Breeding Whooper Swans *Cygnus cygnus* in Latvia, 1973–2009

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Abstract

This study describes the population status, development, distribution and habitat choice of breeding Whooper Swans *Cygnus cygnus* breeding in Latvia. The breeding population increased from one breeding pair in 1973 to *c.* 260 pairs in 2009. The first pair of Whooper Swans nested in the western part of the country, and this area has remained a stronghold for the species within Latvia, supporting 86% of 256 sites where breeding was confirmed during the years 2000–2009, with 54% of pairs found in the districts of Liepaja, Talsi and Kuldiga. Most breeding sites were associated with small water-bodies: 77% were at artificial ponds and 17% at beaver dams. Few nests were found in lakes, mires, bogs and gravel pits. Results are discussed in relation to the increase in Whooper Swan numbers in other parts of Europe.

Key words: beaver dams, breeding habitat, distribution, fishponds, population development.

Intense year-round persecution through hunting, trapping (Brusewitz 1971), and egg collection (Wallengren 1849; Brusewitz 1971), had a major adverse impact on Whooper Swans *Cygnus cygnus* in Europe during the 19th and the early 20th century. National breeding populations were pushed close to extinction in many countries, except in Iceland and Russia (Cramp & Simmons 1977). In the 1840s, the species still bred in southernmost Sweden (Nilsson 1858) but 80 years later the southern border of the breeding range had retreated 1,100 km northwards and only about 20 breeding pairs remained in Sweden (Svensson *et al.* 1999). In Finland, the population was reduced to about 15 pairs by 1949 (Lammi 1983). Legal protection of Whooper Swans halted and reversed the decline, and numbers of breeding pairs have increased in both countries since the 1950s, reaching 3,800 pairs in Sweden by the late 1990s (Axbrink 1999) and 4,600–6,000 pairs in Finland in 2004 (Lehtiniemi 2006). The species continues to spread southwards, re-occupying former nesting grounds. Breeding has been recorded in Denmark since 2002 (Grell *et al.* 2004), Germany since

1995 (Bauer & Woog 2008), Hungary since 2005 (Szinai 2009), and is on the way to becoming established in the Netherlands (van Dijk *et al.* 2010).

In Latvia, the Whooper Swan was reported as a vagrant during migration periods in the 19th century (Lichtenstein 1829; Goebel 1873; Russow 1880; Löwis 1893; London 1895), and into the early 20th century (Transehe & Sināts 1936). It also appears to have bred at Lake Pape in the southwesternmost part of the country in the mid 19th century (Löwis 1893), probably at Lake Lubans in eastern Latvia in the 19th century (Lamsters 1932), very likely at Lake Tasu in western Latvia in 1944 (Tauriņš & Vilks 1949), and consistently in the western part of the country since 1973 (Lipsbergs 1983, 2000).

This study aims to fulfil the recommendations of the Latvian Red Data Book (Andrušaitis 2000), by describing the growth in numbers, distribution and choice of habitat for Whooper Swan pairs breeding in Latvia. We also discuss the Latvian-breeding Whooper Swans in an international context.

Methods

Information on the numbers and distribution of Whooper Swans breeding in Latvia were obtained from a literature search and from field surveys. The literature search included published data and also unpublished results from the *Latvian Breeding Bird Atlas 2000–2004* project. Fieldwork was undertaken by one of the authors (DB) during the years 2003–2009 inclusive.

Data on breeding habitat was recorded during 112 visits made to known and probable Whooper Swan breeding sites between 1 April and 31 August each year from 2004–2009. The *Latvian Breeding Bird Atlas 2000–2004* project, during which field workers were requested to provide information on the exact locality, breeding habitat and Whooper Swan brood size (number of cygnets) yielded the first 52 sites. Information about additional nest sites was obtained by appeals made to the public. Brief information about the Whooper Swan, as well as a request to provide information about its breeding grounds, was advertised through the media, and published in the journals *MMD*, *Vides Vēstis* and *Putni dabā*. Appeals for information were also put out on the home page of the Latvian Ornithological Society (LOB), and birdwatchers were asked to fill in a special questionnaire in relation to breeding pairs. People were asked to submit their information just after the chicks had hatched, to make it possible for the author to check the sites.

For each breeding site, confirmed or probable, the following data were recorded: date of visit, district, parish, name of the water-body, breeding habitat, number of cygnets and possible disturbance factors. To gain some measure of the breeding success of the pair, each site was visited as frequently as possible, and at least twice a season.

Whooper Swan breeding habitats in Latvia were classified into seven main groups: fishponds, multi-purpose ponds, beaver dams, lakes, raised bogs, mires and flooded gravel pit workings. Fishponds are managed for fish farming, are extensive, comparatively shallow (depth of 1–2 m) and fringed with scrub outgrowth of varying

width. Normally, they are inundated in spring (March–April) and emptied in autumn (September–October) and provide good breeding and feeding grounds for waterbirds because food distributed for the fish is also taken by the birds. Multi-purpose ponds are generally 0.5–2.0 m deep, but are subject to less commercial fish harvesting, angling by private fishermen and are also used for hunting. Water levels are not artificially regulated, they retaining water all year round, so their ecological status resembles that of natural lakes. Because such ponds are fringed with substantial amounts of scrub and have an abundance of food, they also provide good conditions for breeding waterbirds. Beaver dams are usually small, densely overgrown water-bodies, with fluctuating water levels. In spring, the water level is very high (if dammed) or very low (if spring floods have broken through the dam, or the dam has been destroyed to avoid flooding of a forest stand). Generally, occurrence of fallen trees and bushes, as well as nutritious above-water vegetation, ensures good feeding conditions for waterbirds at these sites. Lakes exhibit a variety of conditions, but the peatland bogs tend to be highly acidic, low in nutrients and offer poorer feeding conditions for waterbirds. All types of mire except raised bog were classified as mire.

Results

Population development

The first reliable evidence of Whooper Swan breeding in Latvia was obtained in 1973, when a nest with eggs was found in Krauze's fishpond in district of Liepaja (Baumanis 1975). Three more nest sites were subsequently found in fishponds during the 1970s (Baumanis 1980).

During fieldwork for the *Latvian Breeding Bird Atlas 1980–1984*, the number of breeding pairs had increased to 10–20 (Priedniks *et al.* 1989). Most were found in fishponds in the west of the country, but single birds or pairs were also recorded in the eastern part, for instance in the Pielubana Marsh.

The breeding population continued to increase, reaching 20–30 pairs in the early 1990s (Strazds *et al.* 1994), 50–100 pairs in the late 1990s (LOB 1999) and *c.* 150 pairs by 2004 (Boiko 2005), by which time the species had also became established in eastern Latvia (Fig. 1). The number of breeding pairs at the Lake Lubans fishponds grew to ten in 2003–2009 (D. Boiko unpubl. data) and breeding was also confirmed elsewhere in eastern Latvia, for instance Teicu Marsh, where a nest without eggs was found in 2003 and two pairs were recorded in 2004 and 2005 (Avotiņš 2005).

A total of 256 sites with confirmed breeding and 135 sites with probable breeding were recorded during the years 2000–2009. Based on these data, the breeding population was estimated to number 170–200 pairs in 2006 and *c.* 260 in 2007–2009.

Distribution

The western part of the country has been the core breeding area ever since Whooper Swans were first recorded breeding in Latvia (Fig. 1). Of the 256 confirmed breeding sites during the years 2000–2009, 86% were situated in western Latvia, compared to only 14% in the east. Overall, 54% of the

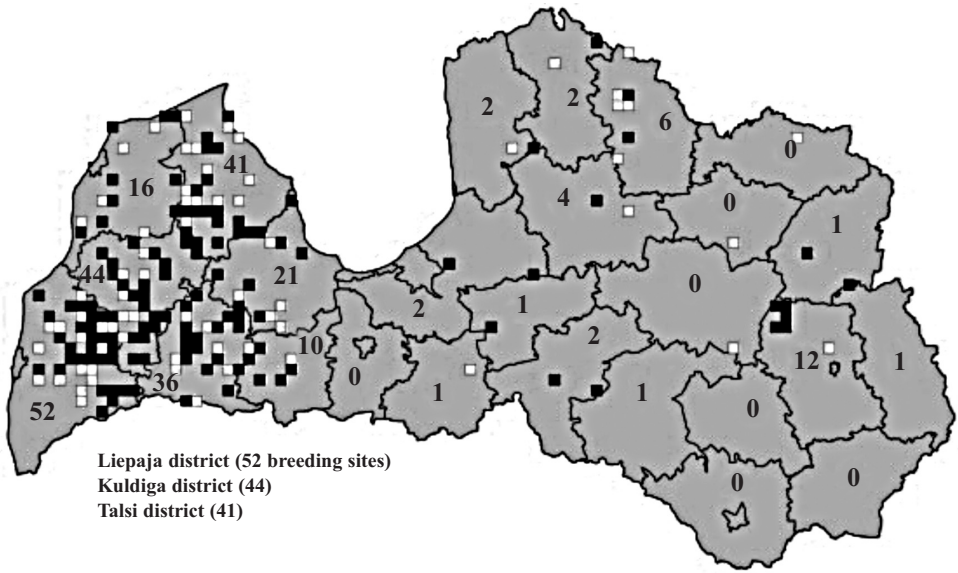

Figure 1. Breeding distribution of Whooper Swan *Cygnus cygnus* in Latvia, based on unpublished data from the *Latvian Breeding Bird Atlas 2000–2004* project. Black squares = confirmed breeding; white squares = probable breeding. Number of confirmed breeding sites between 2004 and 2009 is given for each district.

breeding sites were found in the Liepaja, Kuldiga and Talsi districts, which are all in the west (Fig. 1).

Choice of breeding habitat

Most breeding sites were found in multi-purpose ponds followed by fishponds and beaver dams (Fig. 2). Of the confirmed and probable breeding sites, 77% and 56%, respectively, were found in the two artificial habitats. On including cases where the swans nested at ponds associated with beaver dams, these percentages increased to 94% and 83%.

Discussion

The establishment of a breeding population of Whooper Swan in Latvia appears to continue the general population growth and range expansion which started in Finland and Russia in the 1950s (Haapanen *et al.* 1973; Bianki 1981). Whooper Swans are large, long-lived birds capable of rearing large broods in some years, which permits colonisation of new areas, where reproduction may not always be successful (Mathiasson 1991). Due to rapid cygnet development rate, high cygnet survival rates and low annual adult mortality rates, the species spread rapidly from northern Finland to south and southwestern parts of the country (Haapanen *et al.* 1991). During spring migration, some pairs of this rapidly expanding population stayed to summer in Poland, Lithuania and Latvia, where they eventually started to breed in the

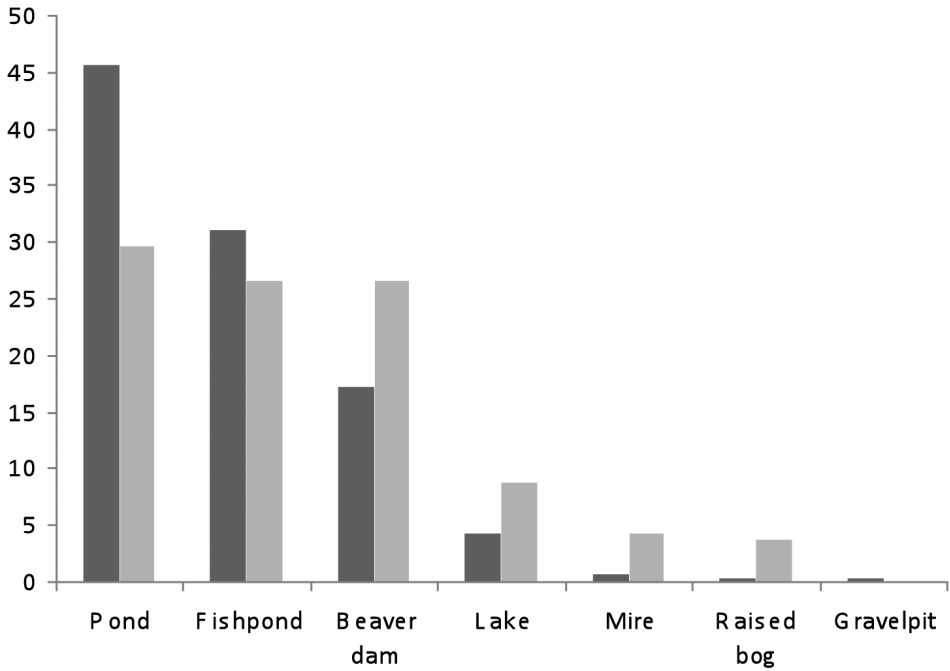

Figure 2. Choice of breeding habitat of Whooper Swan *Cygnus cygnus* in Latvia, 2004–2009, expressed as percentage distribution of confirmed (black columns, $n = 256$) and probable (grey columns, $n = 135$) breeding sites for each habitat category.

1970s (Baumanis 1975; Cramp & Simmons 1977).

The rapid population growth during the 20-year period between the first and second breeding bird atlas in Latvia, from 10–20 pairs (Priednieks *et al.* 1989) to about 150 pairs (Boiko 2005), is similar to that recorded in other parts of the breeding range. In the two northernmost provinces of Sweden, the number of pairs increased from 310 in 1972–75 (Haapanen & Nilsson 1979) to 2,775 in 1997 (Nilsson *et al.* 1998), while in other parts of Sweden the number of breeding pairs increased from 276 in 1985 to 1,408 in 1997 (Axbrink 1999). It is probable that developments in agriculture, such as changing harvesting methods and new crops, have helped to promote the increase in these populations (Nilsson 1997), because the productivity of the species is very much influenced by the conditions in the winter quarters (Nilsson 1979). Mild weather conditions in winter have benefitted Whooper Swans breeding in the Baltic countries also by enabling the birds to spend the winter closer to their breeding grounds (Švažas 2001). Burton (1995) attributed colonisation by Whooper Swan at southern latitudes and subsequent rapid growth in numbers to "the recent post-1950 climatic deterioration in the Arctic region which has probably caused many Whooper Swans to

breed further south, as they did during the Little Ice Age". Supporting evidence for this view is lacking however.

When a pair occupies a new site, they may defend the territory for one or two summers but not breed until the third or fourth year (Haapanen & Hautala 1991). This behaviour makes it possible to give two different figures of the size of the breeding population; all pairs occupying a site or only those with a nest. In the surveys in northern Sweden in 1972–75 and 1997, the proportion of pairs having a nest was 32% and 64%, respectively (Nilsson *et al.* 1998). For the Latvian population, all estimates refer to the number of pairs having a nest, while sites of probable breeding recorded during the atlas work probably to a large extent were made up of pairs occupying new sites. Due to the way the field surveys were carried out, there is only a rough estimate of 65% for the proportion of pairs having a nest in the Latvian Whooper Swan population.

The Whooper Swan is strongly territorial and defends a nest site and an area around it suitable for the pair and their young to feed in (Kear 1972). The pair defends it not only against con-specifics, but also show aggression towards other species, such as Mute Swan *Cygnus olor*, Taiga Bean Goose *Anser fabalis*, Greylag Goose *Anser anser* and Common Crane *Grus grus* (Arvidsson 1987; Brazil 2003; Kampe-Persson *et al.* 2005). Whooper Swans can oust both Bewick's Swans *Cygnus columbianus bewickii* (B. Laubeck pers. comm.) and Mute Swans (Dement'ev *et al.* 1952; Arvidsson 1987) from their breeding sites. Occasionally, Mute Swans are killed when a pair of Whooper Swan takes over their territory (Nilsson 1994). Arvidsson (1987) speculated that, in the future, the Mute Swan might be restricted to coastal sites in Sweden, with inland waters being monopolised by the Whooper Swan. No encounters between Whooper Swan and Mute Swan have been reported from Latvia, but the Mute Swan is gradually withdrawing from the districts of Liepaja, Talsi and Kuldiga, where more than half of the Latvian Whooper Swans breed (D. Boiko unpubl. data). The southward expansion of the breeding range resulted in hybridisation between Whooper Swan and Mute Swan in Sweden (Mathiasson 1992; H. Kampe-Persson unpubl. data) and Poland (Tomiałojć & Stawarczyk 2003). No cases of hybridisation have been recorded in Latvia, but a mixed pair was observed in the River Svēte on 9 April 2007 (H. Kampe-Persson unpubl. data).

The main part of the population growth in Latvia has taken place in a relatively small area, centred around the site where the first pair bred in 1973. A similar distribution pattern was observed among Greylag Geese in Scania, where local numbers increased substantially before the species spread to suitable areas situated ten kilometres or more further afield (Persson 1990). Scanian Greylag Goose females recruited to within seven kilometres of sites where they had been reared, while all breeding dispersal occurred within the local population (Nilsson & Persson 2001). So, the observed distribution pattern might have been caused by a strong pattern of natal female philopatry, known to be the norm amongst both geese and swans (Clarke *et al.* 1997).

Rapid population growth might be expected in the eastern part of Latvia in the years to come, however, since a second breeding nucleus has been established at the Nagli fishponds.

The Whooper Swan breeds in a wide range of habitats (Rees *et al.* 1997; Brazil 2003), but, at least east of the Baltic Sea, with large latitudinal differences. They mostly breed in fishponds in Germany, Poland and Lithuania (Švažas & Stanevičius 2000; J. Morkunas *in litt.*; A. Degen and M. Wieloch, pers. comm.), a pattern repeated in Latvia, where 77% of all nests were found in fishponds and multipurpose ponds (this study). In Estonia, however, the Whooper Swan breeds almost exclusively in natural habitats; 43% in mires, 31% in eutrophic lakes and the remaining 26% in coastal lakes and bays (Luigujõe *et al.* 2002). In Finland, the species was found breeding in bogs, wetlands, oligotrophic, eutrophic and mesotrophic lakes, including those surrounded by forest, and in ponds (Haapanen *et al.* 1977) and in northern Sweden, the Whooper Swan was found mostly on small lakes with lush vegetation or in peatlands and mesotrophic areas (Nilsson *et al.* 1998). While wet mires of the aapa fen type were a main breeding habitat in northern Sweden (Nilsson *et al.* 1998), Finland (Haapanen *et al.* 1977) and northwest Russia (Bianki 1981), only one Latvian breeding site was found in a mire, in the Kacour bog (this study). Access to artificial water-bodies is, however, not a prerequisite for breeding at lower latitudes. In the five southernmost provinces of Sweden, situated at about the same latitudes as Latvia, but lacking fishponds and multipurpose ponds, a total of 380 breeding pairs were found in 1997 (Axbrink 1999). Most of these pairs were found on small water-bodies, often surrounded by forest (Holmgren & Karlsson 1982; Svensson *et al.* 1999). Small natural water-bodies in Latvia and Lithuania are usually heavily owergrown and by that unsuitable for the Whooper Swan. These water-bodies have partly been replaced by artificial ponds and in areas with intense agriculture, large and mosaic fishponds form the only wetland habitat that provides suitable conditions for breeding Whooper Swans (Švažas & Stanevičius 2000).

Notwithstanding the large growth during the last 50 years national populations of Whooper Swan in northwest Europe are still increasing. Axbrink (1999), for instance, suggests that the Swedish population could reach 10,000 pairs. Similarly, the Latvian breeding population will very likely continue to grow; because of the availability of suitable breeding sites, especially in the eastern part of the country, the population may increase to 600 pairs.

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