# 1.1. Relationship between the distribution of four bird species and the water regime changes in the Szigetköz floodplain area of River Danube

Báldi, A., Moskát, Cs. and Zágon, A.

## 1.1.1. Introduction

Riparian areas are among the most productive and richest terrestrial habitats (Báldi *et al.* 1995). However, 77% of river systems in the northern third of the world are significantly affected by human activities (Dynesius and Nilsson 1994). Thus, riparian landscapes are probably among the most threatened landscapes in the world (Décamp 1993).

River Danube at the Slovakian - Hungarian border suffers from a regional scale human disturbance, namely a large hydroelectric power-station was built. The implemented plan of the reservoir and hydroelectric power-station included the construction of a 35 km long artificial bypass canal (including the reservoir), parallel with the Danube. The original river has been received approximately 10% of its natural water regime, thus the upper parts of the Szigetköz suffered from serious water deficiency (Báldi *et al.* 1998).

Monitoring of changes of biodiversity in the Szigetköz is a key task of several Hungarian and Slovakian institutions. The monitoring work of birds in Hungary included community approach in different habitats and using different methods (Báldi 1995, Moskát *et al.* 1999), and a faunal mapping approach (Báldi *et al.* 1998). In this paper we evaluate the results of the faunal mapping technique to document the frequency of occurrence of bird species in the affected areas. In the present short paper we intend to demonstrate the changes of the avifauna, using four indicator species.

## 1.1.2. Study area and methods

The Szigetköz is the floodplain on the right side of the River Danube in NW Hungary (48°00'-47°40'N, 17°15'-17°45'E), consisting of many small islands, side- and dead-branches. The area is managed by the forestry, more than two-third of the area was planted with poplar (*Populus* sp.) plantations (Simon 1992). The River was diverted in late 1992, and a water replenishment system was built in 1995 to artificially provide water for the Upper Szigetköz. An extensive inventory of bird species nesting in the Szigetköz area was conducted by one of us (A. Z.) during the breeding season of 1994, 1996 and 1998. All bird presences were recorded in 62 quadrates of 1x1 km each. The quadrates formed three clusters: 22 in the desiccating Upper Szigetköz near Dunasziget; 22 in the transition zone, Middle Szigetköz, at Ásványráró; and 18 in the Lower Szigetköz, over Vámosszabadi, where the bypass canal already rejoins the river (cf. Báldi *et al.* 1998). See more details in Moskát and Fuisz (1995), Waliczky (1992).

The distribution of four species was analysed: the Common Sandpiper (*Actitis hypoleucos*), which prefers river banks, gravel shores; the Sedge Warbler (*Acrocephalus schoenobaenus*), a characteristic species of reedbeds and marshlands; the Great Reed

Warbler (*A. arundinaceus*), which prefers reed/water edges; and the Coot (*Fulica atra*), a common species of open water, but avoids running waters. Considering the different habitat requirements of these four wetland species (Haraszthy 1998), we assume that they together may indicate most water regime changes.

### 1.1.3. Results and discussion

The faunal mapping method proved to be a sensitive technique for monitoring at the regional scale, and in heterogeneous landscapes (Báldi *et al.* 1999, Moskát *et al.* in press). The distribution of the four selected species showed characteristic patterns. The Common Sandpiper was frequent in the Upper and Middle Szigetköz after the diversion of the main flow, probably due to the large extent of drying gravel river beds (Báldi *et al.* 1998), but after the water replenishment system was built, and the water level increased in many of the canals and branches, its frequency declined (Fig. 1). The frequency of the Common Sandpiper in the Lower Szigetköz was low, and did not show any changes from 1994 to 1998.

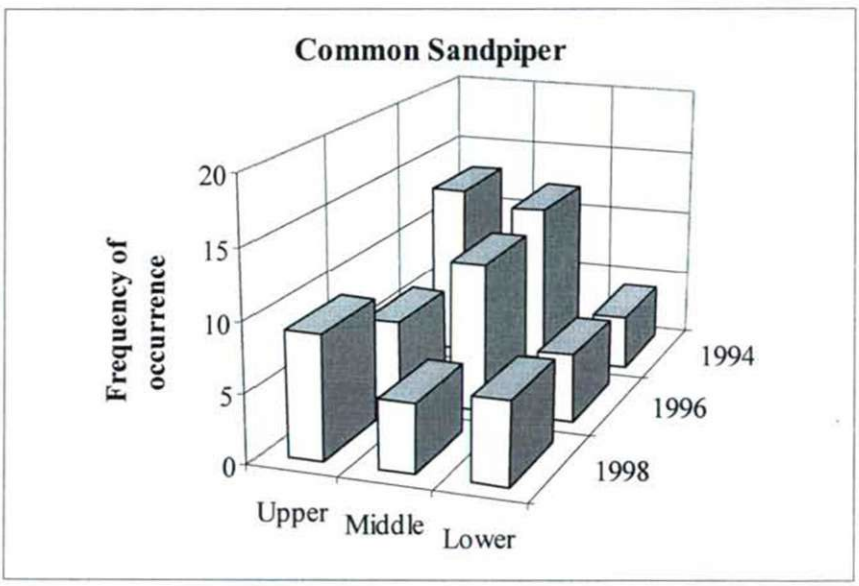


Fig. 1. The frequency of occurrence of the Common Sandpiper (*Actitis hypoleucos*) in the three study years in three study areas in the Szigetköz region.

The frequency of Sedge Warbler was low in the Upper Szigetköz in 1994, when most of the suitable habitats dried out (Fig. 2). In the Middle and Lower Szigetköz, however, it still performed well. Immediately after the water replenishment system started to work, its distribution was homogenous across the Szigetköz, but in 1998, its frequency pattern was the opposite to that observed in 1994: low frequency in the Lower Szigetköz, and large frequency in the Middle and Upper Szigetköz. This was probably the consequence of the very high water level due to the water replenishment system, and the lot of precipitation,

which changed the structure of reedbeds and landscape to a non-optimal habitat for the Sedge Warbler.

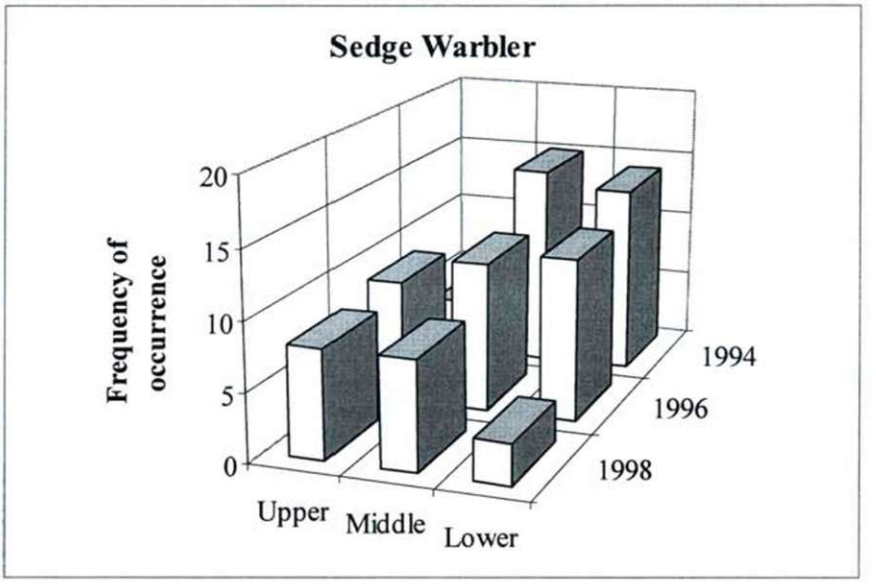


Fig. 2. The frequency of occurrence of the Sedge Warbler (*Acrocephalus schoenobaenus*) in the three study years in three study areas in the Szigetköz region.

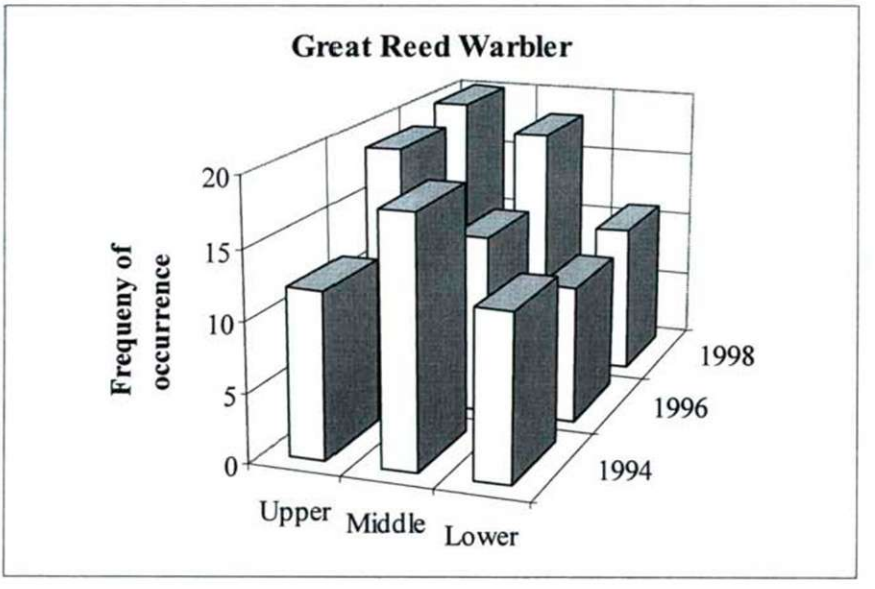


Fig. 3. The frequency of occurrence of the Great Reed Warbler (*Acrocephalus arundinaceus*) in the three study years in three study areas in the Szigetköz region.

The occurrence pattern of the Great Reed Warbler did not show any trend in 1994, but it preferred the Upper Szigetköz both in 1996 and 1998 (Fig. 3). This result is in accordance with the observation of the Sedge Warbler, a closely related species, and connected with the disappearance of reed and marshland habitats from the Lower Szigetköz. In the Upper Szigetköz, the water replenishment system turned the floodplain to a near optimal Great Reed Warbler habitat, with a general dry landscape, with many deep water canals and water courses with narrow elongated reedbeds.

The Coot, a nationally common and abundant species was regionally rare in 1994, when most water courses were totally, or partially dried out (Fig. 4). It was absent from the Lower Szigetköz in the two surveys in 1996 and 1998, probably as the consequence of high and rapidly flowing waters, caused by the new water replenishment system. In the Middle and Upper Szigetköz, however, its frequency largely increased after the water replenishment and precipitation filled up the canal and branch systems.

We demonstrated that changes of the water regime modified the distribution pattern of four wetland species in a species-specific way. Thus, any human disturbance is a potential threat to wildlife. Because river valleys are important habitats and movement corridors for many valuable species (Gallé *et al.* 1995), canalisation, dam construction and other disturbances should be avoided.

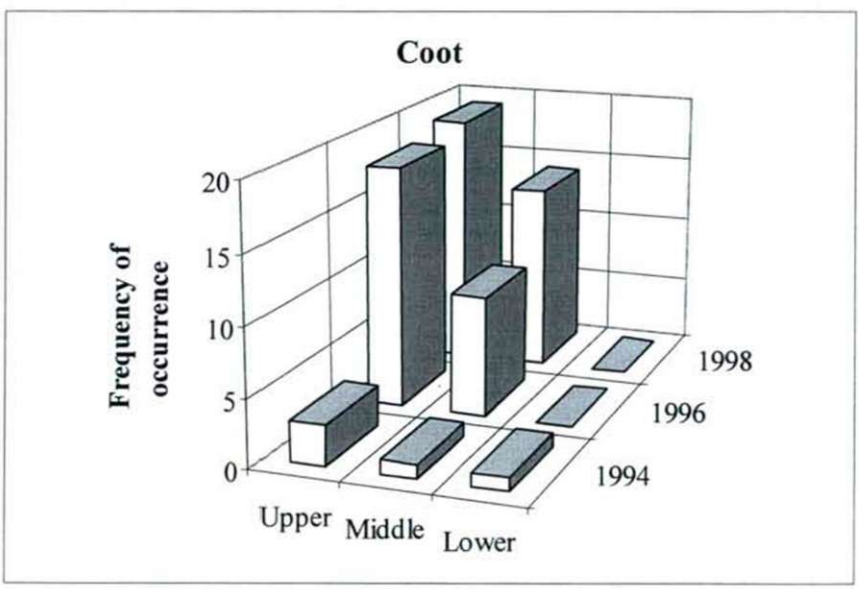


Fig. 4. The frequency of occurrence of the Coot (*Fulica atra*) in the three study years in three study areas in the Szigetköz region.

## 1.1.4. SUMMARY

We investigated the changes of occurrence frequency of four wetland bird species in the Upper, Middle and Lower Szigetköz areas, where the water regime differed due to the construction of a bypass canal for a hydroelectric power-station. The four species showed habitat selection-specific responses to the environmental changes.

## 1.1.5. ACKNOWLEDGEMENTS

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