

SOME RESULTS OF LONG-TERM COUNTS OF WATERBIRDS WINTERING IN THE WESTERN PART OF THE GULF OF GDAŃSK (POLAND), WITH SPECIAL EMPHASIS ON THE INCREASE IN THE NUMBER OF CORMORANTS (*PHALACROCORAX CARBO*)

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Abstract. Regular counts of waterbirds have been conducted in the western part of the Gulf of Gdańsk since 1984. About 130 km of coastline were being surveyed within two days every month (September to April). The most common waterbird species (excluding gulls Laridae) are Tufted Duck (*Aythya fuligula*), Mallard (*Anas platyrhynchos*), Goldeneye (*Bucephala clangula*), Mute Swan (*Cygnus olor*), Coot (*Fulica atra*), Goosander (*Mergus merganser*) and Cormorant (*Phalacrocorax carbo*). The number of wintering birds of each species showed distinct fluctuations. Only Cormorant's number has been rising continually, especially in winter (before 1990 less than 100 individuals, after 2000 more than 3,000). The highest number was recorded in autumn (10,953 in September 2003). In 1998 and 1999 non-breeders and post-breeders Cormorants consumed 300–900 t of fish per year. 73% to 80% of all taken fish were damaging for fishery and biodiversity: round goby (*Neogobius melanostomus*) and nine-spined stickleback (*Gasterosteus aculeatus*).

Key words: Gulf of Gdańsk, waterbirds, wintering, Cormorant, round goby, Poland

INTRODUCTION

Regular long-term counts of waterbirds provide information on the variation of the number of different species. However, interpretation of such information for a given site is often limited by lack of knowledge from the breeding grounds and neighbouring wintering areas. In some cases, an increase in the number of a given species is clearly connected with the uprising of new food sources in water bodies (Schwab *et al.* 2001).

In this paper, we provide information on the fluctuations of the number of some more common waterbird species wintering in the western part of the Gulf of Gdańsk, with special emphasis on a notable increase in the number of Cormorants (*Phalacrocorax carbo*).

MATERIAL AND METHODS

The members of the Waterbird Research Group KULING have been regularly conducting the counts of waterbirds in the western part of the Gulf of Gdańsk since 1984. About 130 km of coastline were under sur-

vey for two days each month from September to April (Fig. 1). The study area was divided into 51 sections, based on the shoreline configuration and presence of embankments, anthropogenic feeding places, harbors,

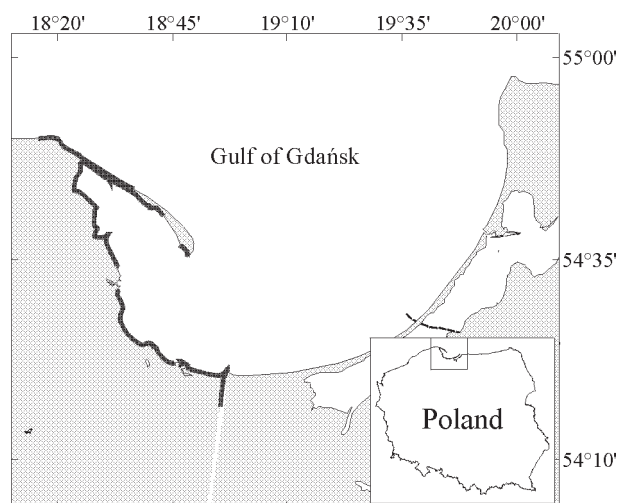


Figure 1. The study area. Surveyed section was indicated by the grey line.

piers, estuaries, cliffs, shallows, and wet coastal meadows. Birds observed in every single section were recorded separately (Meissner 1993). The total number of birds of a given species counted within the whole study area was used to show the fluctuation of the number of birds of a given species in subsequent seasons. The paper presents the maximum bird numbers recorded in winter months (December–February), with the additional data on the abundance of Cormorants in autumn (September–November) and spring (March–April). The diet of Cormorants was studied based on pellet analysis (Carss 1997). Pellets are produced by birds

once a day early in the morning and contain the remains of fish eaten during the day before. In this study, pellets were generally collected twice a month throughout the years 1998 and 1999. The daily food intake was calculated based on the data from Keller and Visser (1999) – 519 g of fish a bird per day.

RESULTS AND DISCUSSION

The most common waterbird species, excluding gulls Laridae, are the Tufted Duck (*Aythya fuligula*), Mallard (*Anas platyrhynchos*), Goldeneye (*Bucephala*

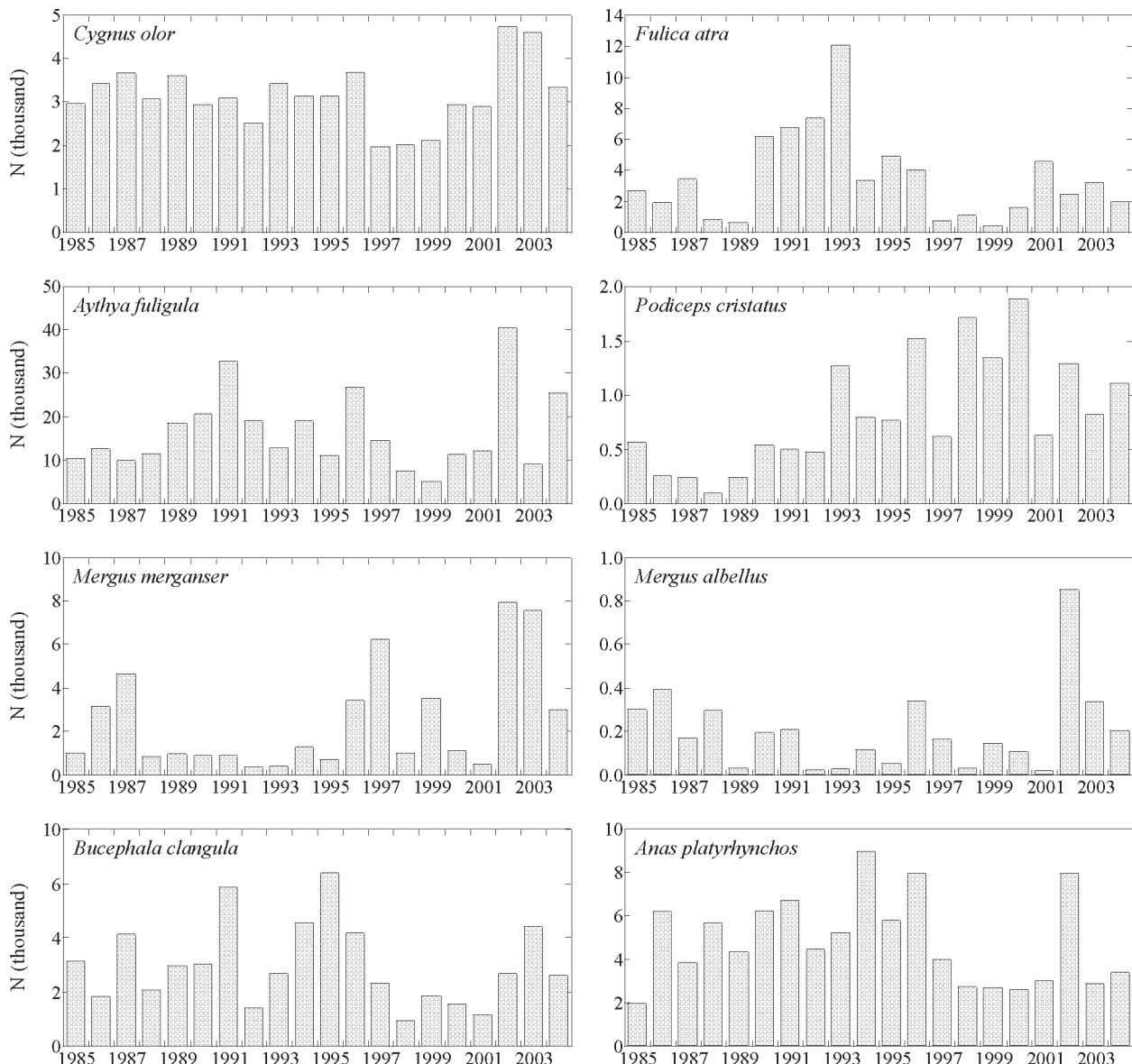


Figure 2. The maximum number of different waterbird species wintering on the Gulf of Gdańsk in subsequent seasons.

clangula), Mute Swan (*Cygnus olor*), Coot (*Fulica atra*), Goosander (*Mergus merganser*) and Cormorant. The number of wintering birds of each species showed distinct variations and only in a case of the Mute Swan these fluctuations were relatively small (Fig. 2). In late nineties, there was a period of three years of a lower abundance of this species, but in most seasons its numbers were rather stable. The Goosander and Smew (*Mergus albellus*) visited the study area in higher number only in some years. The numbers of other species exhibited conspicuous between-years differences. The reasons behind these fluctuations may be: cold weather movements between wintering sites, changes in food supply in the Gulf of Gdańsk, different breeding success in different seasons. Thus, variations in the number of a given species are difficult to interpret without analysis of additional data on bird numbers and weather conditions in adjacent areas. A different situation was in case of Cormorants – the number of this species was increasing continually (Fig. 3). This increase was conspicuous in winter. In 1984–1990, there were less than 100 individuals seen on the Gulf of Gdańsk,

whereas in 2000–2004, more than 3,000 Cormorants were observed each winter (max. 8,252 in December 2002). Generally, the highest numbers of Cormorants staying on the Gulf of Gdańsk were recorded in autumn, especially in September (max. 10,953 in 2003).

The European population of Cormorants started to grow from the beginning of the 1970s. The numbers of breeding pairs on the eastern coast of the Baltic Sea are still increasing (Trollet 1999; Rusanen *et al.* 2001; Goc *et al.* 2003; Lilleleht 2004). A detailed study on the diet composition of Cormorants showed that in 1998 and 1999 non-breeding and post-breeding Cormorants consumed 300–900 t of fish per year. From 73% to 80% of all fish taken were the round goby (*Neogobius melanostomus*) and nine-spined stickleback (*Gasterosteus aculeatus*) (Fig. 4). The relationship between the round goby and Cormorant was the most interesting. The round goby is a new for the Baltic Sea invader fish, recorded for the first time in 1990 in the Gulf of Gdansk and then for ten years extremely abundant in coastal waters. In the late 1990s the round goby constituted up to 70% of the annual biomass consumption of Cormorants. Moreover, in the spawning period (April–October), its percentage in Cormorant diet exceeded 90%. Hence, high numbers of Cormorants in the Gulf of Gdańsk are mainly due to food supplies created by this fish species.

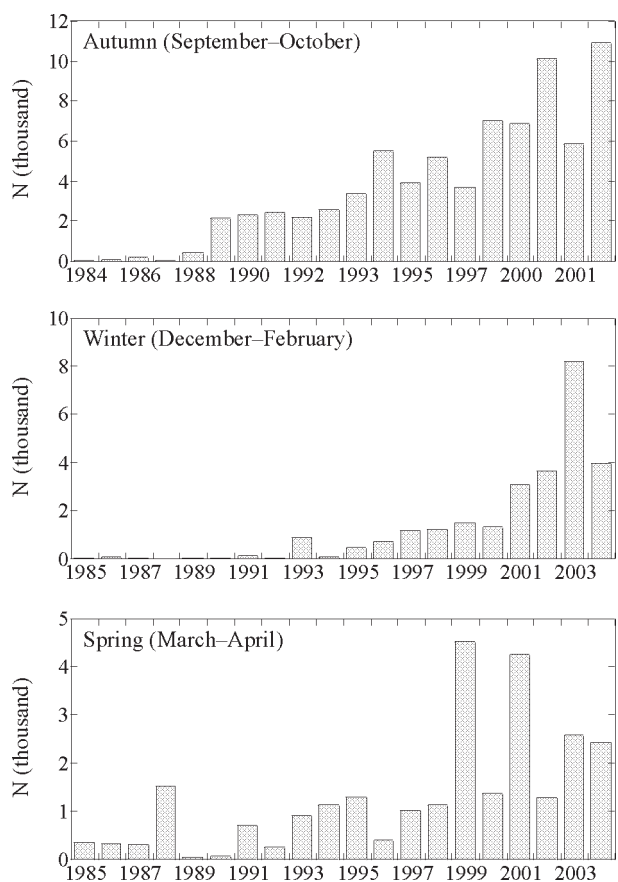


Figure 3. The maximum number of Cormorants staying on the Gulf of Gdańsk in subsequent seasons.

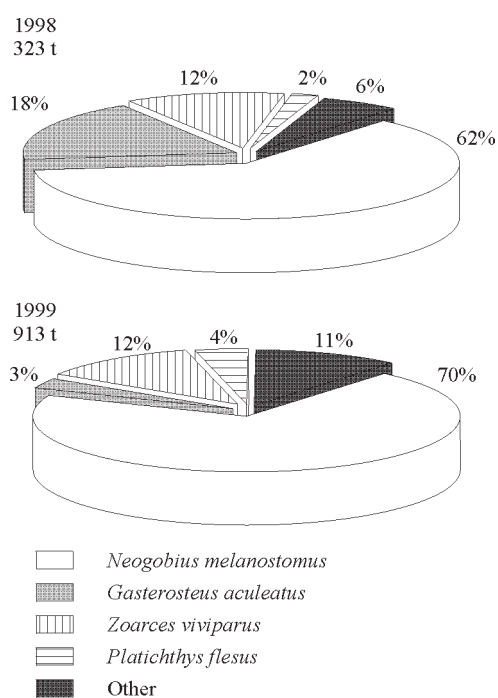


Figure 4. Annual biomass of food consumption by non-breeding Cormorants staying on the Gulf of Gdańsk.

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**KAI KURIE GDANSKO ĮLANKOS (LENKIJA)
VAKARINĖJE DALYJE ŽIEMOJANČIŲ VANDENS
PAUKŠČIŲ ILGALAIKIŲ APSKAITŲ REZULTATAI,
YPATINGAI PABRĖŽIANT KORMORANŲ
(*PHALACROCORAX CARBO*)
SKAIČIAUS PADIDĖJIMĄ**

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SANTRAUKA

Reguliarious vandens paukščių apskaitos vykdomos vakarinėje Gdanskio įlankos dalyje nuo 1984 m. Kasmėnesiniai dviejų dienų stebėjimai buvo vykdomi 130 km pajūrio ruože nuo rugsėjo iki balandžio mėnesio. Dažniausiai sutinkamos rūšys (išskyrus Laridae): kuoduotoji antis (*Aythya fuligula*), didžioji antis (*Anas platyrhynchos*), klykuolė (*Bucephala clangula*), gulbė nebylė (*Cygnus olor*), laukys (*Fulica atra*), didysis dančiasnapis (*Mergus merganser*) ir didysis kormoranas (*Phalacrocorax carbo*). Nustatyti dideli atskirų rūšių žiemojančių paukščių skaičiaus svyravimai. Tik kormoranų pastoviai gausėjo, ypatingą žiemą (iki 1990 m. buvo užregistruojama iki 100 individų, po 2000 m. – daugiau kaip 3000). Didžiausi skaičiai buvo užregistruoti rudenį (10953 kormoranų 2003 m. rugsėjo mėn.). 1998 ir 1999 m. m. buvo užregistruota, kad pasibaigus perėjimo laikotarpiui kormoranai (įskaitant neperinčius) suvartodavo 300–900 t žuvies per metus. Nuo 73% iki 80% šių žuvų (*Neogobius melanostomus* ir *Gasterosteus aculeatus*) buvo nuostolingi žuvininkystės ir biologinės įvairovės atžvilgiu.

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