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Species trends, turnover and composition of a woodland bird community in southern Sweden during a period of fifty-seven years

Arternas trender, omsättning och andelar inom ett skogligt fågelsamhälle i södra Sverige under femtiosju år

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Abstract

The number of small passerine bird territories was determined annually during 57 years (1953–2009) in a 13 ha broadleaf deciduous wood with several grazed glades, surrounded by crop farmland in southernmost Sweden. Only marginal habitat changes occurred. Both number of species and number of territories increased. Resident species and short-distance migrants tended to increase whereas tropical migrants declined. Many of the changes were similar to trends recorded by the national Breeding Bird Survey, suggesting that they were due to regional population trends. Notable changes were: former dominant Willow Warbler now rare but closely related newcomer Chiffchaff now well established, Garden Warblers replaced by Blackcaps, Tree Pipit strong recent decline, increase of cavity-nesting Great and Blue Tits, locally extinct Yellowhammer recovered. Species turnover between adjacent pair of years was without trend but turnover increased with increasing distance between pair of years predicting complete turnover by about 2190. A comparison with a larger oldgrowth wood nearby indicated no obvious effects of the small size and narrow configuration of the study site on its community.

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Fågelsångsdalen (literal translation: Birdsong valley) is a 13 ha broadleaf deciduous wood surrounded by farmland and bordering the small town of Södra Sandby in Scania, the southernmost province of Sweden (55° 43' N, 13° 20' E). The small passerine birds that were keeping territories in the breeding season have been counted annually since 1953 (i.e. all passerines except corvines). The data from the first forty years were analysed by Enemar et al. (1994). The survey has continued without interruption and with the same method as before. Here we present the results of another seventeen years, through 2009, making the time series fifty-seven years long, the longest breeding bird survey in the world known to us. It is most probably unique in having been conducted with the same standardized method through all years.

In this paper we describe and discuss the changes that have occurred during the most recent seventeen years, evaluate whether the new data affect the patterns identified by Enemar et al. (1994), namely that long distance migrants tended to decline whereas short distance migrants tended to remain stable or increase in numbers, and that species turnover rate tended to increase with increasing distance between pair of years although turnover between pairs of adjacent years showed no trend.

Scientific species names are found in Appendix 1 and 2.

The study plot

Fågelsångsdalen (called "the valley" through this paper) is a narrow nature reserve with a matrix of broad-leaved deciduous woodland and areas of open land with grass and herbs (habitat map in Enemar et al. 1994; for the current situation see also aerial photographs in http://www.eniro.se/ and http://maps.google.se). The valley has been grazed by cattle but somewhat less regularly and less intensively in recent decades than earlier. This has resulted in moderate expansion of bushes and patches of taller herbs. However, the ratio between wood and open land has remained almost the same throughout the survey period. Starting in the 1980s, the valley went through a period of die-off of elm

trees due to the Duch elm disease. The effect was particularly apparent in the southern part where elm was the predominant canopy species. A dense secondary wood with a number of remaining old trees has now developed in this part. A small stream runs in the bottom of the valley. Farmland with annual crops surrounds most of the plot, and the nearest woods, Räften and Linnebjär, one to two kilometres away, are also small. A somewhat larger wood is the nature reserves Måryd and Skrylle, two to three kilometres away. For a description of the study plot and its history we refer to Enemar et al. (1994) where also a time series of photographs from selected points of the plot is given.

Methods

The same territory mapping method as used by Enemar et al. (1994) was applied also during the additional seventeen years. For a recent general description and discussion of the method we refer to Bibby et al. (2000). The method is also called "spot mapping" after William (1936), and it is similar to the method used in the Common Bird Census in the UK (Marchant et al. 1990) and the Breeding Bird Census in North America (Robbins 1970). The observer walks slowly through the plot putting down all bird observations in their proper positions on a map, paying particular attention to recording simultaneous presence of males in adjacent territories. Species maps are then constructed from the visit map records. The species maps are used to evaluate the number of distinct clusters of records which are believed to represent territories. The method is of course prone to errors both when recording the birds in the field and when evaluating the number of territories from the species maps. Furthermore, the number of territories is never stable throughout the breeding season: some birds die, some fail to breed successfully and leave their territories, and some arrive late and establish new territories. However, for our analysis it is not essential to know the exact number of territories in every particular part of every breeding season. Instead, standardization (recording birds and evaluating the species maps in the same way every year) is the key to reliable comparisons, and we did our best to achieve this.

We made ten visits per year in all but two years (nine visits in 2007 and 2009). They were distributed from April through June (always after 9 April and before 18 June) but with variation according to the arrival of spring. All surveys were made by the same person, one of the authors (Ann Mari Thorner). Since AMT also carried out all surveys in 1987–1992, there is now a series of no less than twenty-one years with the same observer. This ensures that the new results are comparable with the data from before 1993. Each visit took between two and three hours so the minimum annual survey effort was twenty hours. A cluster of records was accepted as a territory if it contained at least three records (for a few very late arriving species two records was considered sufficient; cf. Svensson 1978). Adjacent clusters were accepted as different territories either if they were distant enough from each other (in relation to typical territory size) to make it likely that they belonged to different males or if they contained simultaneous records (a male recorded in both at the same time).

A special study on inter-specific competition with a large number of nest-boxes was conducted in the valley in 1963–1966 (Enemar et al. 1972). The populations of Great Tit, Blue Tit and Pied Flycatcher were artificially enhanced these years. We removed the effect of the experiment by reducing the numbers to a proportion equal to the mean proportion in the four years before and the four years after the experiment. The number of Great Tits was reduced from 9, 10, 19, 16 pairs to 6, 6, 12, 10, respectively. The number of Blue Tits was reduced from 6, 4, 7, 5 pairs to 3, 2, 4, 3 pairs. The number of Pied Flycatchers was reduced from 15, 18, 18, 13 pairs to 4, 5, 5, 4 pairs. These modified values are used in all calculations in this paper.

Species turnover rate between two different years was calculated by dividing the total of new and lost species with the number of species in year one plus the number of species in year two. This gives the value one hundred percent (that is complete) turnover when no species are common between the two compared years. This is different from the turnover calculation by Enemar et al. (1994), where the sum of new and lost species was divided by the mean number of species in the two years. The latter method gives one hundred percent turnover when half of the species have been lost and replaced with new ones (the methods are identical in principle but give results that differ by a factor of two). In the same way, we calculated turnover between two years different number of years apart (from adjacent years to a maximum of fifty-six years apart, that is 1953 and 2009).

Altogether, forty-one small passerine species were recorded as territorial in at least one of the fifty-seven years. Eighteen of these species were keeping territories in all or almost all years (the first eighteen species in Appendix 1, also listed in

Table 1). These eighteen species are called "regular" in this paper. The final twenty-three species of Appendix 1, that is those with zero values in many or almost all years, are called non-regular species. Eight of these latter species were recorded in less than four of the fifty-seven years, and these species are not at all tested for population change. For the remaining fifteen non-regular and the eighteen regular species, we calculated and compared the average number of territories during the first forty and the last seventeen years, respectively. The difference between the two periods for the regular species was tested using a two-tailed t-test (Microsoft Excel) and the logarithms of the original values (with a small number of zeros replaced with the value 0.1 to permit calculation of logarithms). The differences for the non-regular species were tested using frequencies, namely the number of years with different number of territories (i.e. with 0, 1, 2, 3, and so forth, territories). When the number of frequency classes was larger than four, frequencies were pooled to form exactly four classes, the same ones for both periods, giving a 2×4 cell matrix. The Fisher exact test was then applied using the Vassar Stats package (home page of Vassar College, Poughkeepsee, NY). For the regular species we also calculated the trends across all fifty-seven years using the logarithm of abundance and standard linear regression (Microsoft Excel), also here with zeros replaced with the value 0.1. The same method was used when we calculated trends for parts of the full time series in these species. When calculating correlations between species we used the Spearman rank correlation module of STATISTICA (version 6.1; StatSoft®).

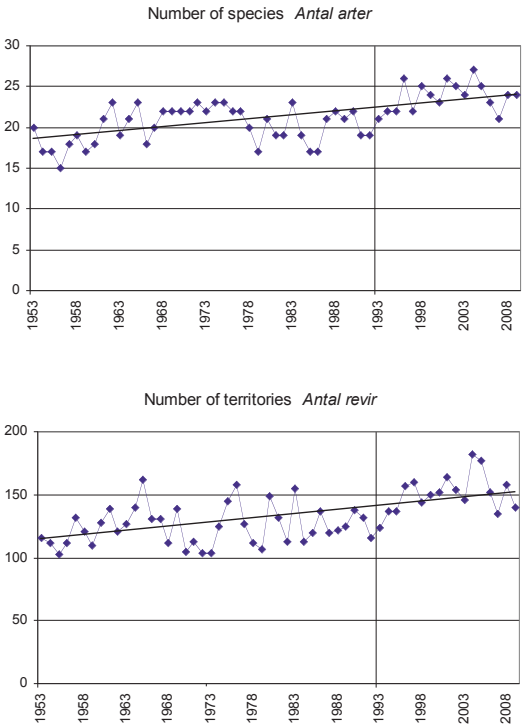

Figure 1. Number of species and number of territories of small passerines in Fågelsångsdalen. The vertical line indicates the border between the first forty and the subsequent seventeen years.
Antal arter och antal revir av små tättingar i Fågelsångsdalen. Den vertikala linjen markerar gränsen mellan de första fyrtio och de senaste sjutton åren.

Results

The number of territories of small passerines recorded in 1953–2009 is shown in Appendix 1, with the data from the most recent seventeen years in part 3 of it. Although we mainly deal with "small passerines", that is the same species that were analysed in Enemar et al. (1994), we give data for the other species as well (available for only the most recent years; Appendix 2).

Both the number of species and the number of territories increased remarkably during the last seventeen years (Figure 1). During the previous forty years there was no significant trend of either species richness or total density. The mean values in 1993–2009 were 151 territories (s.d. 14.9) and 24 species (s.d. 1.8) versus 125 (s.d. 15.3) territories and 20 (s.d. 2.2) species in 1953–1992. Both differences (26 territories and 4 species) are highly significant (t-test, two-tailed; $p<0.001$). These higher values during the recent period cause the trends of both territories and species to become significantly positive for the full period of fifty-seven years ($p<0.001$ for both; linear regression).

Among all thirty-three species that we compared (Table 1), twenty-three of them were more abundant and ten less abundant during the last seventeen than during the first forty years (irrespective of whether the difference was significant or not). The proportion of increasing species was about the same among the non-regular species (73%) and the regular ones (67%). Of the latter, whose trends were also tested by regression analysis (Table 1), fourteen had significant trends (nine positive and five negative ones). Table 1 also shows that the trends found during the first forty years remained the same during the recent seventeen years in elev-

Table 1. Number of years with at least one territory, mean number of territories in the first forty (1953–1992) and the last seventeen (1993–2009) years of the study, and average annual change for the eighteen "regular" species. The eight species that kept territory in less than four of the fifty-seven years are not included in this comparison (cf. Appendix 1). Significance levels: *p<0.05, **p<0.01, ***p<0.001. English species names in Appendix 1.
*Antal år med minst ett revir, medeltalet revir under de första fyrtio och de sista sjutton åren av studien samt den genomsnittliga årliga förändringen för de arton "regelbundna" arterna. De åtta arter som hade revir under färre än fyra av alla femtiosju åren har inte tagits med i jämförelsen (jfr. Appendix 1). Signifikansnivåer: *p<0,05, **p<0,01, ***p<0,001. Svenska artnamn i Appendix 1.*

		No of years with at least one territory *Antal år med minst ett revir*		Mean no of territories *Medeltal revir*		Difference *Skillnad*	Trends Mean % change per year *Trender* *Medeländring % per år*		
		First 40 yrs *Första 40 år*	Last 17 yrs *Sista 17 år*	First 40 yrs *Första 40 år*	Last 17 yrs *Sista 17 år*		All 57 yrs *Alla 57 år*	First 40 yrs *Första 40 år*	Last 17 yrs *Sista 17 år*
1	*Fringilla coelebs*	40	17	18.77	22.88	+***	+0.4***	+0.6***	–0.0
2	*Phylloscopus trochilus*	40	17	13.95	9.06	–**	–0.8***	–0.9***	–2.1*
3	*Sylvia borin*	40	17	13.53	8.82	–***	–0.6***	–0.3	–1.1
4	*Parus major*	40	17	8.65	12.35	+***	+0.8***	+1.0***	+0.3
5	*Luscinia luscinia*	40	17	11.60	5.59	–***	–1.0***	–0.4*	–2.6
6	*Turdus merula*	40	17	9.15	10.65	+*	+0.3***	+0.4**	+0.5
7	*Sylvia atricapilla*	40	17	4.70	12.82	+***	+1.2***	+0.3	+1.2**
8	*Parus caeruleus*	40	17	3.68	9.47	+***	+1.3***	+0.9***	+1.3**
9	*Erithacus rubecula*	38	17	4.66	5.41	+*	+0.2	–0.6	–0.5
10	*Sylvia communis*	38	17	4.38	4.82	+	–0.3	–1.5**	+0.5
11	*Troglodytes troglodytes*	24	17	2.34	8.06	+***	+2.7***	+1.2	+0.6
12	*Hippolais icterina*	39	16	3.48	4.36	+	+0.2	+0.8	–5.1*
13	*Anthus trivialis*	37	2	4.91	0.32	–***	–4.0***	–2.5***	DD
14	*Acrocephalus palustris*	35	15	3.71	2.78	–	+1.0*	+3.2***	+0.2
15	*Prunella modularis*	37	17	2.83	4.47	+***	+0.8*	+0.5	+0.2
16	*Sturnus vulgaris*	26	17	2.48	4.76	+***	+2.9***	+4.4***	–1.5
17	*Ficedula hypoleuca*	39	17	2.66	0.97	–**	–1.0*	+1.5	–3.5
18	*Parus palustris*	34	12	2.23	2.59	+	–0.1	–1.3**	+3.4***
19	*Emberiza citrinella*	2	17	0.05	1.53	+***			
20	*Sitta europaea*	15	17	0.58	3.12	+***			
21	*Carduelis chloris*	14	13	0.80	2.47	+**			
22	*Phylloscopus collybita*	0	12	0.00	3.35	+***			
23	*Carduelis cannabina*	22	0	1.10	0.00	–***			
24	*Turdus pilaris*	5	10	0.35	1.29	+**			
25	*Muscicapa striata*	7	10	0.18	1.47	+***			
26	*Motacilla alba*	17	2	0.65	0.12	–*			
27	*Turdus philomelos*	13	7	0.45	0.59	+			
28	*Carduelis carduelis*	6	6	0.20	0.94	+			
29	*Phoenicurus phoenicurus*	1	10	0.03	1.29	+***			
30	*Certhia familiaris*	5	10	0.13	0.88	+**			
31	*Passer montanus*	11	0	0.48	0.00	–			
32	*Emberiza hortulana*	5	0	0.35	0.00	–			
33	*Sylvia curruca*	6	4	0.15	0.29	+			

Table 2. Number of significant correlations (Spearman Rank; p<0.01) between the eighteen regular species in relation to wintering area and population trend. T = Highly significant overall positive (+) or negative (–) trend (Table 1). For each species 17 correlations were calculated; those with a significance level of p<0.01 are summarised in the table.

Antal korrelationer (Spearman rank) mellan de arton regelbundna arterna i förhållande till övervintringsområde och populationstrend. T = Höggradigt signifikant positiv eller negativ trender (Tabell 1). För varje art beräknades 17 korrelationer; de med en sannolikhet för signifikansen om p<0,01 summeras i tabellen.

	Wintering area *Vinterområde*	Trend	Positive correlations with other species wintering in *Positiva korrelationer med andra arter med vinterområde i*		Negative correlations with other species wintering in *Negativa korrelationer med andra arter med vinterområde i*	
			Europe	Africa	Europe	Africa
Turdus merula	Europe	+	6			
Parus caeruleus	Europe	+	6			5
Troglodytes troglodytes	Europe	+	6			5
Parus major	Europe	+	6			4
Sturnus vulgaris	Europe	+	5	1[1]		2
Fringilla coelebs	Europe	+	5			3
Sylvia atricapilla	Europe	+	3			5
Prunella modularis	Europe		1			
Parus palustris	Europe			1[2]		
Erithacus rubecula	Europe					
Hippolais icterina	Africa					
Sylvia communis	Africa		1[3]			
Acrocepahlus palustris	Africa		1[4]			
Ficedula hypoleuca	Africa			2	3	
Sylvia borin	Africa	-		3	4	
Phylloscopus trochilus	Africa	-		3	5	
Luscinia luscinia	Africa	-		4	6	
Anthus trivialis	Africa	-		4	6	

[1]) *Acrocephalus palustris*, [2]) *Sylvia communis*, [3]) *Parus palustris*, [4]) *Sturnus vulgaris*

en of the species, although they were less often significant. In only one species, the Marsh Tit, the two trends were both different and significant; a negative trend turned into a positive one, and this made the fifty-seven year trend non-significant.

Among the fifteen non-regular species (the eight species with fewest territories excluded), different patterns could be observed when the last seventeen years were compared with the previous forty years (Table 1, Appendix 1). Three species had gone extinct in the valley (Linnet, Ortolan Bunting and Tree Sparrow). One species, the Chiffchaff, established itself for the first time and increased substantially. Four species became regular with strong population increase (Nuthatch and Yellowhammer) or almost regular (Redstart, Treecreeper, Spotted Flycatcher and Greenfinch). The Fieldfare was keeping territories in 1988–2004 but was absent both before and after this period. The remaining four species showed little or no significant change.

Enemar et al. (1994) found that in terms of trends there was one main divide among the species. Residents and short distance migrants (wintering in Europe and northern Africa) had mainly positive trends whereas tropical migrants (wintering in Africa south of the Sahara) had mainly negative ones. With seventeen more years added, the pattern tends to remain the same (Figure 2). Table 2 is a summary of a Spearman rank correlation matrix for the eighteen regular species (Table 1), the same species as in table 5 in Enemar et al. (1994) except Linnet that has been absent after 1980. Out of 153 possible correlations 106 were significant at a p-level of <0.01. Species wintering in Europe and northern Africa correlated positively with other species of their category and negatively with species wintering in tropical Africa. The tropical migrants showed the reverse pattern. There were only two deviations from this pattern. One was a positive correlation of Whitethroat (tropical migrant)

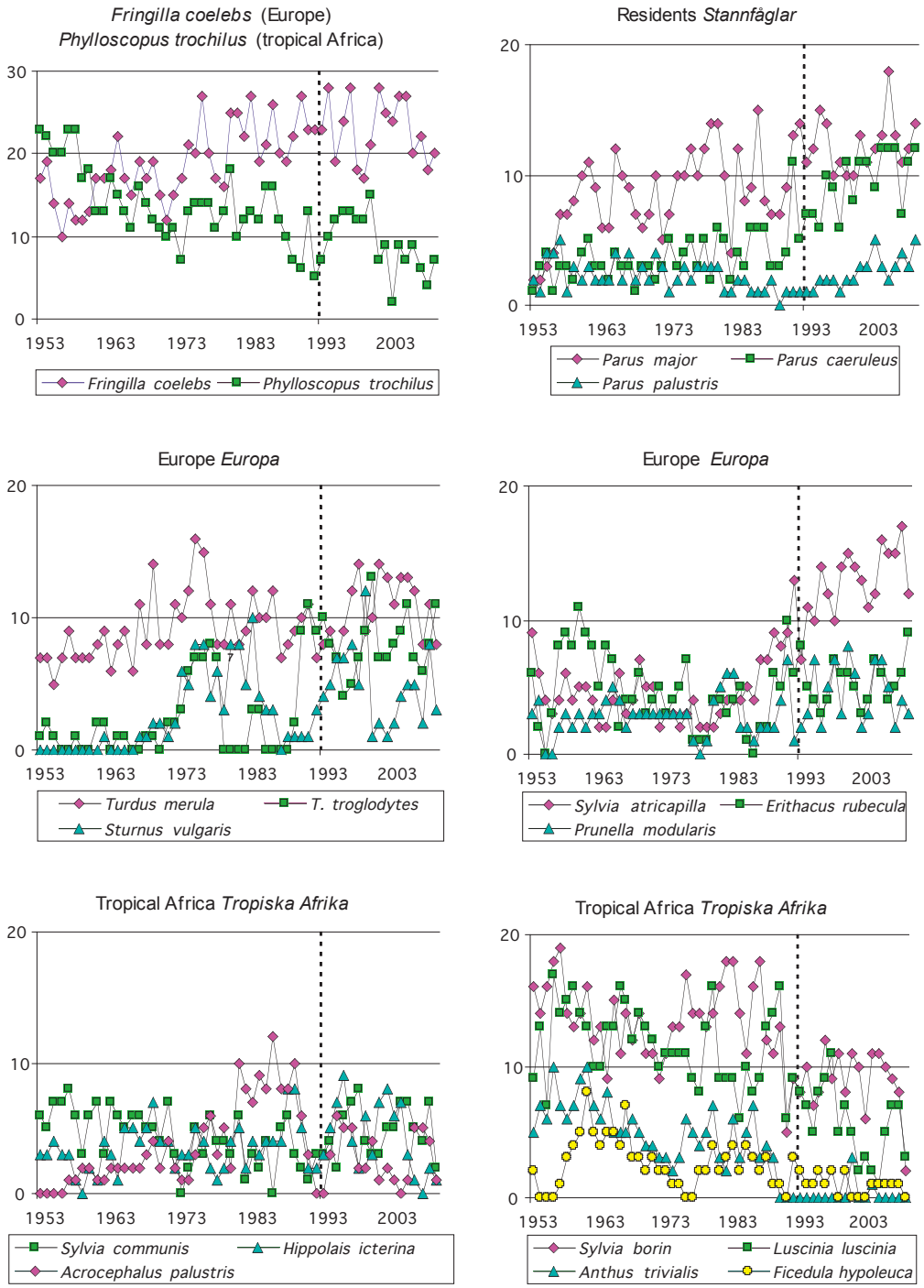

Figure 2. Abundance of the eighteen species that were breeding in Fågelsångsdalen in all or almost all years. A vertical line indicates the border between the first forty years and the subsequent seventeen years.
Antal revir av de arton arter som häckade i Fågelsångsdalen alla eller nästan alla år. En vertikal linje visar gränsen mellan de första fyrtio och de senaste sjutton åren.

versus Willow Tit (resident) and the other a positive correlation between the Starling, wintering in western Europe, and the Marsh Warbler, wintering in tropical Africa. This latter correlation was a consequence of both species being rare in the early and late years of the survey period but more common in the middle of the period.

Average species turnover rate during the latest seventeen years was not significantly different from that of the preceding forty years, and average turnover rate between successive adjacent years for the full fifty-seven year period was 11% without any trend ($p>0.05$; linear regression). Enemar et al. (1994) found that species turnover rate increased with increasing distance between pair of years. We found that this increase continued and was over 30% for two years that were about fifty years apart (Figure 3), for example 36% between 1953 and 2009, the most distant years (10 new and 6 lost species and with 20+24 species these two years).

We compared the local trends of the valley with the Swedish trends for the period 1975–2008, the period covered by the Breeding Bird Survey (Lindström et al. 2009), a national project similar to the Breeding Bird Survey of North America (Sauer et al. 2008), both using point routes. Thirty-eight species of small passerines could be compared (the trend sign of *Fågelsångsdalen* first): 24 species had the same trends (12 +/+, 12 –/–) and 14 species had different trends (12 +/–, 2 –/+). The 24/14 outcome was, however, not significantly different from equal numbers (19/19; Fisher exact test).

We also compared the passerine community of the valley with that of a larger and more mature wood only four kilometres to the south, namely Dalby Söderskog National Park, a 37 ha oldgrowth deciduous wood (Svensson 2009). The general structure of the two communities was very similar (all species, also non-passerines and corvines were included in this comparison; Figure 4). At the species level the main difference was that there were two very abundant species in Dalby Söderskog (Starling and Chaffinch) but only one (Chaffinch) in the valley. In spite of the overall similarity between the two communities there were several other differences in density of individual species, and the species had different positions along the abundance order axis.

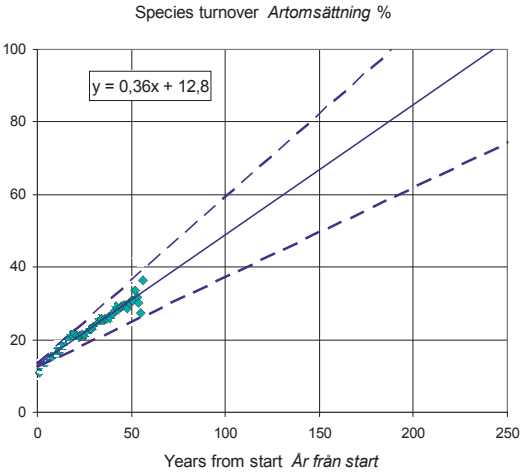

Figure 3. Species turn-over rate between two years different number of years apart (from adjacent years to fifty-six years apart), with a projection to when one hundred percent turnover will be attained. Dotted lines = two standard errors.
Artomsättningen mellan två år som ligger olika antal år från varandra i tidsserien (från närliggande till femtiosex år isär) samt en framskrivning till när hundra procents omsättning förväntas ha skett. Streckade linjer = två standardfel.

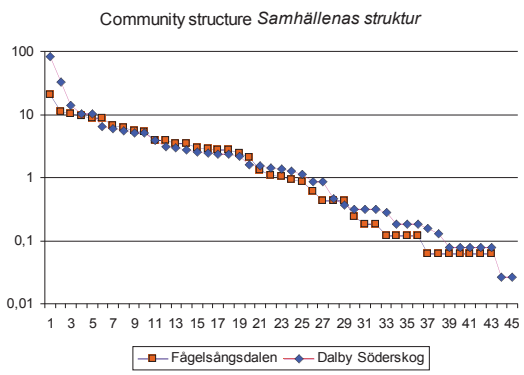

Figure 4. Structure of the bird community of Fågelsångsdalen compared with that of Dalby Söderskog. The species are sorted in order of abundance and the values are each species' percentage of the whole community. The vertical scale is logarithmic. All species, also non-passerines and corvines are included here (using averages for years when surveyed; Appendix 2).
Fågelsamhällets struktur i Fågelsångsdalen i jämförelse med det i Dalby Söderskog. Arterna är sorterade i ordning efter talrikhet och värdena anger varje arts procentuella andel av hela fågelsamhället. Den vertikala skalan är logaritmisk. Alla arter, även icke-tättingar och kråkfåglar inkluderas här (med medelvärden från år då de inventerats; Appendix 2).

Discussion

Both species richness and total number of territories of the valley increased during the fifty-seven years of the survey. The trends were already posi-

tive during the first forty years (Enemar et al. 1994) although not significant. With the additional seventeen years the positive trends became significant, and the rate of increase even accelerated. The positive development of the community is probably a combination of local and large scale events. The comparison with the national bird survey showed that several species fared better in the valley than regionally. The comparison with Dalby Söderskog indicated no obvious effects on the bird community of the valley because of its small size and narrow configuration. The fifty-seven year survey convincingly documents that *Fågelsångsdalen* has retained the rich bird life that made it famous and that it still deserves its name.

The main long term pattern of community change, identified by Enemar et al. (1994) and confirmed by us for the full fifty-seven year period, namely declines among tropical migrants and stable or increasing populations of short-distance migrants, is not just a local phenomenon. The same has been recorded by the Swedish Breeding Bird Survey (Lindström et al. 2009, Ottvall et al. 2009). Enemar et al. (1994) suggested that milder winter conditions in Europe governed the growth of this category of birds. They then tentatively explained the decline of the tropical migrants by competitive exclusion. If this explanation is correct the latest seventeen years provide no contradiction. Wintering conditions in Europe have continued to ameliorate and populations of species wintering in Europe have continued to grow. The competition experiment from 1963–1966 (Enemar et al. 1972), using numerous nest-boxes to drastically increase the population of the Pied Flycatcher, a tropical migrant, gave no evidence whatsoever of any effect on the rest of the community. If this result can be generalized, tropical migrants are weak competitors, and when a tropical migrant tries to co-exist with non-tropical migrant with a similar niche in the breeding season, the former should fare worst. The valley provides a few such examples. Garden Warbler versus Blackcap and Willow Warbler versus Chiffchaff represent two pairs of closely related species with presumably similar ecologies and with one of the species being a tropical migrant. In both cases it was the tropical migrant that was the loser. In the valley there were also a number of ground (litter) feeding species: the tropical migrant Thrush Nightingale declined but Robin, Blackbird and Dunnock, with European winter ranges, remained stable or increased. Increasing populations of resident Blue and Great Tits may have ousted the late arriving Pied Flycatcher from the valley,

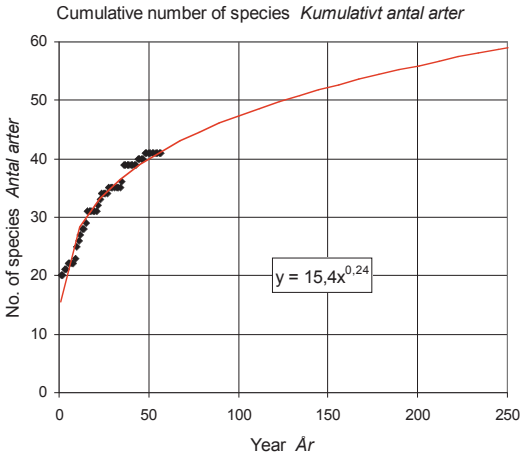

Figure 5. Cumulative number of small passerine species recorded as territorial in Fågelsångsdalen after different number of years, with a projection for a period of two hundred and fifty years.
Kumulativt antal små tättingarter som registrerats som revirhållande i Fågelsångsdalen efter olika antal år, samt en framskrivning för de närmaste tvåhundrafemtio åren.

all three being cavity nesters. Although these examples are suggestive, one cannot exclude that the declining population trends of the tropical migrants have independent origin. They may well depend on deterioration of wintering habitats in sub-Saharan Africa or along the migration routes rather than on competition in the breeding habitat. A series of severe winters in Europe, reducing the populations of the short distance migrants, could possibly provide hints about which of the two alternatives that is most important.

Enemar et al. (1994) predicted that with the species turnover rate found for the first forty years, only a few of the species with territories in 1953 would still remain in the valley after one hundred years. This statement was followed by the reservation that the steady rise is expected to level off, a process that was indicated in their figure 9. However, the new analysis of all fifty-seven years shows no levelling off. Instead it supports the original projection: turnover will continue to grow at the same rate as before. But our modified calculation of the turnover rate indicates that the time of complete turnover will be 240 years from the start of the study, in contrast to the original projection of 100 years. This implies that by about 2190 all the species present in the 1950s will be gone and replaced with new species. Note, however, that the error of this projection is considerable.

Related to the species turnover rate is the cumulative number of species that has been resident in at least one year. After the first forty years, thirty-nine species of small passerines had been recorded as territorial in the valley. During the next seventeen years two new species were added making the new total forty-one. The cumulative number of species versus number of survey years follows a straight line in a logarithmic diagram. This has also been found in several other bird communities (Svensson 2006). Figure 5 demonstrates the relation with a projection for a period of 250 years. After one hundred years, i.e. after another forty-three years, six new species are suggested to be added up to a total of forty-seven, and after 250 years almost sixty species are suggested to have been recorded as territorial in the valley. Such an increase in species numbers would not be surprising. With the current pool of woodland species in the wider region our projection is quite realistic, considering also the dynamics of historical gains and losses of species in northern Europe (Järvinen & Ulfstrand 1980) and current predictions for the next century (Huntley et al. 2007). The model we use suggests an eternal addition of new species with time without any asymptotic limit and no exhaustion of the species pool. However, the exact form of the curve may prove to be different.

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Sammanfattning

Fågelsångsdalen är en 13 hektar stor blandlövskog med flera öppna partier bevuxna med gräs och örter, belägen vid Södra Sandby öster om Lund i Skåne och omgiven av jordbruksmark med årsgrödor. Alla tättingar utom kråkfåglar har inventerats årligen sedan 1953. Resultaten från de första 40 åren har tidigare redovisats av Enemar m.fl. (1994), i det följande kallad 40-årsanalysen. Inventeringsmetoden har varit revirkartering och den har varit identisk och lika noggrant genomförd alla år. I denna uppsats redovisas de resultat som tillkommit under de senaste 17 åren. Dessutom görs analyser på de kompletta tidsserierna med alla 57 åren. Vi studerar också en del mönster som framträdde i 40-årsanalysen för att se om de fortfarande står sig. Inventeringen av Fågelsångsdalen är den längsta kända i hela världen som utan avbrott genomförts med så stor noggrannhet och jämförbarhet i en miljö som förändrats mycket litet. En av författarna, Ann Mari Thorner, har ensam gjort alla inventeringar under de senaste 21 åren.

Dalen är naturreservat sedan 1963 och de skogbevuxna delarna har i huvudsak fått utvecklas spontant. Man har dock strävat efter att hålla gläntorna öppna med hjälp av kreatursbete men intensiteten av betet har varit mindre under senare decennier. Viss buskröjning har också skett. Träd och buskar har expanderat något, men förändringarna är inte drastiska, och fördelningen mellan skog och öppen mark har förblivit ungefär densamma genom åren. Almdöden drabbade en del av dalen, men vegetationen återhämtade sig snabbt.

Fågelsångsdalen är liten och isolerad, vilket man kan tänka sig begränsar artsammansättningen och fågeltätheten. En jämförelse med den nära liggande, större och mera åldriga Dalby Söderskogs

nationalpark ger dock inga sådana indikationer. Fågelsamhällenas struktur är likartad (Figur 5) och bortsett från staren är de totala tätheterna av tättingar också lika.

Totalt har 41 arter av små tättingar hållit revir i Fågelsångsdalen. Arton av dessa var nästan årliga och rätt talrika, femton arter var fåtaligare eller mindre regelbundna och åtta arter var rent tillfälliga. Vi analyserade mest detaljerat de arton vanligaste arterna och inte alls de tillfälliga. Inventeringsresultatet från de tillkommande sjutton åren redovisas i Appendix 1 och dessutom redovisar vi de arter, som aldrig tidigare redovisats, i Appendix 2. Dessa arter studeras dock inte närmare och ingår bara i jämförelsen med Dalby Söderskog. De arton vanligaste arternas trender sammanfattas i Tabell 1, där den tidigare 40-årsperiodens trender också jämförs med den nya 17-årsperiodens.

Totalt har det skett en ökning av såväl antal arter som antal revirhållande hanar (Figur 1), en utveckling som hade börjat tidigare men som ännu inte var signifikant i 40-årsanalysen. Även bland de enskilda arterna är det fler som ökat än minskat. Det är alltså inte någon enda dominerande art som svarar för den positiva numerära utvecklingen. I 40-årsanalysen identifierades två grupper av arter, nämligen stannfåglar och kortflyttare, som ökade, respektive tropikflyttare, som minskade i antal. Detta mönster kvarstår efter ytterligare sjutton år (Figur 2, Tabell 1, Tabell 2). Den senare tabellen visar hur arterna med positiva trender är Europaflyttare och inbördes korrelerade. Detsamma gäller Afrikaflyttarna med negativa trender. Några arter utan signifikanta trender faller däremellan utan starkare korrelationer med varandra.

Orsaken till de olika trenderna för kort- och långflyttare ansågs i 40-årsanalysen vara förbättrade övervintringsförhållanden för kortflyttarna och att detta lett till att långflyttarna konkurrerades ut. Eftersom vinterförhållandena fortsatt att förbättras finns inget som motsäger denna tolkning. Stöd för denna tolkning ger också ett experiment som gjordes i dalen (Enemar m.fl. 1972). Med holkar ökades antalet svartvita flugsnappare radikalt, men detta orsakade inga mätbara förändringar i fågelsamhället i övrigt; denna tropikflyttare verkar alltså inte konkurrera ut andra arter. Tre exempel på närbesläktade arter med liknande ekologier där det gått sämst för tropikflyttaren är lövsångare i jämförelse med gransångare, trädgårdssångare i jämförelse med svarthätta samt näktergal jämfört med rödhake, koltrast och järnsparv. Tropikflyttare kanske är svaga konkurrenter för att de kommer sent när kortflyttarna redan är väl etablerade i häckningsområdet. Emellertid finns ändå möjligheten att långflyttarnas sjunkande beståndsstorlekar beror på faktorer i deras tropiska vinterkvarter eller under flyttningen och som inte har något att göra med konkurrens i häckningsmiljön.

Omsättningen av arter mellan åren har inte förändrats; den har om än med en hel del variation legat på 11% (beräknat mellan två år som summan av nya och försvunna arter dividerat med summan av antalet arter det ena och det andra året, därefter uttryckt i procent). I 40-årsanalysen noterades att ju längre det var mellan de jämförda åren, desto högre var artomsättningen. Denna utveckling har fortsatt linjärt och visar inga tecken på att avta (Figur 4). I 40-årsanalysern gjordes en förutsägelse om att alla arter skulle ha bytts ut om ungefär hundra år. Vi har omtolkat resultaten och slutsatsen blir i stället att det dröjer till år 2190 innan alla arter som fanns 1953 har bytts ut mot nya arter.

En egenskap hos ett fågelsamhälle är att det kumulativa antalet arter ökar med tiden. Sedan 40-årsanalysen har det tillkommit två nya arter och det totala antalet arter som häckat minst ett år är nu uppe i 41 stycken. Med en så lång serie som 57 år kan man våga sig på vissa framskrivningar rörande utvecklingen. I Figur 6 har vi använt modellen att det kumulativa antalet arter ökar linjärt med logaritmen av antalet år. När räkningarna i Fågelsångsdalen firar hundraårsjubileum bör ytterligare sex arter ha haft revir i dalen, totalt således 47 arter. Efter 250 år förutsägs antalet registrerade häckfåglar ha ökat till nästan 60. Denna ökningstakt är inte särskilt kontroversiell om man tar hänsyn till både den existerande artpoolen i storregionen och de många faunaförändringar som skett i historisk tid i vår del av världen. Kurvans form kan vara annorlunda än den vi valt och vi får i första hand vänta och se vad som hänt vid 100-årsjubileet om 43 år.

Värt att nämna här i den svenska sammanfattningen är slutligen följande. Fågelsångsdalen tillkom en gång som övervakningsområde i ett projekt som Sveriges Ornitologiska Förening startade i början av 1950-talet. Frånvaron av inventeringsmanual och organisation gjorde att av de startade provytorna kom bara den i Fågelsångsdalen att bestå, och det enbart genom Anders Enemars insatser. Han inventerade fram till 1967. Under övriga år har endast tre personer före Ann Mari Thorner gjort mångåriga insatser, nämligen Erik Nyholm, Berith Cavallin och Inga Rudebeck. Det formella ansvaret för inventeringens framtid har övertagits av Skånes Ornitologiska Förening och alla originaldokument såsom besöks- och artkartor från inventeringarna och fotodokumentationen från fasta punkter finns i föreningens arkiv.

Appendix 1, part 1.
Number of territories of small passerines. Grey cells: modified values; see text. English names in Appendix 3.
Antal revir av små tättingar. Grå celler: justerade värden; se texten. Svenska namn i Appendix 3.

Period 1953–1972		53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
1	*Fringilla coelebs*	17	19	14	10	14	12	12	13	17	17	18	22	17	15	19	17	19	15	12	15
2	*Phylloscopus trochilus*	23	22	20	20	23	23	17	18	13	13	17	15	13	11	16	14	12	11	10	11
3	*Sylvia borin*	16	14	16	18	19	14	13	14	16	12	13	9	15	11	14	12	14	11	11	9
4	*Luscinia luscinia*	9	13	7	17	14	15	16	14	13	10	10	13	13	16	15	12	14	13	12	10
5	*Parus major*	2	2	3	4	7	7	8	10	11	9	6	6	12	10	9	7	6	7	10	5
6	*Turdus merula*	7	7	5	7	9	7	7	7	8	9	6	8	9	6	11	8	14	8	8	11
7	*Sylvia atricapilla*	9	6	4	3	4	6	4	5	5	4	2	2	4	6	3	4	7	5	5	2
8	*Parus caeruleus*	1	3	4	1	3	3	2	4	5	3	3	2	4	3	3	1	3	3	2	3
9	*Erithacus rubecula*	6	2	0	3	8	9	8	11	9	8	5	8	7	2	4	4	6	3	4	5
10	*Sylvia communis*	6	5	7	7	8	6	3	6	7	3	7	6	5	6	6	5	5	4	7	3
11	*Troglodytes troglodytes*	1	2	1	0	0	1	0	0	2	2	0	1	1	0	0	1	1	0	2	2
12	*Hippolais icterina*	3	3	4	3	3	1	0	2	1	4	3	1	5	5	4	5	7	4	4	2
13	*Anthus trivialis*	5	7	6	10	7	6	7	9	10	7	6	8	5	5	5	6	5	4	4	3
14	*Acrocephalus palustris*	0	0	0	0	1	1	2	2	1	1	2	2	2	2	2	3	4	2	4	2
15	*Prunella modularis*	3	4	0	0	2	3	2	3	2	3	3	4	5	4	2	3	3	3	3	3
16	*Sturnus vulgaris*	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	2	1	2
17	*Parus palustris*	2	1	4	4	5	1	3	2	3	2	2	2	4	2	4	2	3	2	4	3
18	*Ficedula hypoleuca*	2	0	0	0	1	3	4	5	8	5	4	5	5	4	7	3	3	2	3	2
19	*Emberiza citrinella*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	*Sitta europaea*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	3
21	*Carduelis chloris*	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	2	4
22	*Phylloscopus collybita*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	*Carduelis cannabina*	1	0	2	1	0	1	1	2	4	3	1	3	3	5	3	1	6	1	0	1
24	*Turdus pilaris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	*Muscicapa striata*	1	1	1	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
26	*Motacilla alba*	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0	0	0	1	1	2
27	*Turdus philomelos*	0	0	1	0	0	0	1	1	2	2	1	2	3	0	0	0	0	1	0	0
28	*Carduelis carduelis*	0	0	0	0	0	0	0	0	1	1	0	1	2	0	0	0	0	0	0	0
29	*Ph. phoenicurus*	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
30	*Certhia familiaris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	*Passer montanus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	3	1
32	*Emberiza hortulana*	1	0	4	4	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	*Sylvia curruca*	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
34	*Acrocephalus scirpaceus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	*Phylloscopus sibilatrix*	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0
36	*Saxicola rubetra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	*Regulus regulus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	*C. coccothraustes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
39	*Passer domesticus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	*Locustella naevia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	*Aegithalos caudatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Species *Arter*	20	17	17	15	18	19	17	18	21	23	19	21	23	18	20	22	22	22	22	23
	Territories *Revir*	116	112	103	112	132	121	110	128	139	121	110	121	139	114	131	112	139	105	113	104

Appendix 1, part 2.
Number of territories of small passerines. *Antal revir av små tättingar.*

Period 1973–1992		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
1	*Fringilla coelebs*	17	21	20	27	20	17	16	25	25	22	27	19	21	26	20	19	22	27	23	23
2	*Phylloscopus trochilus*	7	13	14	14	14	11	13	18	10	12	13	12	16	16	12	10	7	6	13	5
3	*Sylvia borin*	11	13	13	17	14	14	13	14	16	18	18	14	11	16	18	12	11	13	5	9
4	*Luscinia luscinia*	11	11	11	11	9	8	13	16	9	9	9	6	10	8	9	13	14	16	6	9
5	*Parus major*	7	10	10	12	10	12	14	14	10	4	12	8	9	15	8	7	7	9	13	14
6	*Turdus merula*	10	12	16	15	11	8	8	11	8	9	12	10	10	12	7	8	9	10	11	7
7	*Sylvia atricapilla*	3	3	2	3	4	2	2	2	3	4	4	4	5	4	7	7	9	8	9	13
8	*Parus caeruleus*	5	3	4	5	3	5	2	6	5	2	4	3	6	6	6	3	3	4	11	5
9	*Erithacus rubecula*	3	4	5	7	1	1	1	4	4	3	4	5	1	0	2	2	6	5	10	6
10	*Sylvia communis*	0	2	5	3	6	4	4	3	6	1	3	2	4	0	5	6	3	2	1	3
11	*T. troglodytes*	3	6	7	7	8	7	0	0	0	0	3	3	0	0	0	0	2	9	11	9
12	*Hippolais icterina*	3	3	5	4	2	1	2	4	5	2	4	3	4	4	4	8	8	5	2	2
13	*Anthus trivialis*	3	2	3	6	5	4	5	7	3	2	6	3	5	7	3	4	3	0	0	0
14	*Acrocephalus palustris*	1	1	3	5	6	3	5	2	10	8	7	9	8	12	8	8	10	6	3	0
15	*Prunella modularis*	3	3	3	3	1	0	1	4	5	6	6	2	2	1	2	2	2	4	7	1
16	*Sturnus vulgaris*	6	5	8	8	4	6	3	8	8	5	10	4	3	3	0	1	1	1	1	3
17	*Parus palustris*	1	2	3	2	3	3	3	3	1	1	2	2	1	1	1	2	0	1	1	1
18	*Ficedula hypoleuca*	2	1	1	0	0	2	2	4	2	3	4	2	4	3	2	3	1	1	0	3
19	*Emberiza citrinella*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
20	*Sitta europaea*	2	1	0	0	1	1	0	0	1	1	2	0	0	0	1	0	0	2	2	0
21	*Carduelis chloris*	3	5	3	2	0	0	0	1	0	0	2	2	0	2	0	1	0	2	0	0
22	*Phylloscopus collybita*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	*Carduelis cannabina*	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
24	*Turdus pilaris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	4	2	1
25	*Muscicapa striata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
26	*Motacilla alba*	0	2	4	1	2	2	0	1	0	1	1	0	0	1	2	0	1	0	0	0
27	*Turdus philomelos*	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1
28	*Carduelis carduelis*	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
29	*Ph. phoenicurus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	*Certhia familiaris*	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1
31	*Passer montanus*	1	1	3	4	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
32	*Emberiza hortulana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	*Sylvia curruca*	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
34	*Acrocephalus scirpaceus*	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	*Phylloscopus sibilatrix*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	*Saxicola rubetra*	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
37	*Regulus regules*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
38	*C. coccothraustes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	*Passer domesticus*	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	*Locustella naevia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
41	*Aegithalos caudatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Species *Arter*	22	23	23	22	22	20	17	21	19	19	23	19	17	17	21	22	21	22	19	19
	Territories *Revir*	104	125	145	158	127	112	107	149	132	113	155	113	120	137	120	122	125	138	132	116

Appendix 1, part 3.
Number of territories of small passerines. *Antal revir av små tättingar.*

Period 1993–2009		93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	∑
1	*Fringilla coelebs*	23	28	19	24	28	18	17	21	28	25	24	27	27	20	22	18	20	1140
2	*Phylloscopus trochilus*	7	10	12	13	13	12	12	15	7	9	2	9	7	9	6	4	7	712
3	*Sylvia borin*	8	10	7	8	12	9	11	8	11	10	6	11	11	10	9	8	2	692
4	*Luscinia luscinia*	8	7	5	8	9	11	5	7	5	2	3	2	1	5	7	7	3	559
5	*Parus major*	11	12	15	14	10	11	10	10	13	11	12	13	18	13	11	12	14	556
6	*Turdus merula*	8	9	7	9	12	14	9	10	14	13	11	13	13	12	8	11	8	547
7	*Sylvia atricapilla*	7	11	10	14	12	10	14	15	14	13	11	12	16	15	15	17	12	406
8	*Parus caeruleus*	7	7	6	10	9	6	11	8	11	11	9	12	12	12	7	11	12	308
9	*Erithacus rubecula*	8	5	4	3	4	7	6	6	5	3	4	7	6	4	5	6	9	278
10	*Sylvia communis*	3	4	2	6	7	8	4	3	3	5	5	7	7	5	4	7	2	257
11	*T. troglodytes*	10	8	7	4	5	7	9	13	7	7	8	9	11	7	6	8	11	229
12	*Hippolais icterina*	3	5	7	9	4	2	6	3	7	8	6	7	3	1	0	2	1	213
13	*Anthus trivialis*	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	200
14	*Acrocephalus palustris*	0	3	6	5	5	2	2	4	1	2	1	0	1	5	5	4	1	195
15	*Prunella modularis*	2	3	7	2	5	7	3	8	6	2	3	7	7	5	2	4	3	189
16	*Sturnus vulgaris*	4	5	7	7	8	5	12	1	2	1	2	4	5	5	2	8	3	179
17	*Parus palustris*	1	1	2	2	2	1	2	2	3	3	5	3	2	3	4	3	5	133
18	*Ficedula hypoleuca*	2	1	1	2	1	2	0	2	0	0	0	1	1	1	1	1	0	122
19	*Emberiza citrinella*	1	1	1	4	3	1	7	5	6	6	6	12	9	8	4	6	5	87
20	*Sitta europaea*	2	1	3	1	3	3	3	4	4	3	3	2	2	6	5	5	3	76
21	*Carduelis chloris*	0	1	6	4	4	2	2	3	3	4	4	4	3	0	0	0	2	74
22	*Phylloscopus collybita*	0	0	0	1	1	1	1	0	2	0	6	9	6	3	8	9	10	57
23	*Carduelis cannabina*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44
24	*Turdus pilaris*	2	4	2	2	0	0	1	1	2	3	4	1	0	0	0	0	0	36
25	*Muscicapa striata*	3	1	0	2	0	1	0	0	3	5	4	0	4	1	0	1	0	32
26	*Motacilla alba*	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	28
27	*Turdus philomelos*	0	0	1	0	0	0	0	0	0	1	2	2	2	0	0	1	1	28
28	*Carduelis carduelis*	0	0	0	0	0	0	0	2	2	4	5	2	0	0	1	0	0	24
29	*Ph. phoenicurus*	0	0	0	1	0	1	0	0	1	2	0	3	2	1	3	4	4	23
30	*Certhia familiaris*	4	0	0	1	3	1	1	0	1	0	0	1	1	1	0	0	1	20
31	*Passer montanus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
32	*Emberiza hortulana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
33	*Sylvia curruca*	0	0	0	1	0	2	0	0	0	0	0	1	0	0	0	1	0	11
34	*Acrocephalus scirpaceus*	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	3
35	*Phylloscopus sibilatrix*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
36	*Saxicola rubetra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
37	*Regulus regules*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
38	*C. coccothraustes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
39	*Passer domesticus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
40	*Locustella naevia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
41	*Aegithalos caudatus*	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	Species *Arter*	21	22	22	26	22	25	24	23	26	25	24	27	25	23	21	24	24	41
	Territories *Revir*	124	137	137	157	160	144	150	152	164	154	146	182	177	152	135	158	140	7501

Appendix 2.
Number of territories of non-passerine and corvine species. These species were not surveyed in 1953–1992 (Hooded Crow, Mallard and Pheasant not until 1999). Magpie was reported regular with 1–3 territories in 1953–1992 but has since only occasionally visited the valley.
Antal revir av icke tättingar och kråkfåglar. Dessa arter inventerades inte 1953–1992 (kråka, gräsand och fasan inte förrän 1999). Skatan rapporterades som årlig med 1–3 revir 1953–1992 men har därefter bara tillfälligt besökt dalen.

	19 93	19 94	19 95	19 96	19 97	19 98	19 99	20 00	20 01	20 02	20 03	20 04	20 05	20 06	20 07	20 08	20 09
Corvus cornix																	
Hooded Crow *Kråka*	?	?	?	?	?	?	1	2	2	1	2	3	3	3	3	3	2
Columba palumbus																	
Wood Pigeon *Ringduva*	4	6	5	7	7	6	7	6	6	7	9	8	6	9	9	10	10
Dendrocopos minor																	
Lesser Spotted Woodppecker *Mindre hackspett*	0	0	0	1	0	0	2	0	0	0	0	0	0	0	1	0	1
Dendrocopos major																	
Great Spotted Woodpecker *Större hackspett*	1	0	1	1	1	1	1	0	2	1	1	1	1	2	2	2	0
Buteo buteo																	
Common Buzzard *Ormvråk*	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cuculus canorus																	
Cuckoo *Gök*	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0
Anas platyrhynchos																	
Mallard *Gräsand*	?	?	?	?	?	?	1	1	1	3	3	2	1	3	2	0	3
Strix aluco																	
Tawny Owl *Kattuggla*	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1
Phasianus colchicus																	
Pheasant *Fasan*	?	?	?	?	?	?	3	5	2	6	2	4	5	3	4	5	2

Appendix 3.
List of species with English and Swedish names in the same order as in Appendix 2.
Artlista med engelska och svenska namn i samma ordning som i Appendix 2.

1 *Fringilla coelebs* Chaffinch *Bofink*
2 *Phylloscopus trochilus* Willow Warbler *Lövsångare*
3 *Sylvia borin* Garden Warbler *Trädgårdssångare*
4 *Luscinia luscinia* Thrush Nightingale *Näktergal*
5 *Parus major* Great Tit *Talgoxe*
6 *Turdus merula* Blackbird *Koltrast*
7 *Sylvia atricapilla* Blackcap *Svarthätta*
8 *Parus caeruleus* Blue Tit *Blåmes*
9 *Erithacus rubecula* Robin *Rödhake*
10 *Sylvia communis* Whitethroat *Törnsångare*
11 *Troglodytes troglodytes* Wren *Gärdsmyg*
12 *Hippolais icterina* Icterine Warbler *Härmsångare*
13 *Anthus trivialis* Tree Pipit *Trädpiplärka*
14 *Acrocephalus palustris* Marsh Warbler *Kärrsångare*
15 *Prunella modularis* Dunnock *Järnsparv*
16 *Sturnus vulgaris* Starling *Stare*
17 *Parus palustris* Marsh Tit *Entita*
18 *Ficedula hypoleuca* Pied Flycatcher *Svartvit flugsnappare*
19 *Emberiza citrinella* Yellowhammer *Gulsparv*
20 *Sitta europaea* Nuthatch *Nötväcka*
21 *Carduelis chloris* Greenfinch *Grönfink*
22 *Phylloscopus collybita* Chiffchaff *Gransångare*
23 *Carduelis cannabina* Linnet *Hämpling*
24 *Turdus pilaris* Fieldfare *Björktrast*
25 *Muscicapa striata* Spotted Flycatcher *Grå flugsnappare*
26 *Motacilla alba* White Wagtail *Sädesärla*
27 *Turdus philomelos* Song Thrush *Taltrast*
28 *Carduelis carduelis* Goldfinch *Steglits*
29 *Phoenicurus phoenicurus* Redstart *Rödstjärt*
30 *Certhia familiaris* Treecreeper *Trädkrypare*
31 *Passer montanus* Tree Sparrow *Pilfink*
32 *Emberiza hortulana* Ortolan Bunting *Ortolansparv*
33 *Sylvia curruca* Lesser Whitethroat *Ärtsångare*
34 *Acrocephalus scirpaceus* Reed Warbler *Rörsångare*
35 *Phylloscopus sibilatrix* Wood Warbler *Grönsångare*
36 *Saxicola rubetra* Whinchat *Buskskvätta*
37 *Regulus regulus* Goldcrest *Kungsfågel*
38 *Coccothraustes coccothraustes* Hawfinch *Stenknäck*
39 *Passer domesticus* House Sparrow *Gråsparv*
40 *Locustella naevia* Grashopper Warbler *Gräshoppsångare*
41 *Aegithalos caudatus* Long-tailed Tit *Stjärtmes*