

CHANGES IN ABUNDANCE OF WATERBIRDS IN SOUTH BOHEMIA DURING THE LAST DECADE: A SUMMARY REVIEW

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Abstract

Remarkable changes in waterbird numbers were recorded in South Bohemia during the 1980s. The decline in numbers of most duck species and many other aquatic bird species (such as Podicipedidae, Rallidae, *Larus ridibundus*) was obviously the most important change recorded on South Bohemian fishponds during the first half of the 1980s. On the contrary, increases in numbers were recorded only in several species (*Phalacrocorax carbo*, *Cygnus olor*). Increasing mortality (due to botulism) was recorded in many waterfowl species, and an increase of the non-breeding component of the population was found in ducks, but no changes were recorded in reproductive parameters (brood size, clutch size, breeding success). A shift to field habitats was recorded in breeding waders. Possible causes affecting the abundance of particular waterbird species are discussed: these include changes in management of surrounding landscape, drainage of wetlands in the vicinity of fishponds (ducks, waders), changes in littoral stands (ducks, waders, passerines), water level fluctuation (*Anser anser*, waders, passerines), gradual coverage of islets by shrubs and trees (ducks), increase of fish stock (ducks). Relationships between fluctuation in abundance and changes in distribution of particular species (e.g. *Phalacrocorax carbo*, *Cygnus olor*, etc.) are also discussed.

Musil, P. & M. Šálek: Änderungen in der Abundanz der Wasser- und Sumpfvögel in Südböhmen im letzten Jahrzehnt: eine Zusammenfassung

Während der 1980er Jahre kam es in Südböhmen zu markanten Änderungen in der Menge der Wasservögel. Die ausgeprägteste Änderung war die Abnahme der Bestände der meisten Entenarten und vieler anderer Wasservogelarten (z.B. *Podiceps* sp., Rallidae, *Larus ridibundus*). Im Gegensatz dazu nahmen die Bestände nur bei einigen Arten zu (z. B. *Phalacrocorax carbo*, *Cygnus olor*). Ein Anstieg der Mortalität wurde bei einer Reihe von Wasservögeln (in Folge des Botulismus) festgestellt. Der Anteil der Nichtbrüter in den Entenpopulationen stieg an, aber Änderungen der Reproduktionsparameter (Gelegegröße, Familiengröße, Bruterfolg) wurden nicht nachgewiesen. Bei den Limikolen wurde eine Verlagerung zu Feldbruten vermerkt.

Einflüsse der verschiedenen Faktoren auf die Abundanz der Wasser- und Sumpfvogelarten werden diskutiert: Änderungen der Landschaft in der Umgebung der Teiche (Enten, Limikolen), Änderungen der Litoralvegetation (Enten, Limikolen, Singvögel), Wasserstandsschwankungen (*Anser anser*, Limikolen, Singvögel), Verwachsen der Teichinseln mit Gebüsch- und Baumvegetation (Enten). Aufmerksamkeit wird auch den möglichen Zusammenhängen zwischen den Schwankungen der Abundanz und den Arealveränderungen einzelner Arten (z.B. *Phalacrocorax carbo*, *Cygnus olor* u.a.) gewidmet.

Musil, P. & M. Šálek: Změny početnosti vodních a mokřadních ptáků v jižních Čechách v posledním desetiletí: souhrnné zhodnocení

V průběhu 80. let došlo v jižních Čechách k výrazným změnám v početnosti vodních ptáků. Patrně nejvýraznější změnou byl pokles početnosti většiny druhů kachen, potápek, dlouhokřídlých a krátkokřídlých. Naopak výrazný vzestup početnosti byl zaznamenán pouze u některých druhů (kormorán velký, labuň velká). Bylo zjištěno zvýšení mortality řady druhů vodních ptáků (v důsledku botulismu), růst nehnízdící složky populace (kachny), nebyly však prokázány změny reprodukčních parametrů (velikost snůšek, velikost vyvedených rodinek, úspěšnost hnízdění). U bahňáků byl zaznamenán přechod ke hnízdění v polích.

INTRODUCTION

Being at the top of the food chain, waterbirds are strongly affected by changes in wetland ecosystems. They represent a well studied group of animals, and many studies exist on their ecology and population dynamics.

Dramatic changes in waterbird numbers in South Bohemia were noted in the early 1980s. The breeding numbers of the most abundant duck species and some other waterbirds which have been increasing for several decades, began to decline abruptly in many fishpond regions (FIALA 1987; ŘEPA 1987; BEJČEK et al. 1990; MUSIL 1990; MUSIL & FUCHS 1993).

This paper summarizes these changes in numbers (e. g. BEJČEK et al. 1990; MUSIL 1990; ŠÁLEK 1992a, MUSIL & FUCHS 1993, ŠÁLEK 1994), changes in reproduction (MUSIL 1990, MUSIL et al. in press) and the habitat requirements (MUSIL 1990, ŠÁLEK 1994) of particular bird species and species groups.

CHANGES IN SPECIES RICHNESS AND IN TOTAL ABUNDANCE

During the first half of the 1980s, the species richness was stable but an increase in the number of species was recorded after 1986 (Table 1). This was a consequence of occurrence of erratic species and late migrants on ponds drained due to spring harvest of fish stock. In the first half of the 1980s, decreasing species prevailed,

whereas later on, increasing species prevailed over decreasing species (MUSIL & FUCHS 1993).

Changes in total waterbird abundance correspond with changes in the numbers of the main waterbird groups (such as Lariformes, Anseriformes, Gruiformes, Podicipediformes).

Grebes

The three species of grebes show different trends in abundance. A stable population was found for Great Crested Grebe *Podiceps cristatus*. An abrupt decline was recorded in Black-necked Grebe *Podiceps nigricollis* during the first half of 1980s, and a gradual decrease in Little Grebe *Tachybaptus ruficollis* during the whole of the 1980s (MUSIL & FUCHS 1993).

Cormorant

The Cormorant *Phalacrocorax carbo* was the most rapidly increasing waterbird on the South Bohemian fishponds. The Cormorants occurred in South Bohemia regularly during spring and autumn migration up to 1980. After 1980, single Cormorants also started to occur during the breeding season. The first breeding colony was found in our study area in 1993 (JANDA & MACHÁČEK 1990).

The number of breeding pairs of Cormorants increased up to 1987, when active human intervention began with the aim of reducing the Cormorant population (MUSIL et al. 1993).

Period		1981-1982	1986-1987	1991-1992
Total abundance		37005	20099	21749
Number of species		52	52	60
Changes in numbers of particular species	new species	6	12	
	increase >20%	10	20	
	no changes	10	17	
	decrease >20%	32	15	
	extinct species	6	6	

Tab. 1: Summary data on changes in abundance of particular bird species on 160 fishponds in South Bohemia

The increase of the Cormorant breeding population in South Bohemia is connected with an expansion of this species across Europe (see e.g. VAN EERDEN & GREGERSEN 1993, LINDELL et al. 1993).

Mute Swan

The increase of Mute Swan *Cygnus olor* abundance continued during the second half of the 1980s, being consistent with an expansion of this species in Czech Republic (ŠTASTNÝ et al. 1987b, ŠTASTNÝ & BEJČEK 1989, HORA 1989).

Greylag Goose

The increasing abundance of Greylag Goose *Anser anser* stopped in the mid 1980s, and then began to decrease. This may be a consequence of repeated drainage of many fishponds in the breeding season (ŠIMEK 1991).

Ducks

The decline in the breeding population of all duck species as well as in many other aquatic bird species (such as grebes, Coot, Moorhen and Black-headed Gull) during the first half of the 1980s is obviously the most important change recorded on the South Bohemian fishponds (MUSIL & FUCHS 1993). However, these declines have not been satisfactorily explained so far. An increase in abundance back to the level of the beginning of the 1980s was recorded only in the mostly herbivorous ducks (e.g. in Gadwall *Anas strepera*, Red Crested Pochard *Netta rufina*).

In many fishpond regions in South Bohemia, an increasing mortality was recorded in many aquatic birds (most frequently due to botulism) since 1975 (HUDEC et al. 1984). Similarly, large die-offs due to botulism were reported from some others central European countries in 1981 - 83 (REICHHOLF 1983, 1985).

A significant increase in the proportion of the non-breeding part of the population was observed in the most common duck species (e.g. Mallard *Anas platyrhynchos*,

Gadwall, Pochard *Aythya ferina*, Tufted Duck *Aythya fuligula*) during the 1980s (MUSIL 1990).

However, no correlation between changes in abundance of the breeding population and changes in clutch and brood size was found in most waterfowl species (MUSIL et al. in press). There are only two exceptions, Gadwall and Goldeneye *Bucephala clangula*, in which the total abundance correlates with the clutch and brood sizes. In Gadwall, the remarkable decline in both adult abundance and clutch and brood size was recorded in the first half of the study period; after then, all characteristics increased in the second half of the decade. Marked declines in both adult abundance and brood size were recorded in Goldeneye. These trends can be explained by high level of predation in nest boxes by Pine Marten *Martes martes*.

Decreasing abundances of some duck species (such as Mallard, Gadwall, Pochard, Tufted Duck) can be partly explained by gradual coverage of islets, which are optimal breeding habitats for a number of duck species, by shrubs and trees (ŠTASTNÝ et al. 1987a).

The decline in abundance of some other duck species (such as European Teal *Anas crecca*, Garganey *Anas querquedula*, Shoveler *Anas clypeata*) can be explained by changes in wetland habitats adjacent to the fishponds, and by man-made destruction of the littoral vegetation, i.e. their breeding habitat (BEJČEK et al. 1990, MUSIL & FUCHS 1993).

Furhermore, it is possible to expect a negative effect of gradually increasing fish stock size, which would result in competition between fish and some duck species (e.g. PYKAL & JANDA 1994).

Coot

Numbers of Coot show similar trends (MUSIL & FUCHS 1993) to numbers of most common duck species (Mallard, Pochard, Tufted Duck).

Waders

A shift to field habitats was recorded in meadow-breeding waders (i.e. mainly in Lapwing *Vanellus vanellus*, and less in Black-tailed Godwit *Limosa limosa*, Redshank *Tringa totanus* and Snipe *Gallinago gallinago*) during the second half of the 1980s. A similar trend was recorded also in Little Ringed Plover *Charadrius dubius*, i.e. a species breeding originally in drained ponds and other water reservoirs including sandpits (PYKAL 1992, ŠÁLEK in litt.). This shift could be explained by dense and homogenous grass cover in the beginning of the breeding season, and high nest predation in meadows (PYKAL 1992, ŠÁLEK 1992a, 1994).

The shortage of sites sufficiently rich in water and food resources (i.e. sites important for growth of chicks) is probably the limiting factor for breeding success of waders in South Bohemian basins (ŠÁLEK 1992a).

During the 1980s, fluctuations in numbers were found in Lapwing, but in total, the population was decreasing. This development could be a consequence of the shortage of suitable breeding sites, such as habitats with low and sparse vegetation. These habitats either occur rarely in the South Bohemian landscape (ploughed fields, drained ponds) and/or represent habitat with high clutch losses due to nest predation and disturbance (ŠÁLEK 1994). The recent population size of Black-tailed Godwit is lower than at the beginning of the 1980s, but it is probably in accordance with the status of South Bohemian breeding population in 1950-75 (ŠÁLEK 1987, 1992b). A slow population decrease was recorded in Redshank which is more stable than Black-tailed Godwit (ŠÁLEK 1987, 1992b, MUSIL & FUCHS 1993).

Data documenting changes in numbers of Snipe are not available, nevertheless a long-term decrease in population size was recorded in some regions (e.g. ŠŤASTNÝ et al. 1987b, MUSIL & FUCHS 1993).

Gulls

An abrupt decline in numbers of Black-headed Gull *Larus ridibundus* was very similar to the decrease in numbers of most duck species and Coot. The size of breeding colonies decreased more on ponds surrounded by wood than on ponds in the open landscape (KLOUBEC & ŠVECŮVÁ 1990, MUSIL & FUCHS 1993).

Passerines

The majority of Passeriform birds depend strongly on littoral stands, for their breeding habitats. The decrease was therefore recorded (MUSIL & FUCHS 1993) in those species that are more dependent on habitats in which the macrophytes are flooded (such as Sedge Warbler *Acrocephalus schoenobaenus*, Great Reedwarbler *Acrocephalus arundinaceus*), whereas no declines in abundance were found in those dependent on littoral stands (such as Reed Warbler *Acrocephalus scirpaceus*, Reed Bunting *Emberiza schoeniclus*, Whinchat *Saxicola rubetra*, Bluethroat *Luscinia svecica*).

PROBLEMS ASSOCIATED WITH EVALUATION OF TRENDS IN NUMBERS OF WATERBIRDS

When evaluating the trends in numbers of several bird species, it should be noted that our study area in South Bohemia lies at the northern limit of the breeding range of some bird species (i.e. Purple Heron *Ardea purpurea*, Black-crowned Night-heron *Nycticorax nycticorax*, Red Crested Pochard) or, on the contrary, at its southern edge (i.e. Tufted Duck, Goldeneye, Green Sandpiper *Tringa ochropus*). Consequently, one may expect a greater variation in numbers of breeding pairs here than in the centres of their respective ranges (CRAMP & SIMMONS 1986a, b).

However, even during the period of the greatest decline in breeding numbers, the

densities of many species in our study areas were many times higher than those observed in other parts of their respective breeding ranges (see e.g. KJELLEN 1978, HAAPANEN & NILSSON 1979, THOMAS 1980, KOSKIMIES & PÖYSÄ 1989).

FUTURE RESEARCH

The abrupt changes in numbers of water-birds recorded during the first half of the 1980s have provided stimulation for many new studies. Future research shall be aimed at:

- (1) investigation of long-term trends in abundance of particular bird species
- (2) studying differences in abundance trends at various fishpond regions and on different types of fishponds
- (3) assessment of ecological requirements of particular waterbird species
- (4) studying the structure of the avifauna and its variability in different fishpond types and in various parts of the Czech Republic
- (5) investigation of reproduction of the particular species (i.e. clutch size, brood size, breeding success, and breeding habitat requirements).

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Stapfia](#)

Jahr/Year: 1994

Band/Volume: [0031](#)

Autor(en)/Author(s): Musil P., Aálek M.

Artikel/Article: [Changes in Abundance of Waterbirds in South Bohemia during the Last Decade: A Summary Review 55-60](#)