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Seasonal variation in the abundance and habitat use of Barn Owls *Tyto alba* on lowland farmland

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We studied age structure, seasonal variation in abundance and habitat use in the Barn Owl *Tyto alba* on a lowland farmland area in central Portugal during 1991–93. Abundance varied markedly throughout the year and followed a similar pattern in different years. During the breeding season owls were scarce whereas in autumn their abundance was very high. Most of the owls occurring in the area were dispersing first-year individuals that probably only stayed for short periods. Lack of breeding sites might have been the cause of high turn-over, since Barn Owls usually breed when they are one year old. Owls preferred distinct habitat types in different periods of the year. Habitats with very tall and dense vegetation (sunflower, maize, reed beds) were not preferred and habitat structure seemed to have a great influence in habitat selection. Agricultural practices affected habitat utilization, and pastures, tilled fields and winter and summer culture stubbles were preferred on different times of the year. It is likely that Barn Owls need a certain degree of habitat heterogeneity to fulfill their foraging requirements throughout the year.

1. Introduction

Foraging habitat selection by birds can be affected by large-scale landscape units (e.g. Korpimäki 1986, Redpath 1995, Valkama *et al.* 1995) as well as by small-scale microhabitat variables (e.g. Rice *et al.* 1984, Wiens 1985, Widén 1994). These, in turn, will condition food availability, i.e. food abundance and accessibility (Perrins & Birkhead 1983, Cody 1985).

As most mobile predators, birds of prey should forage preferentially in habitat patches that assure the maximum energy intake (e.g. Pyke 1984, Stephens & Krebs 1986). Selected patches should be the most advantageous in terms of prey capture rate and minimum energy costs, which is determined by prey type, density and availability. Several studies have documented the importance of e.g. perch availability and distribution, and vegetation cover and structure for habitat selection and foraging of raptors (e.g. Wakeley 1978, Baker & Brooks 1981, Bechard 1982, Janes 1984, 1985, Korpimäki 1986, Widén 1994).

The Barn Owl *Tyto alba* is a medium-sized nocturnal raptor feeding mainly on small mammals. It has a cosmopolitan distribution and is adapted to human presence and frequently associated with man-modified habitats (Cramp 1985). Over the last few decades Barn Owl populations have severely decreased almost all over Europe and the species is now listed as a SPEC 3 species (i.e. a species whose global populations are not concentrated in Europe, but which have an unfavourable conservation status in Europe; Tucker & Heath 1994). This decrease was mainly due to habitat changes related to new agricultural practices and urbanization (e.g. Tucker & Heath 1994). As a consequence, Barn Owls have suffered from loss of suitable roost and nest-sites and hunting grounds, from the use of pesticides and from the expansion of road connections (e.g. Shawyer 1987, van der Hut *et al.* 1992, de Bruijn 1994, Taylor 1994, Ramsden 1998). The importance of natural hedges and other large-scale landscape features for Barn Owl distribution and abundance has already been studied (e.g. Shawyer 1989, van der Hut *et al.* 1992, Andries *et al.* 1994, Taylor 1994). However, there is a lack of published data on the relative importance of different habitat types for the species within the agricultural systems that it mainly inhabits.

In Europe, Barn Owls are mainly resident (Mikkola 1983, Cramp 1985) although juveniles can disperse more than 100 km (e.g. Bunn *et al.* 1982, Taylor 1994). Movements of Barn Owls have been studied with the help of ring recoveries (e.g. Bunn *et al.* 1982, Baudvin 1976, de Bruijn 1994, Taylor 1994) and more comprehensive data exist on distances moved than on local changes in owl abundance. Nevertheless, some studies using road casualties have shown that considerable seasonal variation can take place in local abundance in different regions of Europe (e.g. Glue 1973, de Bruijn 1994, Taylor 1994, Massemin *et al.* 1997). However, as far as we know, there are no published data quantifying local and seasonal differences in the abundance of Barn Owls using observations of live individuals.

In this paper we investigate habitat use by Barn Owls in a heterogeneous farmland area strongly influenced by human activities, and including different farmland practices. In particular, we paid attention to seasonal changes in the relative importance of the various habitats, since they should be taken into account in any model of land management with conservation aims. Secondly, we assess the importance of a lowland farmland area for Barn Owls and examine whether there is any seasonal and between-year variation in their abundance.

2. Methods

2.1. Study area

The study was conducted from October 1991 to December 1993. The study area, Ponta da Erva, is an alluvial plain of *ca.* 6219 ha, on the southern margin of the estuary of the river Tejo (38°50′N, 8°80′W), in the central part of the western coast of Portugal. In this region, winter is mild and wet and summer hot and dry. The area is almost totally (> 95%) occupied by agricultural fields (cereal, silage, sunflower and maize) and pastures. A huge system of wire fences and ditches separates different farming plots, and a large number of sandy roads, used for farming purposes, crosses most of the area. Natural vegetation subsists only in narrow field edges and in ditch margins (saltmarsh vegetation). Human constructions are reduced to a few houses and barns and traffic is insignificant, since there are no asphalt roads. The area is totally included in a Special Protection Area for Birds (Directive 79/409/EC) and partially in a national Nature Reserve. It is also included in an Important Bird Area (IBA 021 — Tejo estuary; Heath & Evans 2000).

2.2. Barn Owl abundance and distribution

To assess Barn Owl abundance and distribution we periodically conducted car transects within the study area, at a speed of 30–40 km/h (e.g. Fuller & Mosher 1981). On average three transects were carried out each month between October 1991 and December 1993. Five different transects (length: range 18.4–43.2km; mean ± SE: 40.0 km ± 0.5, n = 76) were conducted successively on different nights, and they were evenly distributed in space such that the entire study area was covered by them as efficiently as possible. They began on average 3.5 h after sunset (Tomé 1994) and were not performed during poor weather conditions (Bibby *et al.* 1992).

Barn Owls were detected with the help of car head lights (full beam) along the narrow strip that included the road and its margins. All owl locations were marked on maps (1: 25 000) for posterior identification of habitat use. Most of the owls did not fly after car approach, but if they flew we followed them with a light beam to avoid recounting the same individuals. A Kilometric Index of Abundance (I.K.A., e.g. Fuller & Mosher 1981, Ricci 1989a,b) was determined for each transect by dividing the number of owls observed by the total length of the transect (in km).

2.3. Capture and ringing

Owls were captured and individually colour-ringed in order to more accurately estimate the number of individuals (e.g. Bibby *et al.* 1992) and to determine age structure of the population. The birds were captured during additional transects conducted on nights between August 1992 and October 1993, by a novel method using a simulated mouse lure (Tomé 1994; see also Bull 1987). Age was ascertained on the basis of moult pattern (Taylor 1993). Ringed birds were intensively looked for along the transects.

2.4. Habitat composition

Habitat composition of the study area was based on data collected monthly during a simultaneous study (Leitão 1993), between October 1991 and September 1992. Between October 1992 and June 1993, additional visits were made using the same methodology, in order to map subsequent changes. In each visit, we recorded the type of habitat present in each farming plot in the study area. Five main habitat types were considered:

1. pastures — mainly occupied by herbaceous plants and mostly without cattle during autumn and winter. At the end of this period vegetation was dense and height could reach 1 m. In spring cattle was moved onto these patches and it fairly quickly consumed most of the vegetation.
2. winter cultures — cereal (especially oats *Avena* sp.) and silage fields. Seeding took place generally in October–November and harvesting in May–June.
3. summer cultures — sunflower and maize fields, usually seeded between March and May. They were almost permanently irrigated and were harvested in September.
4. tilled fields — resulting from ploughing before the seeding of winter or summer cultures, and sometimes of pastures in order to prevent the overgrowing of saltpan bushes. Melon cultivations (from March to August), which basically consisted of ploughed fields with patchy distributed melons were also included in this category.
5. reed beds — present only in small patches along the largest ditches.

2.5. Habitat use

The data on habitat use by the Barn Owls were collected between October 1991 and June 1993. All roads considered were bordered on both sides by similar fences and ditches. We only included observations of owls that were probably hunting (mostly from poles; see Tomé 1994) and that were already emancipated from parents.

Due to the narrowness of the roads (*ca.* 6 m), owls could quickly move from one side to the other and thus explore different hunting patches (and in fact they were regularly seen doing so). Therefore, if habitats differed in both sides of the roads, we considered the probability associated with foraging in each patch (i.e. 1 owl corresponded to 0.5 in each).

To determine the availability of each habitat for each transect, we summed the length of all farming plots with that habitat along the transect, using aerial photographs (1:15 000) for length calculations.

To determine if Barn Owls foraged in different habitats non-randomly, we compared the proportion of owls observed in each habitat with the proportion of the respective habitats in each transect. Since proportions of habitat types always sum to 1 and are not inter-independent (unit-sum constraint; see Aitchison 1986), we used compositional analysis to examine our data. This method renders the proportions independent and approximately normally distributed (Aebischer and Robertson 1992) by log-ratio transformation based on one of the proportions as denominator, after replacing zero values with 0.01. Using multivariate analysis of variance and a suitable statistic (Wilk's lambda, Λ), it is possible then to assess whether logratio differences (utilized–

available) differ significantly from 0 (random habitat use) over all the transects. Finally, a rank of the habitats can be composed, based on the relative use of each type, taking also into account when different ranks represent statistically significant differences in the relative utilization of the corresponding habitat types (for more details see Aitchison 1986, Aebischer & Robertson 1992, Aebischer *et al.* 1993, Valkama *et al.* 1998).

Due to temporal variations in habitat composition and structure (resulting from agricultural practices during the year), we considered three periods for the analysis: autumn (September to November), winter (December to February) and summer (June to August). Spring was excluded because the number of owls observed was always too small to allow any analysis (see Results). Each period has been studied in two different years. Overall, 45 transects were considered (Table 1), in which the number of owls varied between 3 and 38 (mean ± SE, 14.8 ± 9.6). Although we cannot totally reject the possibility that some owls may have been observed in more than one transect, it is probable that this involved few individuals, bearing in mind the interval between transects and the high turn-over of owls found in the area (see Results and Discussion).

Statistical tests are two-tailed and corrected for ties when appropriate. We used log-transformations to meet the normality requirements for parametric tests (Sokal & Rolf 1981) when needed, but if the data were not normally distributed even after transformations we used non-parametric tests (Siegel & Castellan 1988).

3. Results

3.1. Temporal variation in abundance

The abundance of Barn Owls varied temporally showing a clear pattern throughout the study period (Fig. 1). Abundance was highest from late summer to mid-autumn, when the abundance index almost reached 2.5 and the number of observed individuals per transect reached 70 (Tomé 1994). The abundance index decreased thereafter during winter, becoming close to zero in spring. It started increasing again in the beginning of summer. This pattern was repeatedly observed in all study years, in spite of some interannual variation in the index values (Fig. 1). The overall annual index did not, however, differ significantly between 1992 and 1993 (mean ± SE, 0.44 ± 0.05, n = 38 vs. 0.43 ± 0.09, n = 26; Mann-Whitney U-test, U = 400.50, P = 0.20).

3.2. Capture-recapture and age composition

Thirty-five owls were captured and colour-ringed, most of them at the end of summer and in the autumn of 1992 (29 between 9 August and 23 November). Although an intense effort for visual-recapture was made throughout the study period (on average 50% of all observed individuals were checked carefully for rings), only two birds (5.7%) of the previously ringed owls were observed, indicating very high turn-over or a very large population. One recapture occurred 43 days and the other just 2 days after ringing. Age was determined for 39 individuals (35 captured plus 4 found dead), 90% of which were caught during end of summer-autumn: all but one (a 2nd year bird) were less than one year old (1st year birds).

3.3. Habitat use

There was no significant year effect in habitat use within winter ($F_{1,8}$ = 3.13, P = 0.12) or summer ($F_{1,12}$ = 3.54, P = 0.053) transects, and therefore data were combined for both years. In the autumn data, there was a significant ($F_{1,19}$ = 4.79, P < 0.01) year effect and thus data were analyzed separately for each year.

Table 1. Seasonal distribution of the transects considered for the habitat use analysis.

Period	Autumn 1991	Winter 1991/92	Summer 1992	Autumn 1992	Winter 1992/93	Summer 1993	Total
No. of transects	7	5	10	14	5	4	45

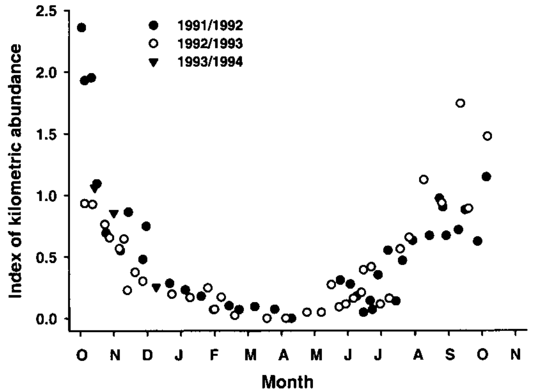

Fig. 1. Variation of the Index of Kilometric Abundance between 16 Oct 1991 and 22 Dec 1993. Note that breeding season of Barn Owls starts in mid-February and lasts until mid-May, and young owls become independent between late May and mid-July. Juvenile dispersal extends from early August to the end of November.

The selection of foraging habitats by Barn Owls was significantly non-random during summers 1992–93 ($\Lambda = 0.28$, $F_{4,13} = 6.38$, $P = 0.008$). During this period Barn Owls utilized pastures and tilled fields more than expected by their availability in the area (Fig. 2a). All the other habitats were used less than expected, but winter cultures represented the second most important habitat for the owls in the ranking matrix (Table 2). In this period there were no significant differences in use of the three top ranked habitats, meaning that the order of their ranks is interchangeable. Summer cultures and reed beds were significantly less used than all the other habitats, but the difference between them was not significant.

Habitat use was random in the autumn of 1991 (Fig. 2b; $\Lambda = 0.23$, $F_{4,6} = 2.54$, $P = 0.24$), but significantly non-random in autumn 1992 (Fig. 2c; $\Lambda = 0.08$, $F_{4,13} = 27.65$, $P = 0.0001$). During this period, summer cultures and, to a much lesser extent, tilled fields, were the only habitats utilized more than expected. Summer cultures were also significantly more used than any other habitat, while there were no detectable differences in the utilization of the second (tilled fields) and third (winter cultures) higher ranked habitats (Table 2). Reed beds were significantly less utilized than all other habitats.

During both winters habitat use was also non-random (Fig. 2d; $\Lambda = 0.0005$, $F_{4,8} = 2594.90$,

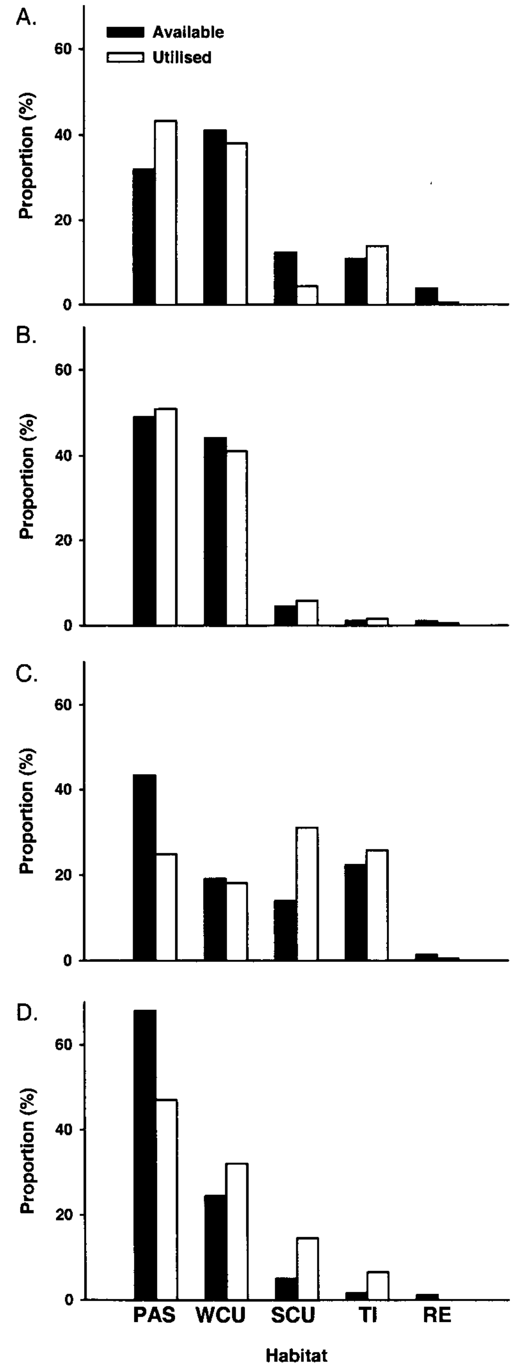

Fig. 2. Proportions of habitat availability (% of the total length sampled along transects) and use (% of the total number of owls seen in transects) in summers 1992 and 1993 (a), autumn 1991 (b), autumn 1992 (c) and winters 1991 and 1992 (d). PAS = pasture, WCU = winter cultures, SCU = summer cultures, TI = tillage and RE = reed.

P = 0.0001; the high F-value is probably due to consistent zero values of utilization of reed beds, see below). Summer cultures, tilled fields and winter cultures appeared to be the most preferred habitat types during both winters. No owls were seen foraging in reed beds, and this habitat was significantly less utilized than all the others (Table 2). Ranking of remaining habitats is complex, since no detectable differences were established between different pairs. Nevertheless, summer cultures seemed to represent the most important habitat for the owls.

4. Discussion

4.1. Seasonal patterns of abundance and population composition

The variation we observed in Barn Owl abundance was similar in 1992 and 1993 and was clearly related to different phases of the annual cycle of owls. In winter only a small number of owls was detected, probably including resident and wintering individuals. During the early breeding period (February–May, e.g. Bunn *et al.* 1982, Mikkola 1983, Cramp 1985, Rufino 1989) owl numbers were very low, corresponding to the breeding population of the study area. This was estimated at 7 to 10 pairs (i.e. *ca.* 1 pair per 6.3 km^2; Tomé 1994) and its density was intermediate to others obtained usually in western Europe (1 pair per 5 to 50 km^2; e.g. Bunn *et al.* 1982, Cramp 1985, Taylor 1991, de Bruijn 1994, Hagemeijer & Blair 1997). Between the end of May and the end of July owls were more abundant. The abundance peaks within this period could have corresponded to fledging of first broods and the abrupt declines to the initiation of second broods (e.g. Baudvin 1975, Mikkola 1983) and to the abandonment of the area by some juveniles (for more details see Tomé 1994). From the beginning of August, owl abundance increased almost continuously, reaching its maximum by mid-September or mid-October. This increase coincided with the main period of juvenile dispersal (September–November; Cramp 1985, Baudvin 1986, de Bruijn 1994, Taylor 1994), and most of the owls probably left the area during autumn, since owls became gradually less abundant after October.

We found that the vast majority of owls that occurred in the study area during the end of summer/autumn period were first year individuals. Although it may be easier to catch young, inexperienced individuals, the disproportion appeared too high (only one owl was not a first year bird) to be only explained by biased sampling. Most of the owls probably came from areas surrounding the Tejo estuary, since the average juvenile dispersal distance for Barn Owls is reported to be less than 50 km in most European regions (e.g. Bunn *et al.* 1982, de Bruijn 1994, Taylor 1994).

Extensive farmland usually comprises good foraging habitats for Barn Owls (e.g. van der Hut *et al.* 1992, de Bruijn 1994, Taylor 1994). This probably justifies the high number of dispersing individuals and the relatively long period during which owl abundance was very high in our study area. Good hunting areas are essential for young owls, since a high percentage of their mortality is

Table 2. Ranking of habitats (> indicates higher rank, i.e. relatively higher utilization) in periods when habitat use by barn owls was non-random. Habitats are assigned the same letter if their relative use did not differ significantly. Data from summers 1992 and 1993, and winters 1991 and 1992 were combined for analysis (see text).

Summers				
Pasture	> Winter cult.	> Tilled	> Summer cult.	> Reed
a	a	a	b	b
Autumn 92				
Summer cult.	> Tilled	> Winter cult.	> Pasture	> Reed
a	b	b	c	d
Winters				
Summer cult.	> Tilled	> Winter cult.	> Pasture	> Reed
a	abc	b	c	d

due to starvation and diseases as a consequence of bad hunting performances (e.g. Newton *et al.* 1991, de Bruijn 1994, Taylor 1994).

In our study, the number of recaptures was very small, in spite of the considerable number of owls captured and the high visual recapture effort. This strongly suggests the occurrence of a very large number of owls and/or that the turnover is high, apparently during the entire non-breeding period. Moreover, one of the two recaptured birds (the individual observed after a 43 days interval) was the only non-juvenile caught: adult birds execute much infrequent and less extensive movements than juveniles (e.g. Bunn *et al.* 1982, de Bruijn 1994, Taylor 1994). High turn-over rates and/or the fact that most birds abandon the area until January may be a consequence of movements in search for suitable nesting sites, since Barn Owls usually breed when they are one year old (Bunn & Warburton 1977, Cramp 1985) and the few rural buildings are already occupied by adult pairs.

The Barn Owl is mainly a sedentary species, especially in Southern Europe, where it is not affected by periodic cycles of prey abundance or by harsh winter conditions to such an extent as in Central Europe (e.g. Mikkola 1983, Cramp 1985, Taylor 1994). As a result, little attention has been paid to Barn Owl movements during their annual cycle and most of the information reports only of breeding and natal dispersal (*sensu* Greenwood 1980) distances. Our results show a clear pattern of seasonal variation in the abundance of these owls at a local scale, indicating the existence of considerable movements of juvenile birds throughout the year. A simultaneous study on road casualties in an area just 10 km away from our study site also revealed a similar pattern: during one year, 57 Barn Owls were found dead within a distance of 20 km, 86% of which between October and January (J. M. Marques, unpublished data). Unfortunately, we could not find any other studies reporting abundance changes in Barn Owls outside breeding season to which we could compare our results.

The fact that the area is located in an estuary might have also contributed to the high numbers observed. Natural hedges, one of the most important habitats for the owls in terms of food supply (e.g. van der Hut *et al.* 1992, de Bruijn 1994, Taylor 1994), are more frequent along river courses and it is possible that juvenile Barn Owls tend to follow rivers in order to obtain favorable hunting habitats.

4.2. Habitat use

Barn Owls appeared to prefer different hunting habitats throughout the year. Habitat structure seemed to have great influence on habitat selection, which was expected since it influences prey availability (e.g. Southern & Lowe 1968, Korpimäki 1986, Bechard 1982). Habitats with very tall or dense vegetation (reed beds and, in summer, summer cultures) were always significantly less used than all the others, because they are practically impenetrable for the owls due to high plant density, structure and height (1.5 m for sunflowers and 3 m for maize). On the other hand, tilled fields, where prey are probably not abundant, was one of the most used habitats at all seasons.

Habitat selection was also probably related to prey density and distribution, as in other raptors (Cody 1985, Janes 1985). In our study area, Barn Owls feed almost exclusively on small mammals (especially mice *Mus* sp., Tomé 1994) at all seasons. The abundance of small mammals depends on several characteristics of soil and ground cover (e.g. Bunn *et al.* 1982, Hardy 1992, van der Hut *et al.* 1992, Taylor 1994) and thus is affected by seasonal variations in habitat composition and structure due to farmland practices.

Pastures, which usually support high densities of small mammals (e.g. Hardy 1992, Taylor *et al.* 1992, van der Hut *et al.* 1992) were preferred by Barn Owls during summer. By late summer, vegetation has been almost totally destroyed by cattle, which presumably reduced mice density. This, in turn, might explain why the owls used pastures significantly less than other habitats during autumn. In winter, when vegetation was again higher, importance of pastures for Barn Owls increased.

Winter cultures were also preferred by the owls in different seasons, but especially after harvesting, in summer. Harvesting leaves plenty of food (seeds, stems, etc.) that may support high densities of small mammals. Mice abundance is also probably high later during autumn and winter, after seeds have been planted.

Barn Owls selected tilled fields throughout the study period, and only during autumn they were significantly less utilized than other habitat in relation to their availability. Besides their structural advantages for the hunting owls, tilled fields sometimes provide abundant prey, especially some rodents and invertebrates (e.g. Tellería 1988, Leitão 1993).

In the autumn, shortly after harvesting, summer cultures were the most preferred habitat type. Prey were abundant in these stubbles, because the large amount of fallen seeds attracted large numbers of passerines and mice. The relative importance of stubble fields for the owls decreased in winter, when food resources for prey were probably less available.

Only in the autumn of 1991, habitat use was apparently random. This result may be related to drought in that year, since it might have led to lower numbers of prey even in most favourable habitats. In addition, the two most used habitats in 1992 were much less available in 1991: in this year summer cultures occupied two thirds of the area occupied in 1992 (9.0% vs. 13.9%) and tilled fields were absent.

4.3. Importance of lowland farmland for Barn Owls

Lowland farmland habitats may constitute highly favorable areas for the Barn Owl in Southern Europe, as indicated by the very high numbers of owls observed in our study. High landscape heterogeneity, along with the presence of ditches and fences bordered by dense strips of vegetation may support high prey densities, especially small mammals (e.g. Hardy 1992, Taylor 1994). Abundance of hunting perches (fence poles) is also important, especially during winter, when energetic constraints increase (Village 1983, Masman *et al.* 1988, Taylor 1994). Consequently, lowland farmland may increase the survival of a large number of individuals in autumn, when usually the juvenile mortality is highest (de Bruijn 1994, Taylor 1994), and might contribute decisively to the population dynamics of the species, at least on a local scale.

Barn Owls appear to benefit from landscape heterogeneity in lowland farmland, as they forage differently throughout the year in distinct types of habitats and their relative importance for the owls vary seasonally. In our study, the major part of habitat types was selected preferentially during a certain period, but none of them was preferred in all seasons. Agricultural practices have a major influence on habitat selection, but owls seem to benefit from both traditional (e.g. extensive pastures) and modern (e.g. irrigated sunflower fields) practices. Although it seems probable that Barn Owls do need a certain degree of habitat heterogeneity at all phases of the year, further studies are required to show how heterogeneity affects home range composition and size, and breeding success.

Provision of nest boxes is likely to be a beneficial conservation strategy in lowland farmland, where remaining habitat conditions seem to be advantageous. Nest boxes are readily used by Barn Owls (Bunn *et al.* 1982, de Bruijn 1994, Ramsden 1998), and considering the high number of birds that visited our study area during dispersal, it is possible that local populations would increase very rapidly.

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Selostus: **Tornipöllöjen *Tyto alba* runsaus ja niiden käyttämät saalistushabitaatit vaihtelevat huomattavasti vuodenajan mukaan Portugalissa**

Tutkimme tornipöllöjen ikärakenteen, runsauden ja pöllöjen saalistushabitaattien vuodenaikaismuutoksia Keski-Portugalissa vuosina 1991–1993. Tutkimusalue (n. 62 km^2) sijaitsi lähellä

Tejo-joen suistoa, ja yli 95 % maa-alasta oli viljelykäytössä. Alueella viljeltiin lähinnä viljaa, auringonkukkaa ja maissia. Osa pelloista oli laitumena tai säilörehunurmena.

Pesimisaikana helmi-heinäkuussa tornipöllöjä havaittiin laskennoissa niukalti; alueella pesi vain muutama pari. Syksyllä tutkimusalueelle kuitenkin vaelsi huomattavan paljon tornipöllöjä ja niiden runsaus oli suurimmillaan syys–lokakuussa. Suurin osa linnuista oli nuoria (samana kesänä syntyneitä) ja ne näyttivät viipyvän alueella vain lyhyen ajan.

Lintujen saalistushabitaatin valinta näytti vaihtelevan huomattavasti suhteessa vuodenaikaan. Yleisesti ottaen pöllöt karttoivat korkeaa kasvillisuutta, kuten auringonkukka- ja maissipeltoja sekä ruovikoita. Laitumet sekä kynnös- ja sänkipellot puolestaan olivat suosittuja saalistusalueita, mutta niiden suosio oli erilaista eri vuodenaikoina. Tutkimusalueen habitaattien alueellinen ja ajallinen vaihtelu on ilmeisesti edullista tornipöllöille. Pöntötystä lisäämällä alueelle olisi todennäköisesti mahdollista saada myös oma pesimäkantansa.

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