

The White Stork in Latvia from 1934 to 2005

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Zusammenfassung

Die sechste internationale Bestandsaufnahme des Weißstorchs in Lettland wurde 2004 und 2005 durchgeführt. Die Mehrzahl des Materials wurde 2004 gesammelt. Wie in allen vorigen Bestandsaufnahmen, erfolgte auch diesmal das Sammeln der Daten vorwiegend mittels der Versendung von Fragebögen an Schulen. Auch die Mitglieder der Lettischen Ornithologischen Gesellschaft, als auch die Bevölkerung wurden im Rahmen der Öffentlichkeitsarbeit zur Teilnahme aufgefordert. Der Weißstorch wurde als Vogel des Jahres 2004 gewählt.

Insgesamt 9.148 Berichte über 8.058 Nester wurden während der beiden Jahren eingeschickt. Es lagen Daten aus 74% aller Gemeinden vor, aber nur 66% des Gesamtterritoriums wurde vollständig erfasst. Deshalb wurde der Gesamtbrutbestand (HPa) und die Gesamtzahl der ausgeflogener Jungvögel (JZG) durch Extrapolation berechnet (durch Anwendung der Daten von vollständig erfassten Gemeinden in jedem Bezirk).

Der Gesamtbestand des Weißstorchs für 2004/05 in Lettland wurde auf ca. 10.600 Paare (HPa) hochgerechnet. Damit blieb der Bestand seit 1994/1995 stabil. Im Jahr 2004 blieben 8% aller Paare erfolglos (HPo), 11% im Jahr 2005. Die Siedlungsdichte (StD) ist mit 17 Paaren/100 km² bzw. 43 Paaren/100 km² landwirtschaftlicher Nutzfläche (StDbiol) weltweit eine der höchsten.

Der Bruterfolg war ausreichend hoch, um die Stabilität der lokalen Population sicherzustellen und betrug 2004 im Durchschnitt 2,3 Junge/Paar bezogen auf alle Paare (JZa) und 2,5 Junge/Paar für erfolgreiche Paare (JZm) und 2,0 bzw. 2,3 im Jahr 2005. Im Jahr 2004 betrug die Gesamtzahl der Jungvögel (JZG) 22.300, bzw. 18.400 im Jahr 2005.

Der Anteil von Nestern auf Nisthilfen war mit nur 19% erheblich seltener als 10 Jahre zuvor. Der Anteil von Nestern auf Masten stieg auf 60% an. Insgesamt brüteten 55% aller Paare auf Masten ohne menschliche Hilfe.

Derzeit scheint es in Lettland keine lokalen Gefährdungen zu geben, die den Bestand des Weißstorchs im Lande ernsthaft gefährden könnten. Es ist jedoch zu erwarten, dass die Intensivierung der Landwirtschaft in Zukunft negative Effekte haben könnte.

Summary

The 6th International White Stork Census was carried out in Latvia during 2004 and 2005, with most of the country being censused in 2004. As for all previous censuses, data were obtained mainly by means of questionnaires distributed among all rural and small town schools. All members of the Latvian Ornithological Society, as well as the general public (through the mass-media) were also encouraged to take part in the census. To draw attention to this bird, the White Stork was chosen by LOS as their Bird of Year 2004.

In total, 9,148 reports from 8,058 nests were obtained over the two census years. Reports came from 74% of local communities, but only 66% of the country can be considered to have been well-covered by the census. Therefore, the total numbers of occupied nests and fledged young were estimated by means of extrapolation using relevant data from well censused areas.

The Latvian population of the White Stork is stable and quite large – about 10,600 occupied nests (HPa) in 2004/2005, the same number as recorded breeding in Latvia in 1994/95. 8% of pairs were unsuccessful (HPo) in 2004 and 11% in 2005. The breeding density (StD) is one of the highest in the world – on average 17 occupied nests per 100 km² of territory, or 43 per 100 km² of agricultural land (StDbiol).

Breeding performance was good enough to ensure the stability of the local population – an average of 2.3 fledged young/occupied (JZa) nests and 2.5 fledged young/successful (JZm) nest in 2004; and 2.0 and 2.3 in 2005, respectively. The total number of fledglings (JZG) was 22,300 in 2004, and 18,400 in 2005.

Human assistance in erecting nests is given less often than before – only 19% of nests are built on man-made platforms. Increasing numbers of storks build their nests on utility poles, and the proportion of such nests reaches 60%. In total, 55% of nests are built without human help on poles.

At present, there are no special local threats for White Storks which could seriously influence their situation in Latvia. However, it is likely that this situation could change in the future, due to increasing intensification of agriculture.



Introduction

White Storks probably started to occupy the current territory of Latvia from the 15-16th century onwards, with the increasing conversion of land to agriculture (originally most of the territory was covered by forest and bogs). It was recorded as a breeding species in the first publications devoted to the birds of Latvia (BESEKE 1792). Since the mid-19th century, they have been distributed throughout Latvia. Latvia participated in the first international census in 1934, and also in all of the subsequent international censuses (STRAUTZELS 1942; SPURIS 1960; JANAUS 1978; JANAUS & STIPNIECE 1989, 1999). The aim of this article is to summarize and analyze data obtained during the 6th International White Stork Census in Latvia (2004-2005) and compare the results with those obtained during preceding censuses.

Methods and material

Nest data were gathered mainly in 2004, but also in 2005. As in all previous censuses, data were obtained mainly by means of questionnaires distributed among: all rural and small town schools; members of the Latvian Ornithological Society; and in the mass-media. In addition to the questionnaires themselves, schools and individual participants were also all provided with instructions and relevant maps (mainly 1:100,000). The questionnaires asked for the following information: locality (farm name, community, district), nest site (tree, pole, building etc.), type of nest support (man-made or natural), occupation status (uninhabited, occupation unknown, occupied successful with known number of fledglings, occupied successful with unknown number of fledglings, occupied unsuccessful, occupied but breeding success not known, number of fledglings, and notes - for example, loss of young and/or adult birds and its causes, fights between adults, destruction of nest by humans).

During 2004 and 2005 we obtained a total of 9,148 reports referring to 8,058 nests (some nests were recorded more than once by different participants, and some were surveyed in both years). Although reports were received from 74% of local communities, only 66% of the total territory can be considered to have been well-covered by the census (Fig. 1). Therefore, as in the four previous censuses, the total numbers of occupied nests and fledged young were obtained by extrapolation (in every of 26 districts the average nest density on agricultural land and the average number of young were calculated using data from well-censused communities, and then applied to agricultural land in uncensused communities within the same district). "Agricultural land" included arable land, pastures, meadows and gardens.

Unfortunately, not all returned questionnaires contained full information for all of the requested parameters. Consequently, we used only precise, confirmed data to quantify: location, type of nest support, proportions of unoccupied, successful and unsuccessful nests, productivity and mean fledged brood size.

To raise awareness of the census, the White Stork was chosen by the Latvian Ornithological Society as their Bird of Year 2004. Information posters, stickers and individual questionnaires were prepared and widely distributed among the public.

Results

Population size

Data obtained during the census in 2004/2005 are summarized in Table 1. The extrapolated total number of occupied nests was 10,600 in 2004 and/or 2005 (supposedly in 2004 this number was somewhat higher than in 2005). The percent of occupied unsuccessful nests differed slightly in 2004 and 2005 but was comparatively low – 8% and 11%, respectively. The difference in the percentage of unoccupied nests between the two census years was greater: 9% and 15%, respectively. 2005 was a so-called *Störungsjahr* for parts of the eastern migrating population of the White Stork. The season was characterized by a late return of the breeding birds, a sharp decline in breeding numbers and low breeding success (NABU BAG WEISSSTORCHSCHUTZ 2006).

Figure 2 shows regional changes in numbers of occupied White Stork nests compared with 1994/1995. Numbers in the western and eastern regions of Latvia have mainly declined, while central, north-eastern and south-eastern parts of the country generally show an increase.

Population density

The mean population density of the White Stork in Latvia in 2004-2005 was 17 breeding pairs (StD) per 100 km² of land (Tab. 1). As overall land cover includes forests, bogs, cities and other habitats unsuitable for White Stork nesting, and because the proportion of agricultural lands varies greatly between districts (from 20.5 to 58.6%), the population density on suitable habitats (arable land, pastures, meadows, gardens) is a more appropriate measure. For the whole of Latvia, the average breeding density was 43 breeding pairs per 100 km² of agricultural land only. As can be seen in Figure 3, the distribution of nests is quite uneven – ranging from 22 to 81 nests/100 km² of agricultural land in different districts. The highest densities were found either in districts with widespread but not over-intensively managed agricultural activities, or in districts where White Storks tended to nest in colonies (up to 30 pairs). In general, the south-east of Latvia is less inhabited by White Storks, possibly because of lower soil fertility and, consequently, a relative lack of potential food. The other reason could be the density of human settlements – the south-east of Latvia is less densely inhabited by people than the rest of the country (as a rule, White Storks build their nests in or close to human settlements).

Breeding success

2004 was an exceptionally good year for White Storks in Latvia, and the average number of fledged young was as high as 2.3 per breeding pair (productivity, JZa) and 2.5 per successful pair (mean fledged brood size, JZm). By contrast, 2005 was very poor – on average only 2.0 young fledged per breeding pair and 2.3 young fledged per successful nest. Figure 4 shows the proportions of different brood sizes in 2004 and 2005. After extrapolation, the total number of fledged young (JZG) was 22,300 for 2004, and 18,400 for 2005.

As with breeding density, mean fledged brood size of the White Stork also varies greatly between different districts – ranging from 2.08 to 2.81 young per successful pair in 2004 (Fig. 5) and from 2.0 to 3.01 in 2005, an even greater variation. As with nes-

ting density, regional differences can be observed – the largest mean fledged brood size was recorded in south-eastern Latvia.

We compared breeding density (average number of breeding pairs per 100 km² of agricultural lands in the district) and mean fledged brood size, and found negative though not statistically significant ($r=-0.343$) correlation.

Nest location and support

In 2004–2005 most White Stork nests (6,679) in Latvia were placed on utility poles (mainly electricity poles) – representing on average 60% of all occupied nests (Fig. 6). Many fewer nests were located on trees (21%) or buildings (19%). Of the buildings used for nesting, almost half (48%) were water towers.

Of 5,757 occupied nests in 2004/2005 for which the type of support is known, the vast majority (81%) were built without any human help (for example artificial platforms) (Fig. 7).

In total, in 2004/2005 among 5,656 occupied nests with known both location and support, more than a half (55%) were built on poles without any help by humans (Fig. 8).

Development of the breeding population since 1934

Table 2 shows the main demographic parameters recorded for breeding White Storks in Latvia in census years from 1934 onwards.

There have been remarkable changes in the numbers of White Storks breeding in Latvia over the last 70 years (Tab. 2). Following declines in the 1970s and 1980s, a considerable increase was observed after 1990, presumably due to rapid changes of agriculture management in Latvia and adjacent countries, after the collapse of Eastern bloc socialism. This increase took place across Latvia, but was especially pronounced in the eastern part of the country. At the same time, breeding performance generally declined (Tab. 2, Fig. 9), but remained more or less stable at traditionally high levels in the south-eastern corner of Latvia.

Breeding density (on agricultural land) showed an even greater increase than the number of nests – in 2004/2005 it was almost twice as high as in 1934 (Tab. 2). This can be explained not only by the growth of the breeding population, but also by a decrease in the extent of agricultural land.

The placement and nature of nest support has undergone considerable change as well.

In 1934 up to 87% of nests were located on artificial platforms. By contrast, in 2004/2005 no more than 19% of occupied nests were built with human help (Fig. 7), even though the general attitude of people to storks is benevolent. There has been a very pronounced increase in the proportion of nests built on poles since 1974, when 1% of nests were built on poles, compared with more than 60% in 2004/2005 (Fig. 6). Most of the poles used for nesting were electricity transmission poles and the 7,000 nest sites involved represent approximately 0.3% of electricity transmission poles in the country (Upzare, Kalnina 2007).

Discussion

Latvia is one of the most important breeding areas of the White Stork and its ca. 10,600 occupied nests in 1994/95 and 2004/05 represent about 6% of the species' global population in 1994/95 (SCHULZ 1999). A very high population density (17 pairs per 100 km² of territory, 43 pairs per 100 km² of agricultural area) indicates the richness and health of the land. At a country scale, only Lithuania has slightly higher densities (though densities can be even higher in some smaller regions with colonial breeding, for example, in Spain; MARTÍ 1999).

The most pronounced increase in breeding numbers was observed between 1984 and 1994/95 and this was driven both by local circumstances (the collapse of the Soviet system resulting in decline of intensive agriculture and a sharp increase in the extent of land left fallow, a decrease in the use of agricultural chemicals, cessation of agricultural improvement etc.), and improved conditions (positive rainfall changes) on the wintering grounds (SHONGWE *et al.* 2011). The same effect was also recorded in neighbouring countries – Lithuania (MALINAUSKAS & ZURBA 1999), Estonia (OTS 1999), Belarus (SAMUSENKO 1999) and Poland (GUZIAK & JAKUBIEC 1999). These changes have had a positive impact also on other wild bird species associated with similar biotopes, for example the Corncrake (KEISS 2005). Now the local White Stork population in Latvia has apparently reached its maximum potential, and since 1994/95 the total number of occupied nests has been stable. The 10 years between the two most recent censuses have generally been years of stagnation for Latvian agriculture: although the proportion of all land that is used for agriculture has stayed almost constant (38.3% in 2003), the area of fallow lands increased to 39% of all agricultural land in 2003 (DOBELE 2004). It is worth noting that agricultural intensification in Latvia has started again in the last few years, but we expect this process to accelerate in the immediate future. This will likely have a negative impact on the local breeding population of White Storks.

Breeding performance fluctuates quite considerably between years. 2004 was very successful for our White Storks while 2005 had lower breeding success. Nevertheless, in both years breeding output was high enough to ensure stability of the local population. Also, in the years since the census, the number of fledged young per nest has remained within the range observed during last 70 years (JANAUS 2000; unpubl. data of Lab. of Ornithology).

We observe continuing changes in nest location and support. Although the attitude of people towards White Storks is positive, direct assistance (such as erecting artificial nest platforms) is less common than before – only 19% of nests are now on platforms. As well as the percentage, the absolute number of “artificial” nests shrank from almost 6,000 in 1934 to about 2000 in 2004/2005. Therefore, storks are forced to choose such locations where they can build their nest without human help. As a rule, this means poles, mainly electricity transmission poles, and 55% of all Latvian White Storks in 2004/2005 were nesting on self-made nests placed on poles. This causes frequent conflicts due to interruptions of power supply. Unfortunately, the relevant legislation is contradictory and cannot solve the problem, and a small number of nests in this situation have been thrown down (with special permission). It is worth noting that the problem is still growing – in 2007, 65% of 500 nests on our study plots (which are distributed practically all over Latvia) were on poles (unpubl. data of Lab. of Ornithology).

In general, at present there are no significant factors in Latvia likely to give rise to a noticeable negative impact on the local breeding population of the White Stork. In order to monitor the situation in future years, when changes in agriculture management are predicted to influence not only White Storks but also other wild animals, the species has been included in the State Monitoring Programme (monitoring breeding success on control plots).

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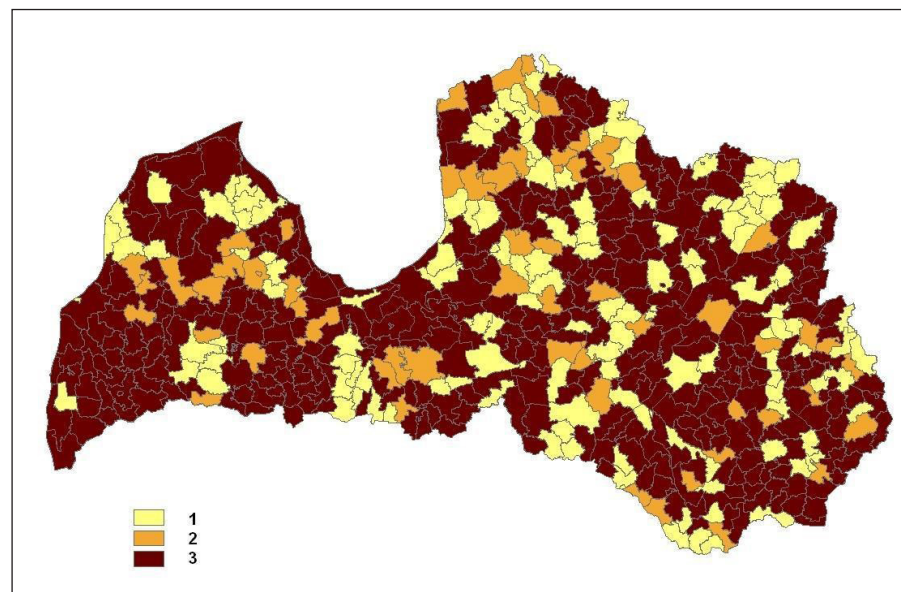


Fig. 1. Coverage of the territory of Latvia by the 6th International White Stork Census 2004/05.

- 1 – Communities not covered by census,
- 2 – Communities partly covered by census,
- 3 – Communities well covered by census

Abdeckung der Landesfläche von Lettland durch den 6. Internationalen Weißstorchzensus 2004/05.

- 1 – Gemeinden nicht durch den Zensus erfasst,
- 2 – Gemeinden teilweise durch den Zensus erfasst,
- 3 – Gemeinden gut durch den Zensus erfasst

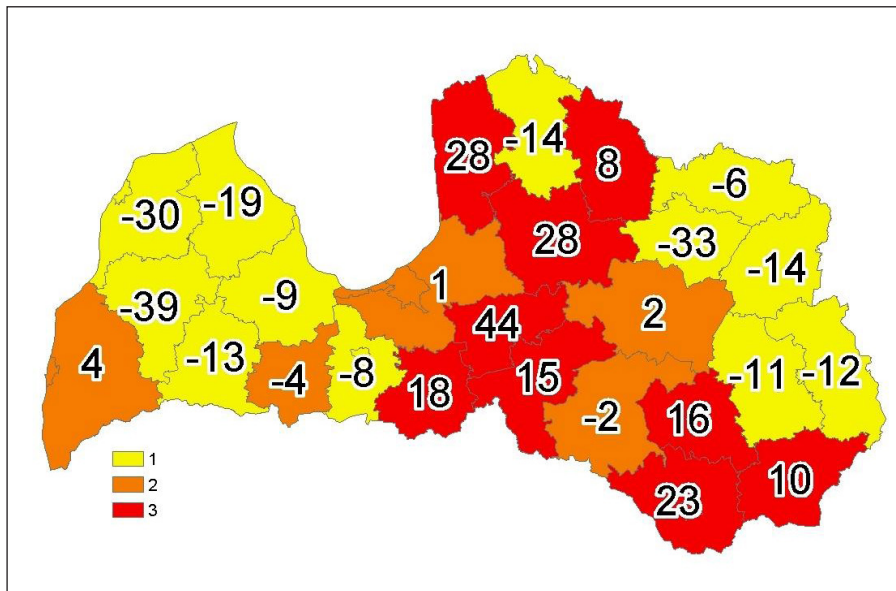


Fig. 2. Changes (in %) in the number of occupied White Stork nests (HPa) in Latvia between 1994/95 and 2004/05

1 - significant decrease ($p < 0.05$),
 2 - no significant changes,
 3 - significant increase ($p < 0.05$)

Änderung in der Anzahl von Weißstorchbrutpaaren (HPa) zwischen 1994/95 und 2004/05.

1 - Signifikanter Rückgang ($p < 0.05$),
 2 - Keine signifikanten Änderungen,
 3 - Signifikanter Anstieg ($p < 0.05$)

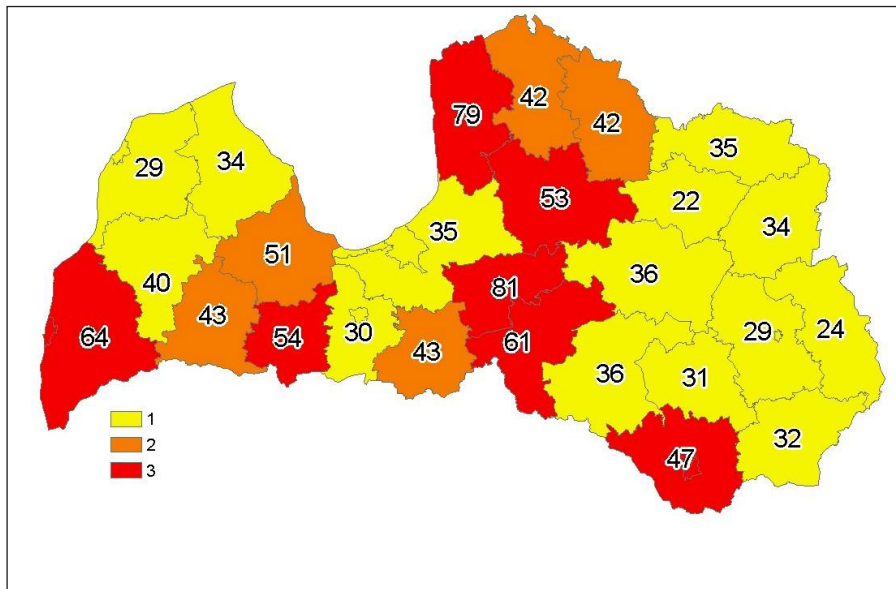


Fig. 3. Population density of the White Stork in Latvia in 2004/05 (StDbiol, HPa/100 km² agricultural land).

1 - density lower than average ($p < 0.05$),
 2 - density differ not significant from average,
 3 - density higher than average ($p < 0.05$)

Siedlungsdichte des Weißstorchs in Lettland 2004/05 (StDbiol, HPa/100 km² landwirtschaftlicher Nutzfläche).

1 - Dichte geringer als im Durchschnitt ($p < 0.05$),
 2 - Dichte unterscheidet sich nicht signifikant vom Durchschnitt,
 3 - Dichte höher als im Durchschnitt ($p < 0.05$)

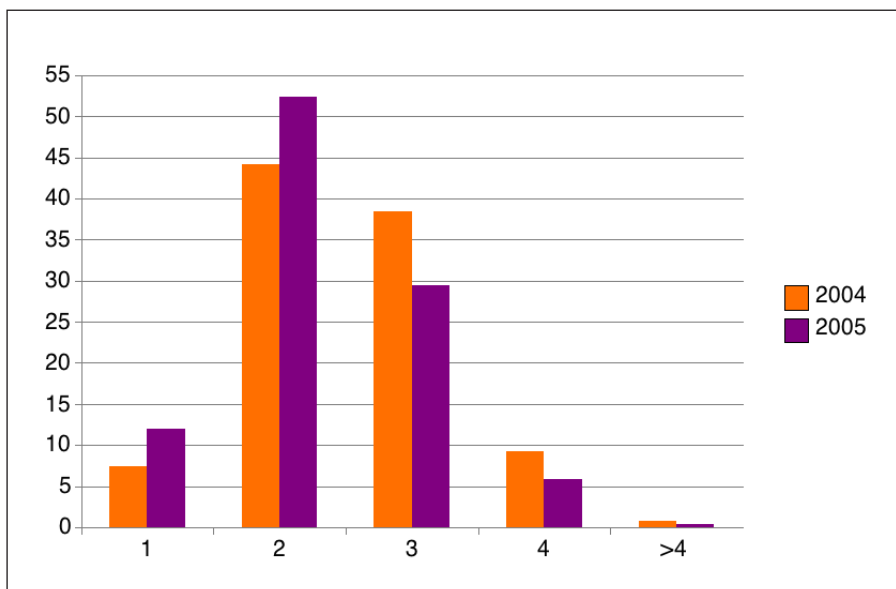


Fig. 4. Frequency distribution of the number fledging young per nest in Latvia in 2004 and 2005.

Häufigkeitsverteilung der Anzahl flügger Jungvögel pro Nest in Lettland 2004 und 2005.

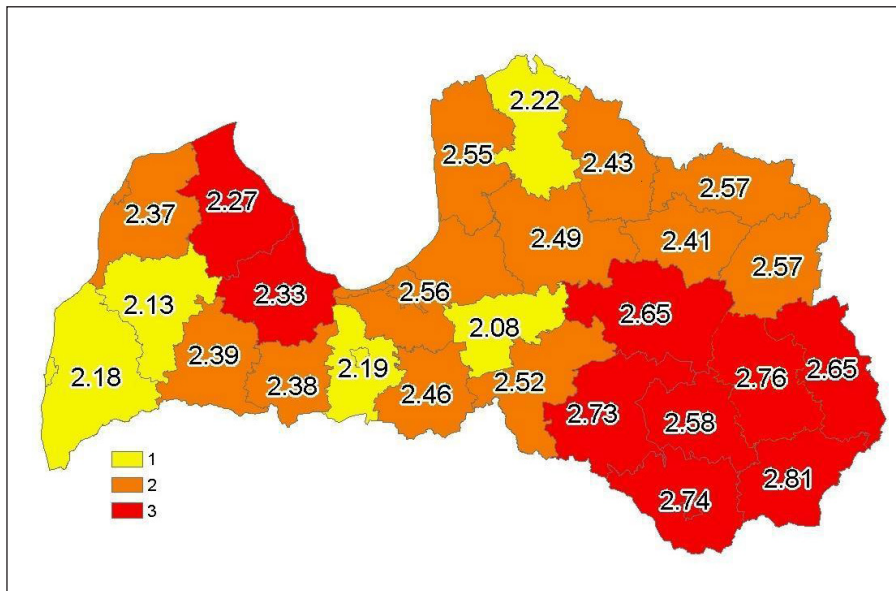


Fig. 5. Breeding success (JZm) of the White Stork in Latvia in 2004 (n=5061)
 1 - lower than average (p<0.05),
 2 - no significant difference from average,
 3 - higher than average (p<0.05)

Durchschnittlicher Bruterfolg (JZm) des Weißstorchs in Lettland 2004 (n=5061).
 1 - niedriger als der Durchschnitt (p<0.05),
 2 - kein signifikanter Unterschied,
 3 - höher als der Durchschnitt (p<0.05)

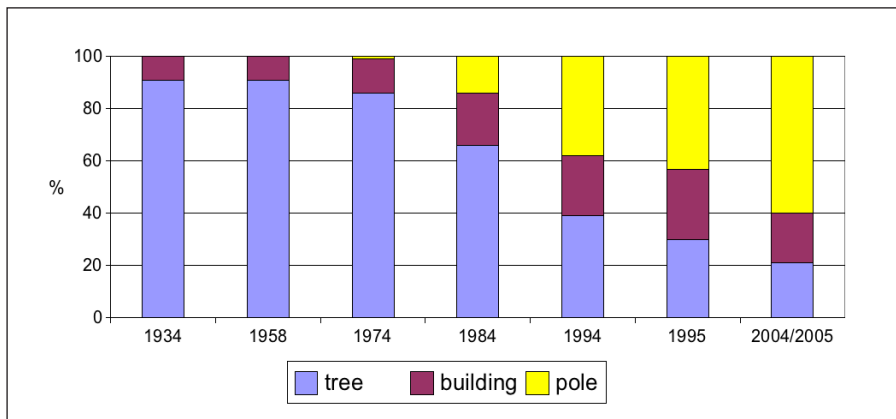


Fig. 6. Percentages of White Stork nests in Latvia according to location, 1934 - 2004/2005.

Anteil verschiedener Neststandorte des Weißstorchs in Lettland, 1934 - 2004/05.

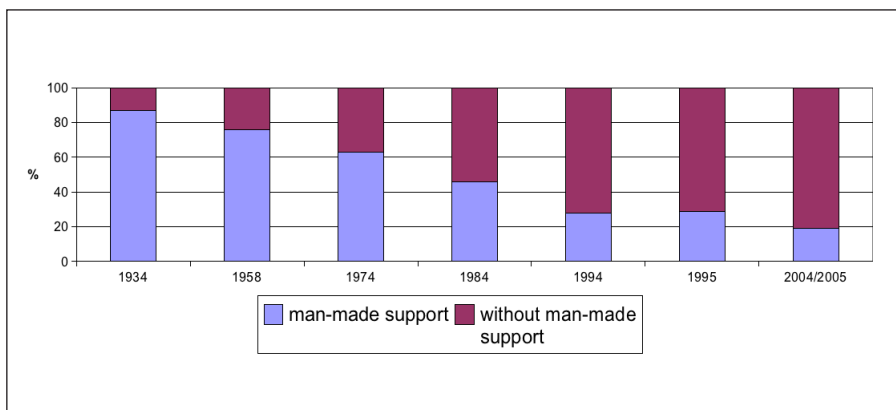


Fig. 7. Percentages of White Stork nests in Latvia according to origin of nest support, 1934 - 2004/2005.

Anteil verschiedener Nestunterlagen des Weißstorchs in Lettland, 1934 - 2004/05.

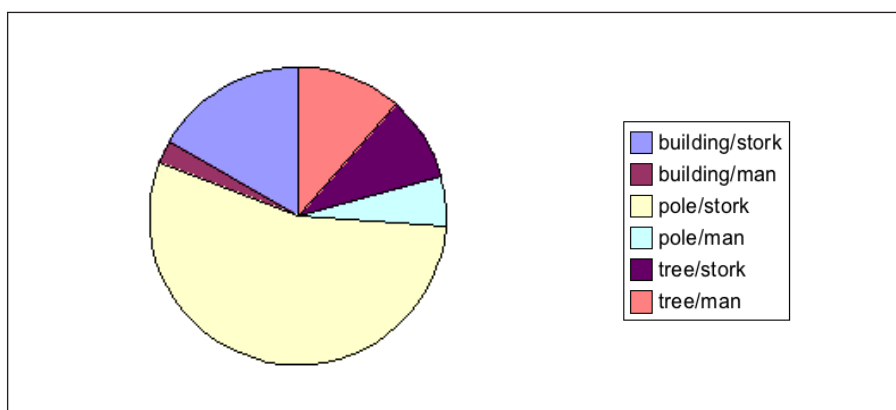


Fig. 8. Percentages of White Stork nests in Latvia in 2004 according to location and origin of nest support.

Anteil von Weißstorchnestern in Lettland hinsichtlich Neststandort und -unterlage, 1934 - 2004/05.

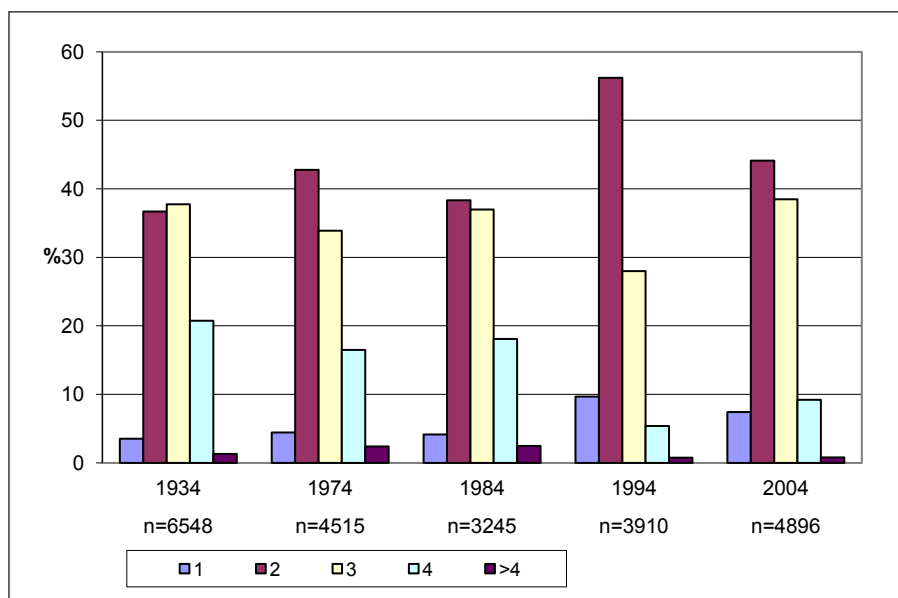


Fig. 9. Frequency distribution of the average number of fledging young per nest in Latvia from 1934 to 2004/05.

Häufigkeitsverteilung der durchschnittlichen Anzahl ausfliegender Jungvögel pro Nest in Lettland von 1934 - 2004/05.

Tab. 1. Results of the 6th International White Stork Census 2004/05 in Latvia.
Ergebnisse des 6. Internationalen Weißstorchzensus 2004/05 in Lettland.

Parameter	Nests actually	Nests actually	Total estimate
	counted	counted	2004/2005
	in 2004	in 2005	(rounded)
Total number of nests (H)	7089	2013	
Occupied nests (HPa)	6207	1539	10600**
% nests occupied	91%	85%	
Successful nests with known number of young (HPm)	4919	1171	
Successful nests with unknown number of young (HPmx)	377	85	
Successful nests total	5296	1256	
Unsuccessful nests (HPo)	450	152	
Percentage of HPo (%HPo)	8%	11%	
Occupied nests with unknown success (HPx)	461	131	
Nests visited by 1 or 2 storks no longer than 1 month (HB1, HB2)	179	62	
Uninhabited nests	442	216	
Nests with unknown occupation (H?)	261	196	
Total number of fledglings (JZG)	12387	2694	22300/18400**
Average number of young/HPa (JZa)	2.3	2.0	
Average number of young/HPm (JZm)	2.5	2.3	
Population density HPa/100 km ² of territory (StD)*			17
population density/100 km ² of potential habitat (StDbiol)			43

* Except big cities Riga, Jurmala, Daugavpils, Jelgava, Ventspils, Rezekne, Liepaja

** Extrapolated

Tab. 2. Main results of White Stork censuses in Latvia since 1934.

Wichtige Ergebnisse von Weißstorchbefragungen in Lettland seit 1934

¹STRAUTZELS 1942, ²SPURIS 1960, ³JANAUS 1974, ⁴JANAUS & STIPNIECE 1989, ⁵JANAUS & STIPNIECE 1999

Year	HPa	HPm	population density		JZG	breeding success	
			STD	STDbiol		JZa	JZm
1934 ¹	6750	6548	13	23	18300	2,7	2,8
1958 ²	?	6125	10	15	17000	?	?
1974 ³	5763	5551	9	21	15000	2,6	2,7
1984 ⁴	6273	5230	10	24	14500	2,5	2,8
1994/1995 ⁵	10600*		17	42			
1994		9650*			22400*	2,1	2,3
1995		9860*			22900*	2,1	2,3
2004					22300*	2,3	2,5
2005					18400*	2,0	2,3
2004/2005	10600*		17	43			

* Extrapolated

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