Barn Owl *Tyto alba* Management and Monitoring in south-west Hungary

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ABSTRACT

The Barn Owl population in south-west-Hungary (Baranya county) has been monitored since 1985, and its active conservation and population management with nestboxes was launched in the 1990s. Between the first Barn Owl population assessments in the region in 1985-1986 and 2001, a total of 122 nesting sites were furnished with nestboxes. Because the number of boxes increased with time, values of nesting parameters were standardised for 100 boxes. A monitoring rate was calculated as the proportion of successfully checked boxes relative to the total number of boxes, which rate, after the initial difficulties during the first year, turned out to exceed 90% in 2001. The number of nestboxes followed a linear growth during the eight years, but their occupation frequency changed in line with current barn owl abundance values. There was no significant correlation between the number of boxes provided and the number of boxes occupied by owls (r = 0.56, NS), suggesting that the rate of occupation was independent from the number of boxes placed out. Nesting parameters were analysed for the period 1995-2001, during which time a total of 336 box nestings was recorded. This gives an average of 48 nestings per year, or 51.6 nestings per year per 100 boxes. In years with lower numbers of nestings (1996, 1997), nesting success did not decrease or deviate from the average significantly. Annual nesting success varied between 80% in 1999 and 90% in 1997

INTRODUCTION

Both in its nesting and feeding, the Barn Owl *Tyto alba* is closely associated with human settlements and their surroundings (Mikkola 1983). Church restoration activities in the study area were started in the early 1970s and have continued until the present day, and the closing of church towers deprived the owls of their tradition al nesting sites (Bank 1990). There are several examples showing thet the provision of nest-boxes can stop population decline, and by

ensuring favourable conditions for nesting can help increase breeding densities (Braaksma & de Briujn 1976; Julliard and Beuret 1983; Colvin 1984,;Duckett 1991; Regisser 1991; Taylor *et al.* 1992). Provision of nestboxes has for long been a practical means of conserving Barn Owls and also al.lows clutch size, nesting success, and all other nesting parameters to be more easiloy monitored than in natural sites. Hence nestbox management regularly contributes to studies of Barn Owlos, enabling efficient and accurate data collection (Taylor 1994).

Surveying of the population found in Baranya county was started in 1985-86, with the inclusion of members of the Baranya County Group of Bird Life Hungary. The survey was primarily focused on the most significant nesting sites, i.e.church towers. A total of 150 towers out of 330 examined were open, and traces of Barn Owl presence were found in 87 of them (Bank 1990).

In the present study we provide an evaluation of Barn Owl conservation activities between 1995-2001 based on nestbox studies, by analysing (i) the annual changes of nesting parameters, (ii) hatching, fledging and reproductive success, and (iii) monitoring success recorded during Barn Owl management.

MATERIAL AND METHODS

Placing out nestboxes in closed church towers was launched in 1987, but we started detailed data collection only in 1995, from 47 boxes. The nestboxes applied are $100 \times 50 \times 50$ cm, with a 15×15 cm entrance opening and a separator sheet dividing the box into two compartments of identical size. Boxes were checked for the first time in early April, tafter which the frequency of further checkings was adjusted to the stage of nesting.

Occupancy rates weere analysed (occupancy rate = number of occupied boxes / total number of boxes), in relation to the number of boxes available.

During visits we recorded clutch size, or the number of hatched, fledged or flying chicks. As the data referred different numbers of boxes each year, we also standardized the parameters for 100 boxes. and the resulting figure was multiplied by nestbox occupancy rate. The standardized values were compared using Mann-Whitney U-test.

RESULTS

Evaluation of nestbox occupancy

During the course of seven years, the number of nestboxes placed out grew almost threefold. Nestbox occupancy exceeded 60% in the first year of the investigation, then in 1996 less than 30% of the boxes were occupied, indicating a marked decline of the region's Barn Owl population. In 1997 this tendency further strengthened, with a 10% occupancy rate indicating the dramatic decline of the population. In 1998 the number of nest-boxes further increased, and by 1999 occupancy rate had reached 50%. With further nestboxes continuously being provided, from 1998 occupancy rate increased at a yearly 10%, until in 2001 it exceeded the value recorded in 1995 (Figure 1.). While the number of boxes grew progressively as more and more were provided each year, the rate of their occupancy changed as a function of population size. There was no significant correlation found between the number of boxes provided and the rate of their occupancy (r = 0.48, NS), suggesting that the degree at which the boxes were utilized was largely independent of the number of available boxes (Figure 2.).





Figure 2. Correlation between number of nestboxes and occupancy rate



Clutch size, number of hatchlings, hatching success

The first year of the investigations was a successful one in terms of Barn Owl nesting, as reflected by standardized average clutch size. However, three less successful years followed, which were represented by smaller clutches (Figure 3.). The lowest value for standardized number of eggs was recorded in 1996, but as to standardized averages, the lowest was observed in 1997. The standardized number of eggs in 1995 was significantly different from the rest of the years (z = 5.03-8.31, p < 0.001), since this year had the highest average value. As of 1998 the number of eggs in a nest grew continuously; however, average clutch size dropped back in 2000.

Figure 3. Absolute and standardized values of number of eggs and their mean values



The fact that 1995 was a year of success for the barn owls was also shown by the high number of hatched chiks. The standardized average number of hatched chicks in 1997 was significantly less than in any of the other years (z =2.45 - 3.46, p < 0.001), since the small clutches determined the possible number of hatching chicks (Figure 4.).

Figure 4. Absolute and standardized values of number of hatched chicks and their mean values



In terms of average clutch size and average number of hatching chicks, the year 1999 was rather successful, but hatching success was lowest in this year (Figure 5.), whereas in less successful years (1996 and 1997) hatching success was above average, meaning that smaller clutches were incubated more successfully by the parent birds. The high hatching success in these years may have indicated that mostly the older, more experienced individuals were the ones that successfully raised their young.

Figure 5. Absolute and standardized values of fledged chicks and their mean values



Number of fledging chicks, fledging success, reproductive success

Between 1996-1998, the absolute and standard averages of chicks leaving the nest in different years followed opposite trends: standardized values decreased, whereas absolute values increased. However, from 1998 the two parameters followed parallel trends, showing synchronously a growth in the number of chicks (Figure 6.). Again, the standardized average number of fledging chicks in 1995 was higher than in any other year (z = 3.78 - 6.34, p < 0,001).

Figure 6. Number of clutches and success rates (hatching, fledging and breeding)



From fledging and nesting success results (Figures 5.) it appears that, although in 1997 both clutch sizes and the numbers of hatching and fledging chicks dramatically decreased in comparison with the rest of the years, the

small clutches were more successfully incubated by breeding pairs, and also that the birds were successful in raising their chicks. This is probably due to the fact that the severe winter of 1996-1997 caused higher mortality, with the more experienced older pairs surviving which were more successful in their nesting.

In 1999 the number of nestings increased, but at the same time fledging success and reproductive success declined. However, in the years that followed, as the number of nestings grew, success rate also became higher.

Monitoring success

Successfully monitored nestboxes were the ones in which it was possible to follow breeding throughout the entire breeding period. After initial difficulties rising in the first years, monitoring rate exceeded 90 % in 2001 (Figure 7.). Easy access to the boxes, the possibility of frequent checking, and the precise timing of checkings during the breeding period together mean t a small degree of disturbance as well as sets of remarkably exact breeding data.





DISCUSSION

The 122 nest-boxes placed out before 2001 provided a continuously widening, representative data set which allowed for more precise statistical calculations of nesting data. A total of 83 nesting pairs were recorded in the 122 nest-boxes in 2001. It has been reported from the Netherlands that during a seven-year period 1968-1975 15 pairs settled in the 29 nest-boxes installed (Braaksma & de Brujin 1976). Nest-box Barn Owl management was done in France over 12 years between 1978-1990, during which 90 pairs were recorded in 215 nest-boxes (Regisser 1991). Based on our own data from seven years it appeared that the severe winter in 1996-1997 greatly reduced the Barn Owl population in the region. The reduction was caused by the fact that because of the long and cold winter small mammals increased in late summer, rather than in spring, as in previous years (Horváth 1998). However, the high hatching success suggests that only the older, more experienced pairs succeeded in nesting, implying that it was only these individuals that survived the harsh winter. The studied population needed two years to recover.

For a more accurate assessment of the region's Barn Owl population it would be necessary to study also the pairs nesting outside artifcial nest-boxes but, because of the difficulties involved, d this method is believed to have low accuracy. Consequently, for the further efficient conservation of the Barn Owl in the region, it is recommended that more nest-boxes should be provided and their monitoring should be continued.

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