Hirundo 18: 10–17 (2005)

HABITAT USE OF THE RED-BACKED SHRIKE IN ESTONIA

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The Red-backed Shrike *Lanius collurio* is a common bird species in Estonia but has been declining here as in several other European countries. The current study, based on the nesting card data, analyses the habitat use of the Red-backed Shrike in Estonia in 1942–2001. The most frequently recorded habitat is the vicinity of human settlements, and the use of this biotope has increased significantly. Clear-cuts, wooden meadows, grasslands and shrubs belong to frequently used biotopes as well. Nests have been found on 41 plant species but 41% of all the nests have been on spruces. The average height of the nest tree was 2.8 m and the average height of the nest was 1.2 m. There was no difference in the average nest height of successfully and unsuccessfully bred pairs.

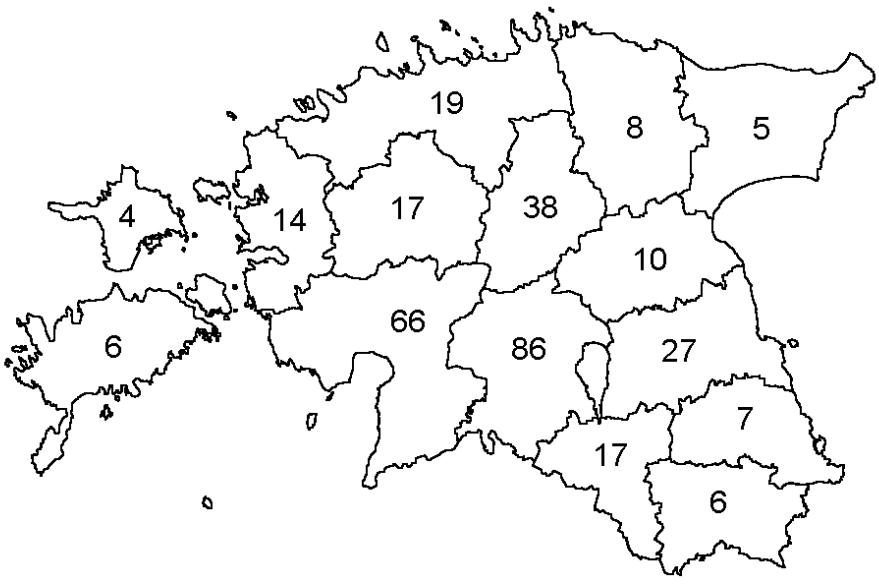
Introduction

The Red-backed Shrike *Lanius collurio* is a common bird species in Estonia with a breeding population of 20 000 – 35 000 pairs; however, the numbers have decreased remarkably (Elts *et al*. 2003). The decline has been observed also in other regions of Europe and therefore the Red-backed Shrike is considered to be a threatened species in Europe (BirdLife International 2004). The main reason for the disappearance of the species is the destruction and deterioration of natural habitats (Pain *et al*. 1997; van Nieuwenhuyse 1999). Detailed studies on habitat use and preferences by the Red-backed Shrike have been carried out in many parts of Europe (e.g. Höpfner 1993; Olsson 1995; Tryjanowski *et al*. 2000; Roos & Pärt 2004), but there are only general descriptions of habitats in Estonia thus far (e.g. Rootsmäe & Veroman 1974; Leibak *et al*. 1994). In current study I analyse the habitat use of the Red-backed Shrike in Estonia, and its temporal changes, during the second half of the 20th century, using the data collected by Estonian Ornithological Society (EOS) in frame of the Nesting Card Program.

Material and methods

Altogether 331 nesting cards of Red-backed Shrike nests from 1942–2001 were analysed. Most cards (304; 92%) have been filled in after the year 1962, mostly in the 1970s (150) and during the following decades (70 and 71, respectively). Endel Edula from Viljandimaa has been the most active observer (filling in 61 cards), and therefore most data come from this county (86 cards; Figure 1). Tenno Laur and Heinrich Veromann have filled in 17 and 12 cards, respectively, and increased remarkably the data set of Pärnumaa county (66 cards). However, in six counties only less than ten nesting cards have been filled in. Such a disbalance within sample might have had an effect on the analyses and some biotopes (such as juniper thickets) may be under-represented.

Although some data fields of nesting card were united, the results are presented as detailed as possible in order to simplify later comparisons. Unfortunately some data fields may still overlap (for example some standalone farms may be classified as settlements); this has been taken into account when making conclusions.



Joonis 1. Punaselg-õgija pesade kohta täidetud pesakaartide arv Eesti maakondades.

Figure 1. *Number of nesting cards with breeding data of the Red-backed Shrike in Estonian counties.*

Results

The Red-backed Shrike breeds in various habitats (Table 1). The vicinity of human settlements is the most frequently mentioned habitat on cards, and the use of this biotope has increased significantly during the second half of the 20th century ($\chi^2 = 66.6$; $df = 4$; $p < 0.001$). The trend remains highly significant even after excluding the small sample from 2000–2001 ($\chi^2 = 49.9$; $df = 3$; $p < 0.001$). Clear-cuts, wooden meadows, grasslands and shrubs also belong to frequently used biotopes.

Tabel 1. Punaselg-õgija pesitsusbiotoopide jaotus Eestis aastatel 1942–2001 (%).

Table 1. *Breeding biotopes of the Red-backed Shrike in Estonia, 1942–2001 (%).*

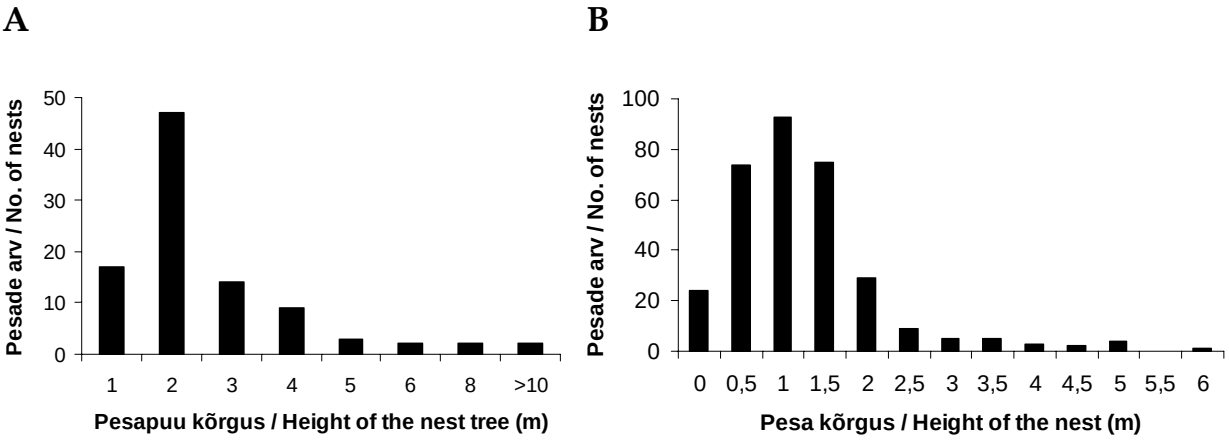
	Aastad / *Years*					
	1942-69	1970-79	1980-89	1990-99	2000-01	1942-2001
Asula / *Settlement*	7.4	1.3	18.8	42.9	61.5	15.8
Raiesmik / *Forest clear-cut*	22.2	14.7	6.3	6.3	15.4	12.0
Puisniit / *Wooded meadow*		12.7	28.1			11.7
Põõsastik / *Shrubs*	37.0	12.0				8.8
Noorendik / *Young forest*	11.1	10.0	10.9			7.9
Mets / *Forest*	3.7	15.3		1.6		7.9
Rohumaa / *Grassland*		6.0	6.3	4.8		5.0
Park, kalmistu / *Park, cemetery*				25.4		5.0
Okaspuuhekk/*Coniferous hedge*	11.1	4.7	3.1	1.6		4.4
Kadastik / *Juniper shrubs*		8.0				3.8
Üksiktalu / *Small farm*	3.7		4.7	7.9	4.8	3.8
Viljapuu- või marjaaed/*Orchard*		2.7	6.3			2.5
Põlluserv / *Field margin*		2.7	4.7			2.2
Viljelusmaa / *Arable land*		4.7				2.2
Jäätmaa / *Wasteland*			4.7	6.3		2.2
Lamminiit / *Flood-plain meadow*		2.7				1.3
Tee- või raudteeserv *Road or railway margin*			3.1	3.2		1.3
Soo / *Mire*		2.0				0.9
Rand / *Seashore*		0.7	1.6			0.6
Sööt / *Set-a-side*			1.6			0.3
Karjäär / *Quarry*	3.7					0.3
N	27	150	64	63	13	317

The Red-backed Shrike uses different herbs and woody plants to build a nest. Nests have been found on 41 different plant species, but as many as 41% of all the nests have been built on spruce (Table 2). The proportion of spruce was lower before the 1970s (17%; n = 24) and increased afterwards (43% on 1970s, n = 142; 35% on 1980s, n = 66; 46% on 1990s, n = 71). The increase has been obvious but only approaches to significance ($\chi^2 = 9.2$; $df = 4$; $p = 0.056$), an the same could be seen after comparing the data of pre-1970s with those of the 1970s ($\chi^2 = 3.02$; $p = 0.08$), the 1980s ($\chi^2 = 1.60$, $p = 0.21$) and the 1990s ($\chi^2 = 3.33$, $p = 0.07$; every $df = 1$).

Tabel 2. Punaselg-õgija pesakohtade jaotus taimeliigiti Eestis 1942–2001. a. andmeil.
Table 2. *Substrates for the Red-backed Shrike nests in Estonia, 1942–2001.*

Liik	N	Liik	N
Kuusk *Picea abies*	122	Kuivanud puu *Dead tree*	2
Kadakas *Juniperus communis*	29	Känd või ümberkukkunud puutüvi	2
Risuhunnik *Brush pile*	13	*Stump or overthrown tree*	
Aed-karusmari *Grossularia reclinata*	12	Lumimari *Symphoricarpos albus*	2
Kibuvits *Rosa sp.*	10	Nõges *Urtica sp.*	2
Punane leeder *Sambucus racemosa*	10	Saar *Fraxinus excelsior*	2
Õunapuu *Malus sp.*	10	Sarapuu *Corylus avellana*	2
Sirel *Syringa sp.*	9	Takjas *Arctium sp.*	2
Mustsõstar *Ribes nigrum*	8	Vaarikas *Rubus idaeus*	2
Mänd *Pinus sylvestris*	7	Astelpaju *Hippophae rhamnoides*	1
Paju *Salix sp.*	7	Enelas *Spiraea sp.*	1
Kask *Betula sp.*	6	Haab *Populus tremula*	1
Kreek *Prunus insitia*	6	Harilik pihlakas *Sorbus aucuparia*	1
Kuslapuu *Lonicera xylosteum*	4	Harilik puju *Artemisia vulgaris*	1
Mage sõstar *Ribes alpinum*	3	Harilik tamm *Quercus robur*	1
Sõstar *Ribes sp.*	3	Kukerpuu *Berberis vulgaris*	1
Toomingas *Padus avium*	3	Lepp *Alnus sp.*	1
Vesipaju *Salix triandra*	3	Nulg *Abies sp.*	1
Viirpuu *Crataegus sp.*	3	Palsamnulg *Abies balsamea*	1
Ilupõõsas *Ornamental shrub*	3	Pappel *Populus alba*	1
Kirss *Cerasus sp.*	2	Pirn *Pyrus sp.*	1
		Kokku / *Total*	301

Nests have been found 0.2–6 m from the ground (Figure 2) whereas three nests were built on the ground. The average height of the nests was 1.24 ± 0.91 m (*SD*; n = 324; median 1.1 m), while half of the nests were 0.7–1.5 m from the ground. Trees used as nest building substrates were on average 2.78 ± 0.52 m high (median 2 m; n = 96) and half of the nests were located on trees or shrubs of 2–3 m high. The higher the nest substrate the higher the nest (r = 0.51; df = 93; $p < 0.001$). This correlation does not exist only due to few high trees present in the sample since two of the nests built on over 10 m high trees being were located only 2m from ground. However, there was no difference in the average nest height of pairs that bred successfully (120 cm; n = 108) and unsuccessful pairs (115 cm; n = 61; *Mann-Whitney U = 3184; p* = 0.72).



Joonis 2. Punaselg-õgija pesapuu (n = 96; **A**) ja pesa (n = 324; **B**) kõrgus Eestis 1942–2001. a andmeil. Pesapuu kõrgus on ümardatud lähima meetrini ja pesa kõrgus lähima poole meetrini.

Figure 2. *Height of the nest tree (n = 96*; **A***) and the nest (n = 324*; **B***) of the Red-backed Shrike in Estonia, 1942–2001. Height of the nest tree is rounded up to the nearest meter and height of the nest to the nearest half-meter.*

Discussion

The habitat of the Red-backed Shrike is usually open or semi-open landscape providing suitable trees or shrubs for nesting and open areas, as well as protruding sites for hunting (Höpfner 1993; Olsson 1995b; Väli 2005). In Estonia, the species breeds in various types of landscape (Rootsmäe &

Veroman 1974, Leibak *et al*. 1994), meaning that the Red-backed Shrike is very plastic species, but also that Estonian landscapes are suitable for the bird. The clearest trend found in current study is the increasing importance of human settlements as breeding site after the 1970s. Although recorded human settlements may denote only single farms and include various biotopes (wasteland, road margin, shrubs, small meadows etc.), the increase of relative importance of populated areas for these birds is still obvious. At the same time (1971–1990), the number of the Red-backed Shrike has been declining considerably (more than 50%; Elts *et al*. 2003), most likely due to the decrease in suitable natural habitats. Hence, the discovered changes in habitat use (Table 1) do not result from increased tolerance towards humans but from the degradation of other biotopes where numbers have decreased. However, some methodological issues might be suspected in association with other findings. For example there are no recent data of the nests in young stands and shrubbery, which are definitely inhabited by Red-backed Shrikes. The same concerns coastal and flood-plain meadows, and juniper thickets. Probably the observation activity on these biotopes is just lower now.

There is a high diversity among trees and shrubs used by the Red-backed Shrike as nesting substrates (Table 2; see also Tryjanowski *et al*. 2000), but the most common nest location in Estonia has been a young spruce 2–3 m high. Even though the importance of spruce, as well as other easily identified plant species, might be overestimated, there still is no doubt in the importance of this species. The probable reason for this preference is the lower predation risk on conifers leading to higher breeding success (Tryjanowski *et al*. 2000). Corvids are the main predators for bush-breeding birds (Söderström *et al* 1998, Roos & Pärt 2004), and the predation risk is positively related to the height of the nest (Jakober & Stauber 1981). However, this was not found in current study. Spruces seem to be more preferred during the last quarter of the 20th century. Probably, this does not come from the increase of young spruce forests or spruce hedges along the roads in the 1970s since the number of nests found in these biotopes did not increase (Table 1). The reason for the difference may be just the limited amount of data in the 1970s, whereas most nests were described on this period only in few regions of Pärnumaa where young spruce forests might have been absent or just not studied.

Summarising, analysis of nesting card data is an excellent method to study the number and breeding biology of a species, but it has not been used very often in Estonia (see Peterson 1989; Elts 2000 for few examples). Obviously, there may occur some kind of systematic errors among nesting card data making the analyses uniting different periods and biotopes hard (but see Lõhmus 2002). For instance, activity may have been concentrated in some certain landscape types while nests in other landscape types may have remained unstudied. However, major temporal or spatial variations should be evident on the nesting cards that, on the other hand, have an advantage of covering a large area. In order to be able to monitor changes in breeding biology of common species, filling of nesting cards is necessary. Moreover, nesting cards are irreplaceable for obtaining information about rare species since even specific surveys do not provide sufficient information. Unfortunately, although the Nesting Card Program has lasted for several decades, there are still too few cards about nests of rare species (e.g. Elts 2000).

Acknowledgements. I am very grateful to all people who have filled in the nesting cards. Jaanus Elts, Andrus Kuus and Riho Marja digitalised the data and thus simplified the analysis. Comments of Jaanus Elts and Lauri Saks improved the manuscript significantly.

PUNASELG-ÕGIJA ELUPAIGAKASUTUS EESTIS PESAKAARDIANDMESTIKU PÕHJAL

Punaselg-õgija *Lanius collurio* kuulub meie tavalisemate linnuliikide hulka, kelle arvukus on aga viimastel aastakümnetel märgatavalt langenud. Käesolevas töös antakse linnuhuviliste täidetud 331 pesakaardi põhjal ülevaade liigi elupaigakasutusest Eestis 20. sajandi teisel poolel. Kõige sagedamini on punaselg-õgija pesitsusbiotoobina mainitud asulat ning selle biotoobi sagedus on järjest suurenenud. Suhteliselt sageli pesitsetakse ka raiesmikel, puisniitudel ja teistel rohumaadel ning põõsastikes-noorendikes. Kokku on pesi leitud 41 taimeliigilt või -liigirühmalt, kuid tervelt 41% pesadest paikneb kuuskedel. Keskmine pesapuu kõrgus on 2,8 m ja pesa kõrgus 1,2 m. Edukalt ja edutult pesitsenud paaride pesade kõrguse vahel erinevust ei leitud.

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