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NUMBERS AND POPULATION DYNAMICS OF THE COMMON SANDPIPER IN THE SURROUNDINGS OF SAUE, 1963–2003

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Numbers of the Common Sandpiper *Actitis hypoleucos* were studied in a study area near Saue (Harju county, Northern Estonia) in 1963–2003. The average breeding density during 41 years was 4.7 pairs per 10 km of riverside or ditch side. The highest density was at the sides of rivers situated near the meadows: on average 12.5 pairs/10 km, maximum 50 pairs / 10 km (Table 1). Population density at ditchsides was four times lower. Long-term trend of population numbers was significantly negative ($r = -0{,}60$, $p < 0.001$), and even more negative for the last thirty years ($r = -0.83$, $p < 0.001$).

Introduction

The natural habitat of the common sandpiper *(Actitis hypoleucos)* is narrow shore side near water and almost all breeding activity is concentrated to this specific area. Even though this species is quite common in Estonia there is still too little data about the number of these birds. The aim of the present study was to provide a general view of the quantity and the long-term changes of the common sandpiper during the second half of the 20th century in an observation plot near Saue as well to evaluate the possible causes of these changes.

Material and methods

The study plot of Saue is located in Harjumaa, in the region between Tallinn – Laagri – Saku – Kiisa – Keila. According to the UTM 5x5 km grid network it lies mainly in the squares LF5570; LF5575; LF6070; LF6075; LF6570

and LF6575. The whole study area was 100 km^2 and during the first years sandpipers were encountered on an area of 60-70 km^2 that also became the most thoroughly observed area later on. The study area was quite mosaic and the relative importance of the cultivated landscape has been rising (see Tuule *et al.* 2001 for details). In the late sixties and in the beginning of the seventies drainage of old ditches and construction of new manifolds was carried out. Also dredging operations and straightening of the Vääna River was carried out. The overall length of the riverside in the study area was 21 km (Keila River making up 16,5 km of the total). Since there was no difference between the number of breeding sandpipers on the shores of Vääna and Keila River, these two were not treated separately. Concerning the birds, the suitable overall length of the ditches was 18km, fluctuating between 10-22 km.

The commencement date of the counts was between 28.04 and 17.07, depending on the beginning of spring (on average 05.05, mainly 01.05-09.05). Thus the counting period lasted for 42 days altogether. In order to estimate the number of sandpipers the line transect method was used and the results are presented as breeding pairs per ten kilometres of shore. Usually threefold counts were carried out by walking along the shore. Although twofold counts were sufficient in uncomplicated and well-knows sites. In most cases the knowledge of existing nest sites helped to avoid the counting of the same birds that had been encountered very far aside the shore over and over again or registering them in a wrong area. Usually there was a field beside one shore and a wooden meadow on the other. In this case the sandpiper pairs were registered in both biotopes but taken into account as one in the total number of birds. The same analogue was used concerning the kilometres of the shore. 1-3 breeding pairs that were nesting in small gravel quarries and at the secondary treatment pools of wastewater in Saue settlement during 1968-1985 were excluded from the analyses.

Tabel 1. Vihitaja asustustihedus Saue vaatlusalal erinevates elupaikades aastatel 1963-2003.
Table 1. *Breeding density of the Common Sandpiper in different habitats in the surroundings of Saue, 1963–2003.*

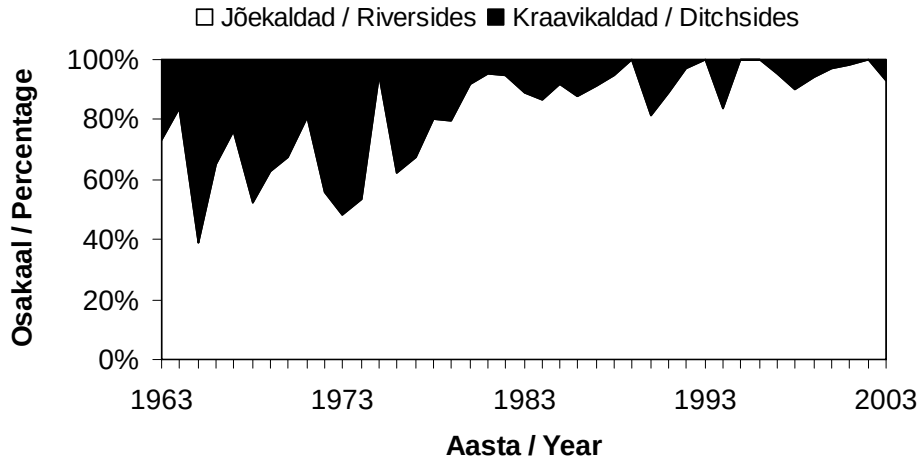
Elupaik / *Habitat*		Transektide keskmine kogupikkus (km/aasta) *Average total length of transects (km / year)*	Paari/10km / *Pairs per 10 km* Min	Max	Keskmine *Average*	SD
Jõekaldad *Riversides*	heinamaadel *in meadows*	5,6	0	50,0	12,5	8,5
	puisniitudel *in wooded meadows*	13,0	2,1	16,9	10,1	3,6
	põldudel *in fields*	4,0	0	30,0	9,5	7,7
	karjamaadel *in pastures*	0,3	0	33,3	6,4	9,8
	Jõed koos *All rivers*	16,0*	2,9	20,0	10,7	4,1
Kraavikaldad *Ditchsides*	heinamaadel *in meadows*	9,1	0	18,2	3,0	4,4
	puisniitudel *in wooded meadows*	15,6	0	15,5	2,2	3,2
	põldudel *in fields*	10,7	0	20,0	2,1	4,0
	karjamaadel *in pastures*	1,8	0	16,7	1,8	4,5
	metsades *in forests*	5,2	0	6,7	0,7	1,7
	Kraavid koos *All ditches*	29,0*	0	10,7	2,4	2,7
Jõe- ja kraavikaldad koos *Riversides and ditchsides together*		45,0	1,3	10,5	4,7	2,1

* Kuna veekogu eri kallastel on sageli erinevad biotoobid, ei ühti kogusumma eri biotoopide andmete summaga. / *Total length is not equal to the sum of separate biotopes because there were often different biotopes in two sides of the waterbody.*

Results

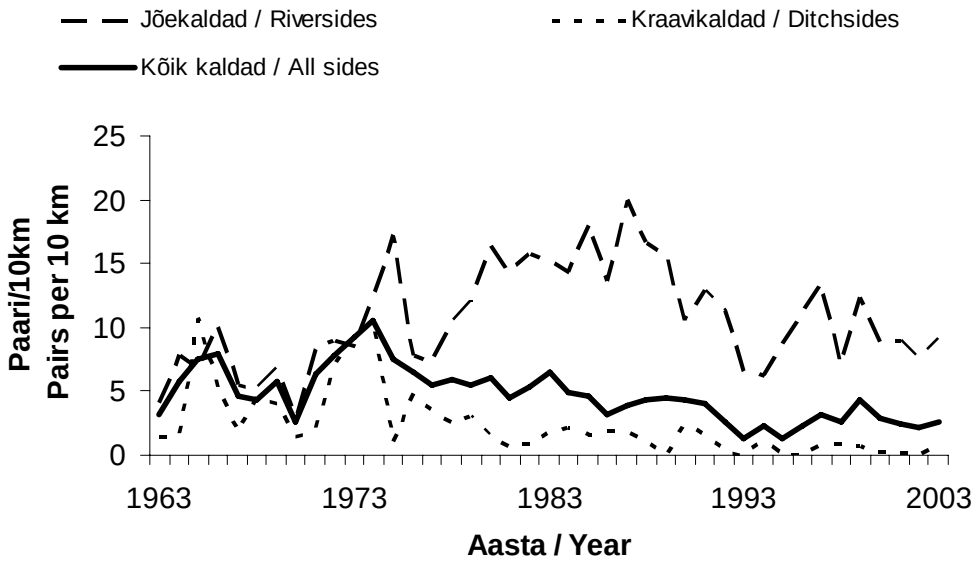
Long-term population concentration of the sandpipers during these 41 years and covering all the habitats on the observation area in Saue was 4,7 pairs per 10 km. The areas with the largest density of this species were grasslands alongside the river – 12,5 breeding pairs per 10 km, in some years reaching even up to 50 pairs per 10 km (Table 1). The riparian zone of the river has been more important to the birds than have been the ditchsides – the average density being four times higher at the river compared to the ditches. Ditches were essential nesting sites only during the first tenth of the observation period. However, the population density of the ditches exceeded the one at the river in 1965 and was equal to the river in 1973. The sandpipers of Saue have preferred river shores in the last 30 years (fig 1) and during the past few decades the ditchsides can be considered only as marginal nesting sites for these birds.

The number of sandpipers rose during the first decade and then started declining. This species was very successful in the first half of the 1970s but since the middle of the 1980s the sandpiper population has reached only up to half of the size that it was in the most favourable period (fig 2). The long-term trend of the population size of this species on the observation area in Saue was declining ($r = –0{,}60$, $p < 0{,}001$), whereby the trend of the last 30 years being even negative ($r = –0{,}83$, $p < 0{,}001$).



Joonis 1. Jõe- ja kraavikallaste kasutamise osakaal vihitaja elupaigana Saue seirealal aastatel 1963–2003.

Figure 1. *Ratio between riversides and ditchsides used as breeding habitat by the Common Sandpiper in the surroundings of Saue, 1963–2003.*



Joonis 2. Vihitaja asustustiheduse muutused Saue seirealal aastatel 1963–2003.

Figure 2. *Population dynamics of the Common Sandpiper in Saue, 1963–2003.*

Discussion

The current study about the population density of the sandpipers was performed because there are very few references in the literature concerning Estonia. For example, in the 1950s the number of this species at the secondary

arm of the Kasari River was 0,4-2 pairs per 10 km (Onno 1963) and there was a population density of 11-12 pairs per 10 km at the Amme and Põltsamaa River (Leibak *et al*. 1994). The number of birds on the river shores on the Saue observation area is in consistency with the latter data – 10,7 pairs per 10 km yet the average density covering all the habitats being only half of that size. On lakeshores the density of these birds is estimated to be 10 times lower (1,2 paari/10km) and on the shore of Võrtsjärv only 3 pairs per 10 km (Leibak *et al*. 1994). These linear estimations of the density are difficult to convert into estimations of square-area, and for that reason data collected in different methods were analysed separately. For example in different parts of Great Britain studies on population density of the sandpiper have been carried out in different methods what makes it difficult to collate these data (Dougall *et al.* 2004). In Estonia data of the density of this species have basically been collected in similar methods, pairs per length of path what makes it easy to collate different data.

Surveys in Great Britain have shown that sandpipers do not like to breed at brooks less than 8 metres long (Vickery 1988). Other authors have also shown that the number of these birds is sensitive to the length of rivers and brooks (Jones 1983; Yalden 1986), since narrow brooks lack in banks of pebbles or debris rich material. However, nesting at brooks is also determined by the surrounding landscape, for example sandpipers can be seen at smaller brooks more often in Scotland than on lowland areas (Dougall *et al.* 2004). In the 1970s new manifolds, with the width of at least 4 metres in spring, were inhabited. In the later years, ditches that were broad enough were used as breeding sites. Ditchsides in forested areas that were free of vegetation were of significant importance yet deep forests were completely avoided. High vegetation at ditchsides in Saue had an immediate and unique effect on the birds – these were abandoned and at the time mowing of the ditchsides ceased the number of this bird species decreased remarkably. When the number of these birds began to decline the least suitable nest sites were abandoned first. There are still some regions at the riverbanks where the original breeding sites of this species are being used.

According to O. Sonno (1958) forests and shrubbery are also essential at the breeding sites of the sandpipers. On the other hand, surveys in Wales have shown that sandpipers prefer banks surrounded by natural pastures and wetlands to banks with trees (Buckton & Ormerod 1997) whereby the occurrence of this species was best predicted by stream and riverbed parameters. D. Yalden (1986) reached to similar conclusions and pointed out the importance of the pastures as foraging areas. The pastures appeared to have the same positive effect on the sandpipers in Saue since they were regularly used as foraging sites additionally to the shoresides. These days a large number of pastures have overgrown with bushes up to the banks and the number of sandpipers has declined drastically. Thus it is evident that the characteristics of the surrounding landscape is of great importance to these birds not only in the vicinity of the banks but in the range of at least some tens of metres as well. In the Leningrad province, in Russia, it has been marked that the distance from water usually depends on habitat type, particularly on the surrounding forest stands (Mal'čevskij & Pukinskij 1983). About half of the nests were located not more than 10 metres and somewhat over 8% of all the nests more than 100 metres off the water. There were four nests in the Saue observation plot that were located 2, 3,5, 5 and 7 metres off the water. However, a nest of the sandpipers was encountered 20 metres off lake Viljandi by E. Edula (1974).

Land improvement operations can be advantageous for sandpipers at least immediately after they have been completed. According to E. Sits (1937), sandpipers settled to the banks of Kasari and Suitsu River after the dredging operations. The removing of gravel and sand from the riverbed and placing it on the riverbanks provided the birds with suitable breeding conditions. During the dredging operations in Saue observation plot the Vääna River was straightened and the surrounding meadows and wooden meadows were transformed into arable land. This had a positive effect on the sandpiper population since there was no vegetation on the riverbanks left anymore. Yet these thorough landimprovement operations had a negative effect on the riverbeds. During floods there was a larger amount of water that flew into the

river during a shorter period of time and in consequence of that the riverbanks collapsed. As a result of which some nesting sites of these birds deteriorated or were even destroyed. In the Netherlands the hopes are high that a new nature restoration project will have its positive effect on the sandpiper population that became almost distinct in the 20th century. The aim of this project is to restore the former winding shape of the river since this will provide the birds with suitable breeding sites (Erhart 1994).

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Vihitaja pesitsusaegsest arvukusest Saue seirealal aastatel 1963–2003

Kokkuvõte. Käesolevas töös esitatakse aastatel 1963–2003 kogutud andmed vihitaja *Actitis hypoleucos* arvukusest Saue seirealal Harjumaal. Kõigi elupaikade lõikes oli 41 aasta keskmine vihitaja asustustihedus 4,7 paari/10 km. Suurim tihedus leiti heinamaadel kulgevate jõgede ääres – keskmiselt 12,5, maksimaalselt kuni 50 paari 10 km kohta. Liigi asustustihedus kraavikallastel oli peaaegu neli korda madalam kui jõgede ääres. Pikaajaline arvukuse trend Saue vaatlusalal oli langev.

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