

# NEST-SITE SELECTION AND BREEDING SUCCESS OF THE LESSER GREY SHRIKE (*Lanius minor*) IN HUNGARY

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## ABSTRACT

Lovászi P., Bártol I., Moskát C. 2000. *Nest-site selection and breeding success of the Lesser Grey Shrike (Lanius minor) in Hungary*. Ring 22, 1: 157-164.

We investigated the nest-site selection of the Lesser Grey Shrike by comparing nest-site characteristics of the vegetation structure with availability in southern and central Hungary in 1998-1999. During a general survey in 1998, in southern Hungary, we found 126 territories of the Lesser Grey Shrike in an area of 2250 km<sup>2</sup>, so density of breeding pairs was 0.05/km<sup>2</sup>. Shrikes preferred short-grass steppes and nested in scattered groups of trees, small patches of woodlands and roadside trees. Most of the 98 Lesser Grey Shrike nests we found were built on poplars and locust trees. There was a significant difference detected in nest location between the two main study sites – Apaj and Baks. In Apaj, Lesser Grey Shrikes chose significantly higher trees than expected basing on the random sample, while in Baks no significant difference existed. This could be explained by the more relevant human disturbance and the dominance of the higher poplar trees in Apaj. We conclude that nest-site selection of the Lesser Grey Shrike mainly depends on the quality and proximity of good foraging areas and is less affected by habitat characteristics. Breeding success of the Lesser Grey Shrike was low both in southern and central Hungary. This was due to the high rate of nest predation during the incubation period and unfavourable weather conditions during the nestling period.

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## INTRODUCTION

The Lesser Grey Shrike has a well-defined breeding range, which extends over 6500 km from north eastern Spain to central Asia, and shows *ca* 2500 km long range from the 55°N in European Russia south to the northern coast of the Mediterranean Sea (Cramp and Perrins 1993, Hagemeijer and Blair 1997). Until the early 20<sup>th</sup> century, the Lesser Grey Shrike was a common bird species all over Europe. After a

moderate population fluctuation recorded in the 1930s, a decrease in its breeding range was reported mainly from the western European countries in the 1960s. This led to the disappearance of the species from many countries. Besides the abrupt decline in western Europe, a continuous decrease in the population was observed along the NW-SE gradient in Europe (Lefranc 1995). The largest populations can be found in east-central and eastern Europe (Slovakia – 400-600 breeding pairs, Hungary – 5000-8000, Yugoslavia – no data, Romania – 30 000-70 000, Ukraine – 3000-3500; Tucker and Heath 1994).

In Hungary, at the beginning of the 20<sup>th</sup> century, the Lesser Grey Shrike was reported as the most numerous shrike species (Herman 1901). Between 1970 and 1990, the Hungarian population decreased, although since 1990 some local populations have shown signs of recovery (Magyar *et al.* 1998). Nowadays the Red-backed Shrike (*L. collurio*) is more abundant than the Lesser Grey Shrike almost everywhere in the country and the Lesser Grey Shrike is listed as a threatened breeding species in the Hungarian Red Data Book (Rakonczay 1989). In Hungary, the Lesser Grey Shrike is concentrated in some places in the Great Plain, but also occurs in a smaller number on the southern slopes of foothills, in pastures and orchards (Magyar *et al.* 1998). In the Hungarian Great Plain, the Lesser Grey Shrike prefers short-grass steppes and often nests in tree lines along roads, windbreaks or in a small group of trees.

In the present study, we investigated nest site selection of the Lesser Grey Shrike by comparing characteristics of the vegetation structure at nest-sites with that of randomly chosen points. We wanted to discover what habitat and microhabitat parameters are preferred by the Lesser Grey Shrike in Hungary. As breeding success is one of the most important factors affecting the survival of threatened populations, we also compared breeding success of the Lesser Grey Shrike in two main habitat types, rows of Poplar (*Populus* sp.) and clusters of Locust Trees (*Robinia pseudoacacia*).

## STUDY AREA AND METHODS

The study was conducted in three parts of the Hungarian Great Plain.

1. Southern Hungary. In 1998 we conducted a general survey in southern Hungary in Csongrád County on 2250 km<sup>2</sup>. We conducted a more detailed study in two parts of the Kiskunság National Park (Fig. 1).
2. Baks Puszta (46°30'N, 20°05'E). This study site is within study area „Southern Hungary”, ca 25 km NE from the town Szeged. The area is mainly covered by short-grass steppe vegetation (called „puszta”), but many other habitat types (saline lakes, fishponds, marshes, groves of oak, small woods of the locust tree) formed a mosaic-like landscape. Most parts of the area are managed by farmers, mainly by grass mowing and grazed by cattle or sheep. The size of this site was ca 30 km<sup>2</sup>. In this site, our study was conducted in 1998 and 1999.

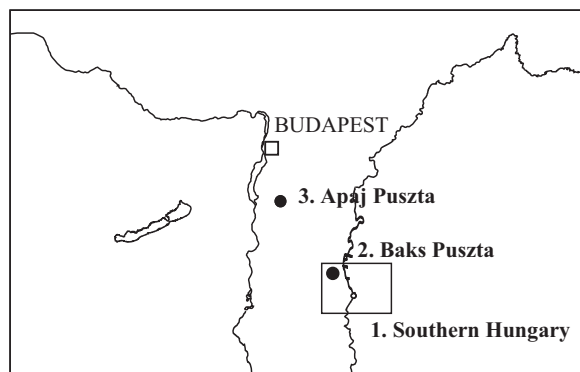


Fig. 1. Map of the study sites in Hungary

3. Apaj Puszta (47°10'N, 19°10'E). This study site, in central Hungary, *ca* 40-60 km SE from Budapest, is in the surroundings of the settlements of Apaj and Kunszentmiklós. This site is a mosaic-type landscape composed of alkaline grasslands (steppe vegetation), small groves and groups of trees, roadside tree-lines, irrigation ditches and cultivated fields. Extensive grazing, as the traditional way of land use, still survived in most of the area, although some grasslands have been ploughed up to grow crops. This site was *ca* 50 km<sup>2</sup> and the study was conducted in 1999.

Fieldwork was conducted between early May and late July in both years and in each of the study sites. From early May we looked for Lesser Grey Shrikes from a slowly moving car (*ca* 30 km/h). Each observation of the Lesser Grey Shrike was plotted onto a survey map and we searched for the nest with binoculars. A habitat survey was carried out for each nest found. We recorded the tree species used for nesting and also estimated the height of the tree, as well as the nest height from the ground level. Additionally, heights of randomly selected trees were also estimated. To calculate breeding success, clutch size, number of hatched chicks and fledged juveniles were also recorded.

## RESULTS AND DISCUSSION

### Nest-site selection

During our general survey in 1998 in Southern Hungary, 126 territories of the Lesser Grey Shrike were found on the area of 2250 km<sup>2</sup>, so density of breeding pairs was 0.05/km<sup>2</sup>. The highest density was detected in Baks Puszta (0.6/km<sup>2</sup>), where 18 pairs were discovered in 1998, but in 1999 only 3 breeding pairs were observed (Table 1). This confirms the great year-to-year fluctuation in the population as reported by Tucker and Heath (1994). Altogether 9 tree species were found when trees were selected randomly but only five tree species were used by the Lesser

Grey Shrike for nesting (Table 2). Most of the Lesser Grey Shrike nests were built on Poplars and Locust Trees. The rest of the tree species seems to be less important, so we pooled them for further analysis under the term „others.” Some difference was revealed in the tree use for nesting in the two main study sites. In Apaj Puszta, Lesser Grey Shrikes selected tree species randomly, so there wasn't any significant difference in the use and availability ( $\chi^2 = 7.77$ ,  $df = 2$ ,  $p > 0.05$ ), but in Baks Puszta birds selected Locust Tree more frequently than it was expected ( $\chi^2 = 3.11$ ,  $df = 2$ ,  $p < 0.05$ ). Horváth (1959) also reported that Lesser Grey Shrikes in Hungary preferred Poplar and Locust Tree species for nesting, but in Slovakia 97% of nests were built on fruit trees (Kristín 1995).

Table 1  
Number of Lesser Grey Shrike nests found in Hungary during 1998-1999

	Apaj	Baks	Other places in southern Hungary
1998	–	18	26
1999	50	3	1
Total	50	21	27

Table 2  
Frequency of tree species used for nesting and selected randomly  
in two study sites in Hungary

	Apaj Puszta		Baks Puszta	
	Nest	Random	Nest	Random
Poplar ( <i>Populus</i> sp. )	44	28	1	2
Locust Tree ( <i>Robinia pseudoacacia</i> )	4	10	19	16
European Elm ( <i>Ulmus laevis</i> )	1	1	-	1
Willow Tree ( <i>Salix</i> sp.)	1	-	1	1
Apple Tree ( <i>Malus</i> sp.)	-	-	-	-
English Oak ( <i>Quercus robur</i> )	-	1	-	-
Tree of Heaven ( <i>Ailanthus altissima</i> )	-	1	-	-
Oleaster ( <i>Eleagnus angustifolia</i> )	-	2	-	3
Plane Tree ( <i>Platanus</i> sp.)	-	1	-	-
Pear ( <i>Pyrus</i> sp.)	-	-	-	1
Total	50	44	21	24

Birds chose higher trees for nesting ( $t = 4.23$ ,  $df = 69$ ,  $p < 0.01$ ) (Fig. 2) and built their nests significantly higher ( $t = 3.31$ ,  $df = 69$ ,  $p < 0.05$ ) in Apaj than in Baks (Fig. 3). Additionally, in Apaj Puszta, the Lesser Grey Shrike chose higher trees than it was expected based on the random sample ( $t = 5.11$ ,  $df = 92$ ,  $p < 0.01$ ) (Fig. 4.), while in Baks Puszta no significant difference was detected ( $t = 0.25$ ,  $df = 43$ ,  $p = 0.79$ ). A comparison of heights of randomly selected trees did not show any significant difference between sites Baks and Apaj ( $t = 0.79$ ,  $df = 66$ ,  $p = 0.43$ ). The former difference could mainly be explained by human disturbance,

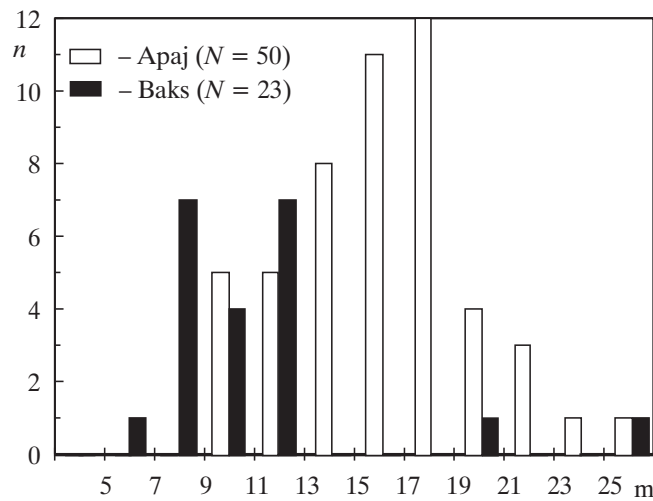


Fig. 2. Nest trees height distribution at Apaj Puszta and Baks Puszta

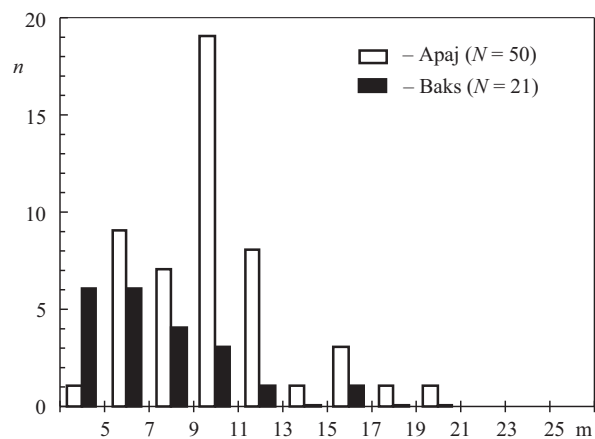


Fig. 3. Nest height distribution at Apaj Puszta and Baks Puszta

which was more extensive in Apaj. However, it might also be the consequence of the different tree species composition of the two areas. On the basis of our results we may conclude that nest site selection of the Lesser Grey Shrike mainly depends on the quality and proximity of good foraging places and is less affected by habitat characteristics in the nest locality.

### Nesting-success

We studied 20 nests from the egg-laying stage until the fledging period. In each of the sites a rather low reproductive success was detected (Table 3). In general, most losses of shrike nests occurring during egg-laying and incubation are caused by

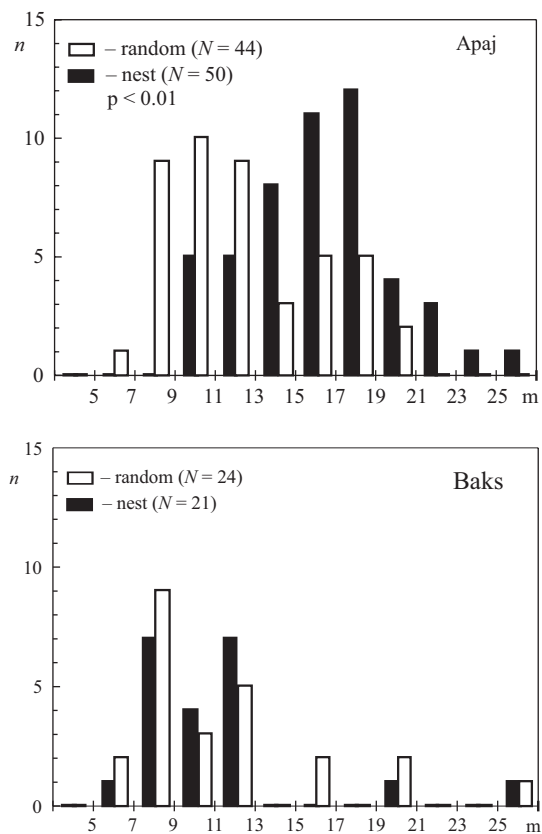


Fig. 4. Distribution of trees chosen by shrikes for nesting *versus* randomly selected trees at Apaj and Baks

Table 3  
Breeding success of the Lesser Grey Shrike in southern Hungary (Baks Puszta, 1998)  
and in central Hungary (Apaj Puszta, 1999)

No. of eggs, nestlings or fledgelings / nest	Number of nests					
	Incubated		Hatched		Fledged	
fledgelings / nest	Baks	Apaj	Baks	Apaj	Baks	Apaj
0	7	-	9	7	11	17
1	-	-	-	-	1	-
2	-	-	3	-	5	-
3	-	2	1	-	4	-
4	5	2	7	4	1	1
5	5	4	3	7	-	2
6	1	4	-	1	-	-
7	-	1	-	1	-	-
<i>N</i>	18	13	23	20	22	20
Mean $\pm$ SD	2.83 $\pm$ 2.38	5.00 $\pm$ 1.22	2.26 $\pm$ 2.02	3.20 $\pm$ 2.50	1.22 $\pm$ 1.38	0.70 $\pm$ 1.72

predation, extreme weather conditions and disturbance (Mercum and Yosef 1998, Diehl 1995). In Apaj Puszta in 1999, the rate of predation was rather high (31.8%). This can also be corroborated with the results of our study of artificial nests predation, when 68.8% of the nests were depredated within 7 days (Bártol and Lovászi – unpubl. data). The main predators were corvids – like the Magpie (*Pica pica*) and Hooded Crow (*Corvus cornix*). These results are similar to the findings of Warncke (1958), Tucker and Heath (1994) and Kristín (pers. comm.).

The Lesser Grey Shrike is well adapted to continental climate, characterised by hot summers and little rainfall (Tucker and Heath 1994), and cold weather combined with persistent precipitation might be catastrophic for the survival of Lesser Grey Shrike nestlings (Lefranc 1993). This was the case in Apaj Puszta in 1999. After a one-week period of harsh weather, 85% of the active nests, mostly with nestlings, did not survive. The same was experienced by Przygodda (after Haensel 1963), who predicted that newly hatched birds failed to survive when temperatures dropped below 17°C. Adults also have to face the serious food-shortage caused by bad weather, which reduces insect activity. Additionally, unlike other *Laniidae*, the Lesser Grey Shrike has a rather narrow diet and rarely caches food, which makes the species even more susceptible to these negative influences (Lefranc and Worfolk 1998).

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