breeding sites (e.g. Nene Washes, Cambridgeshire; Dungeness, Kent; Donna Nook, Lincolnshire; Dornoch Firth, Sutherland). Small plantations and scrub birch *Betula* on hill pastures and moor are equally attractive (e.g. Badau Dudh, Inverness-shire, at 381 m; Glyn Corriog, Clwyd, at 511 m). These extremes account for the wide altitudinal range of nest sites (table 3): 12% in coastal localities, 54% below 200 feet (61 m), and 10% above 1,000 feet (305 m).

### Tree nest sites

Unlike other tree-nesting owls, which normally occupy natural cavities where available, the Long-eared uses platforms, usually high in the upper branches of conifers (especially Scots pine *Pinus sylvestris*), less often lower in dense deciduous growth (particularly hawthorn *Crataegus*), and sometimes in other types of vegetation. Conifers comprised 75% of the 194 trees identified by nest recorders (table 4) and 70% of the 89 trees identified by Whitaker. Whitaker's nest sites ranged from 2 m in an osier *Salix viminalis* to 23 m in a beech *Fagus sylvatica*, and included nests in Scots pine (47), larch *Larix* (15), oak *Quercus* (14), holly *Ilex aquifolium* (6), crab apple *Malus sylvestris* (3) and silver birch *Betula pendula* (2), at an average height of 8 m. In Nottinghamshire and Lincolnshire, Scott found a strong association with hawthorns (39 of 98 tree nests); his lowest tree site was at 2 m in an elder *Sambucus* and the highest at 20 m in an oak.

### Nest platform

The Long-eared Owl usually lays its eggs in the large old nest of another bird, or the drey of a squirrel *Sciurus*; less often on the ground, in a natural

**Table 3. Altitudinal distribution of 151 nests of Long-eared Owls *Asio otus* in Britain**

Altitude in feet (metres)	No. of nests	%
0-200 (0-61)	81	53.6
201-400 (61-122)	17	11.3
401-600 (122-183)	9	6.0
601-800 (183-244)	10	6.6
801-1,000 (244-305)	19	12.6
1,001-1,250 (305-381)	10	6.6
1,251-1,500 (381-457)	3	2.0
1,501-1,750 (458-533)	2	1.3
TOTALS	151	100.0



**Table 4. Tree sites of 198 nests of Long-eared Owls *Asio otus***

Under HEIGHT OF NEST, a, b, c, d, e and f correspond respectively to: 1-5 feet (0.3-1.5 m), 6-10 (1.8-3.0), 11-20 (3.4-6.1), 21-30 (6.4-9.1), 31-40 (9.4-12.2), and 41-60 (12.5-18.3)

	No. of nests	HEIGHT OF NEST						Average nest height in feet (m)
		a	b	c	d	e	f	
<b>CONIFEROUS</b>								
Pine <i>Pinus</i>	96	1	1	39	42	11	2	26 (7.9)
Fir <i>Abies</i> and spruce <i>Picea</i>	24	0	1	8	11	2	2	25 (7.6)
Larch <i>Larix</i>	19	0	2	9	5	2	1	22 (6.7)
Others <sup>1</sup>	8	0	0	4	2	2	0	25 (7.6)
<b>BROADLEAVED</b>								
Hawthorn <i>Crataegus</i>	28	1	4	23	0	0	0	16 (4.9)
Willow <i>Salix</i>	6	1	3	2	0	0	0	15 (4.6)
Others <sup>2</sup>	13	1	2	5	1	4	0	20 (6.1)
UNCLASSIFIED TREES	4	0	1	2	1	0	0	18 (5.5)
<b>TOTALS</b>	<b>198</b>	<b>4</b>	<b>14</b>	<b>92</b>	<b>62</b>	<b>21</b>	<b>5</b>	<b>22 (6.7)</b>

<sup>1</sup> Other conifers include sierra redwood *Sequoiadendron giganteum* (1) and Lawson's cypress *Chamaecyparis lausontiana* (1).

<sup>2</sup> Other broadleaved trees include oak *Quercus* (3), silver birch *Betula pendula* (3), ash *Fraxinus excelsior* (2), alder *Alnus glutinosa* (1), elder *Sambucus nigra* (1), beech *Fagus sylvatica* (1), holly *Ilex aquifolium* (1) and rhododendron *Rhododendron ponticum* (1).

cavity or in a man-made site. The nests used most frequently in Britain are those of Magpie *Pica pica* and Carrion/Hooded Crow *Corvus corone*, although the previous occupant varies in size from Jay *Garrulus glandarius* and Woodpigeon *Columba palumbus* to Grey Heron *Ardea cinerea* (table 5). Old nests of crows added to by a Sparrowhawk, or less often by a Kestrel, are commonly used.

Local preferences have been noted: Magpie nests in certain Derbyshire and Yorkshire conifer plantations (Whitaker, see table 5); Carrion Crow nests on some Lancashire mosslands; and hollow cavities in oaks of certain Suffolk woods (Hosking and Newberry 1945). Most owls, however, will use any available platforms rather than nest on the ground. Thin, flimsy Woodpigeon nests and dilapidated, old Magpie nests are sometimes used successfully, even when the parent owl and nest contents are clearly visible from below; occasionally the eggs or young fall to the ground.

Vacant nests may be occupied in the year following construction or later, when they may be added to by the owl or another bird of prey. Nest platforms are sometimes used in successive years: one built by a Hooded Crow in 1967 in Aberdeen was occupied annually during 1968-71. Regularly, the same tree is used in successive years, but a different nest, which may be as little as 1-3 m from the previous one; the same sector of a wood or plantation is commonly occupied.

The position of the nest in the tree is controlled largely by the availability of platforms, but certain sites are characteristic. Branches forming the crown cluster of Scots pine and the inner base of lateral branches of

**80 and 81.** Top, Long-eared Owl *Asio otus* on nest, Dumfriesshire, May 1970 (*J. F. Young*); bottom, Long-eared Owls breeding in old nest of Carrion Crow *Corvus corone* in crown of Scots pine *Pinus sylvestris*, male passing wood mouse *Apodemus sylvaticus* to female, southern England, June 1976 (*colour transparency: F. V. Blackburn*)

**Table 5. Position of nests of Long-eared Owls *Asio otus* in Britain**

Walpole-Bond (1938) also referred to occasional records of laying in old nests of Rooks *Corvus frugilegus*

Nature of nest site	BTO nest records	
	1942-74	A. Whitaker's records 1904-44
EGGS LAID IN NEST VACATED BY		
Carrion Crow <i>Corvus corone corone</i>	50	—
Magpie <i>Pica pica</i>	33	80
Hooded Crow <i>C. c. cornix</i>	16	—
Unidentified crows (Corvidae)	22	—
Woodpigeon <i>Columba palumbus</i>	11	2
Sparrowhawk <i>Accipiter nisus</i>	7	12
Kestrel <i>Falco tinnunculus</i>	2	—
Grey Heron <i>Ardea cinerea</i>	1	—
Jay <i>Garrulus glandarius</i>	—	1
Grey Squirrel <i>Sciurus carolinensis</i>	1	1
EGGS LAID IN OR ON		
Natural tree growths ('witches' brooms')	3	—
Large open-fronted nestbox	1	—
Stick nest constructed by man	1	1
Natural cavity in willow <i>Salix</i>	1	—
Ground beneath dead bracken <i>Pteridium aquilinum</i> or bramble <i>Rubus</i>	2	6
Ground among heather <i>Calluna/Erica</i>	2	—
TOTALS	153	103

larches are favoured; the uppermost branches of hawthorns and the main forks of oaks and willows *Salix* are regularly occupied, and some use branches covered with ivy *Hedera helix* or honeysuckle *Lonicera periclymenum*.

Ground nests are usual where suitable platforms are lacking: for examples, in open heather *Calluna/Erica* (Shetland), scattered pines (Angus) or gale-damaged copses (Suffolk). The scrape or nest is commonly among the cover of heather, dead bracken *Pteridium aquilinum* or bramble *Rubus*, often at the base of a tree or beneath a fallen tree. An interesting example of a ground nest among reeds *Phragmites australis* is shown in Hosking and Newberry (1945, plate 36). Surprisingly for an owl, twigs are sometimes used to construct a distinct nest cup; Scott watched a male Long-eared Owl carry a larch twig to an occupied but empty tree nest which contained eggs a few days later. Fresh material found in four other nests may have been involved in the complicated courtship display.

Imitation crow nests constructed of sticks by ornithologists in copses lacking nest platforms were occupied successfully in two cases. On the Continent, Long-eared Owls use duck nesting baskets (Haverschmidt 1946), and occasionally open-fronted nest boxes, sometimes with relatively high occupation rates (e.g. Cave 1968). Further experiments with artificial nests and boxes in British and Irish woods devoid of suitable platforms but holding roosting owls could prove fruitful.

**82 and 83.** Long-eared Owls *Asio otus* at nest on lateral branch of larch *Larix*, Nottinghamshire, May 1973 (Derick Scott). Top, female transferring water vole *Arvicola terrestris*, just brought by male, from bill to foot before feeding downy young; bottom, female brooding smaller young, while eldest owlet nestles close



### Breeding season

In late October and early November, males begin territorial marking, although residents hold territory all year. There is little activity from early December until early January, then much from late January to mid March and even later (Scott). First egg dates were calculated for nests where the timing of egg-laying, egg-hatching or young fledging was known, or where the young had been accurately aged. Data from 140 nests show (fig. 2) that most clutches are laid during late March to early April (mean 4th April, including repeats), although the laying season extends from 4th March (Dorset in 1957) to 7th June (Suffolk in 1971). February clutches are not unknown: Whitaker found one definite and one probable case of eggs laid in the last few days of that month; Scott describes February eggs as exceptional, his earliest clutches being 13th (unsuccessful) and 23rd February (three young fledged from four eggs), while Campbell and Ferguson-Lees (1972) stated that a few eggs are laid from the first quarter of February.

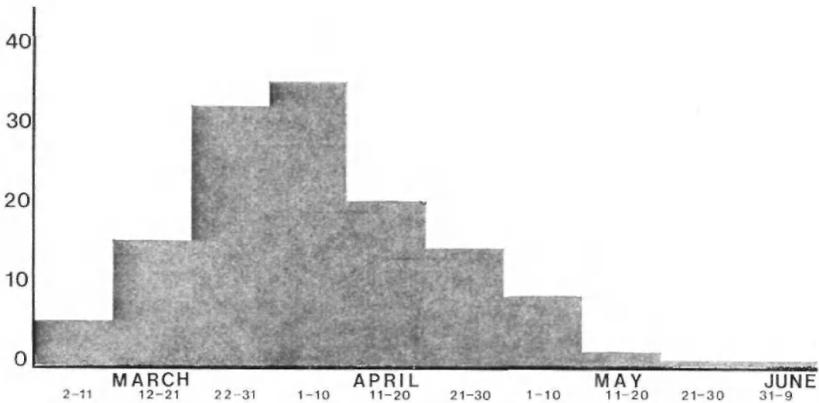


Fig. 2. First-egg laying dates calculated from 140 nest records of Long-eared Owls *Asio otus*, 1942-74. Mean laying date 4th April

While resident owls start laying in March and April, others of probable Continental origin continue to roost communally in adjacent woodland. On Fair Isle, for instance, Long-eared Owls bound for the Continent occur on spring passage between 18th February and 26th June, the bulk from late March to early May (Davis 1965), when most British and Irish residents are incubating full clutches. Such early nesting means that the majority of young will be developing and fledging during May and June, coinciding with the first flush of young rodents and small passerines.

Long-eared Owls regularly occupy copses throughout the summer without apparently attempting to nest. The recovery of ringed birds at the nest during the first year argues against these being immatures. As with

**84 and 85.** Long-eared Owls *Asio otus* at nest, Nottinghamshire, May 1973 (Derick Scott). Top, male arriving at nest with prey: female arches her wings and shields small young protectively; bottom, male at left has just had avian prey snatched from him by female, who 'barked' and is preparing to feed owlets



the Tawny Owl (Southern 1954, 1970), breeding attempts are probably governed by food availability, which probably also influences the number of replacement clutches and second broods. Records indicate frequent replacement of lost clutches (22 cases, four in the same nest) and occasionally a second brood (four). Two of the latter were in a detailed study by Scott in central England: at one site a second clutch of two eggs was laid in the original nest, and, at the other, a second nest 10 m from the first one was used; all were in Magpie nests in hawthorns.

### Food at the nest

The male owl deposits prey at the nest before egg-laying starts, delivers food to the female throughout the incubation period, and collects most of the food for the fledglings. Voles (Cricetidae), mice (Muridae), rats *Rattus* and shrews (Soricidae) form, on average, over 90% of the diet during the breeding season (Glue and Hammond 1974), with birds of secondary importance. The prey is usually delivered fresh and unutilized.

The range of surplus prey identified at nests includes many species typical of grassland, field and moor, illustrating that the Long-eared Owl hunts commonly over open country, as well as in closed woodland: short-tailed vole *Microtus agrestis* 8, wood mouse *Apodemus sylvaticus* 8, rabbit *Oryctolagus cuniculus* (young) 3, brown rat *Rattus norvegicus* 2, mole *Talpa europaea* 1, water vole *Arvicola terrestris* 1, Wheatear *Oenanthe oenanthe* 2, Chaffinch *Fringilla coelebs* 2, Reed Bunting *Emberiza schoeniclus* 2, House Sparrow *Passer domesticus* 2, Pheasant *Phasianus colchicus* (poult) 1, Woodpigeon *Columba palumbus* (squab) 1, Skylark *Alauda arvensis* 1, Song Thrush *Turdus philomelos* 1, Whitethroat *Sylvia communis* 1, and Meadow Pipit *Anthus pratensis* 1.

### Clutch size

In calculating clutch sizes of Long-eared Owls, nest histories were considered only when two or more visits over 48 hours apart were made to an active nest during the incubation period. From 72 nests, clutches of three to five eggs are shown to be frequent, two and six occasional, and one rare (table 6). Replacement clutches of three were usual. Clutches of seven and eight have been reported (Walpole-Bond 1938, Witherby *et al.* 1940). The mean clutch size from nest records (3.91) is significantly lower than the 4.53 for 15 clutches collected during 1867-1922 and housed in the British Museum (Natural History) (table 6), but the extent to which the latter were selected for their size is not known.

Before egg-laying, one or both parents roosts at or close to the nest. The eggs are short, elliptical, white and slightly glossy, and are normally

**Table 6. Numbers and sizes of clutches of Long-eared Owls *Asio otus* from 72 British Trust for Ornithology nest record cards and the British Museum (Natural History) collection**

	CLUTCH SIZE						Average clutch size
	1	2	3	4	5	6	
BTO nest records	1	4	20	26	18	3	3.91
British Museum	0	0	2	4	8	1	4.53



**86.** Young Long-eared Owl *Asio otus* about three weeks old, fledged previous night, Dumfriesshire, May 1971 (*Robert T. Smith*)



**87.** Young Long-eared Owl *Asio otus*, resting in typical pose on lateral branch against trunk, Co. Cork, June 1976 (*Richard T. Mills*)

**Table 7. Brood sizes of Long-eared Owls *Asio otus* from 89 British Trust for Ornithology nest record cards**

	BROOD SIZE						Average brood size
	1	2	3	4	5	6	
No. of broods	15	33	33	7	1	0	2.39

laid on alternate days. As a rule, incubation starts with the first egg, but may be delayed. It ranges from 25 to 30 days (Witherby *et al.* 1940) and is undertaken by the female, although the male has been known to incubate for short periods and to brood tiny young (Scott). Many females sit tight, not flushing until the tree is climbed; others will leave when the tree trunk is rapped.

### Breeding success

It is difficult to confirm the precise number of young successfully fledging because, when nests are examined, well-developed owlets will climb away along branches at tree nests or hide among the cover of bracken or brambles on the ground. A successful brood, therefore, is defined as one where the owlets were thought capable of leaving the nest when last seen. Young remain in the nest for 21 to 24 days, occasionally up to 26 or 27. Of 78 nests found during incubation and followed through to the fledging period, 32 (41%) resulted in at least one owlet reaching the flying stage.

Losses of complete clutches were high: in 39 (85%) of the 46 nests that failed. Where known, failure was caused by robbery by man (13), or infertile or addled eggs (4), with single clutches destroyed by rain, and taken by Hooded Crow and Jay; one nest was taken over by a Kestrel. Of the 267 eggs laid, at least 87 hatched and 69 young flew, but both are underestimates owing to early losses of young and premature fledging.

In most nests, one or two young died during the fledging period; only seven complete broods were lost, but only three of the 72 nests were proved to have raised the complete clutch successfully. More intensive studies are needed to show how strongly the breeding season and clutch size are related to the food supply, but it is clear that, in most years, the Long-eared Owl produces more eggs and hatches more young than it can hope to fledge.

### Acknowledgements

This summary was made possible by the many members of the BTO who submitted nest record cards. Derick Scott has spent hundreds of hours in the field studying Long-eared Owls and kindly added comments from his experience to the first draft of this paper; Tony Hardy, Robert Morgan and the late Kenneth Williamson also provided helpful criticism. Thanks are also due to Mrs A. Whitaker, who made available her late husband's diaries, and to Michael Walters, who extracted the British Museum (Natural History) data on owl clutches. Miss Stella Woodman typed from my manuscript and drew fig. 2.

### Summary

Details of breeding biology from 329 nests of Long-eared Owls *Asio otus* in Britain and Ireland during 1904-74 were studied. The chief nesting places were isolated plantations, shelter-belts, copses, hedges, scrub or scattered trees on heath and moor (33% of nests), farmland (24%), coastal/wetlands (15%) and woodlands (25.5%). Platforms formed by

old nests of other large birds (especially Magpie *Pica pica*, Carrion Crow *Corvus corone corone*, Hooded Crow *C. c. cornix* and Sparrowhawk *Accipiter nisus*), high in trees (73% conifers), were the main nest sites; less often, a cavity, nestbox or the ground was used. The laying season extended from late February to early June (mean for first egg, 4th April), with regular replacement clutches, but rarely a second brood. Clutch size ranged from one to eight eggs (usually three to five, mean 3.91); brood size one to five (usually two to three, mean 2.39). Some aspects of breeding behaviour are described.

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