

Structural changes in the ichthyofauna of the Carpathian tributaries of the River Vistula caused by anthropogenic factors

Krzysztof KUKULA

Abstract – Analyses concerned the chief Carpathian tributaries of the upper course of the River Vistula. In the years 1993–2002 over 21 thousand fish of 21 species were caught. In the collected material *Phoxinus phoxinus* L., *Cottus poecilopus* Heck, and *Leuciscus cephalus* (L.), were most abundantly represented with *L. cephalus*, *Salmo trutta* m. *fario* L., and *Chondrostoma nasus* L. dominating in the biomass. The current materials were compared with data from the 1960s and 1970s, and also from earlier years, basic changes being observed in the ichthyofauna. *Acipenser sturio* L., *Salmo salar* L., and *S. trutta* m. *trutta* L. became extinct. *Alburnoides bipunctatus* (Bloch), *Barbus barbus* (L.), *C. nasus*, *Cottus gobio* (L.), and *Vimba vimba* (L.), characteristic of mountain and submontane river sectors, were found in the group of endangered species. Pollution and the construction of water dams had the most pronounced impact. The effects of pollution were distinctly visible in the River Skawa and the San middle course, where a dramatic decrease was noted in the percentages of *C. nasus*, *B. barbus*, and *A. bipunctatus*. At the same time, the numbers of *L. cephalus* and *Gobio gobio* (L.) increased and *Rutilus rutilus* (L.) widened the area of its occurrence. In most dam reservoirs fish assemblages were formed with a great share of *R. rutilus* and *Perca fluviatilis* L. These species previously not recorded, e.g. in the upper San, occurred fairly abundantly. In the River Wisłok significant changes in the ichthyofauna composition occurred both above and below the dam reservoir. Above the reservoir the numbers of *P. fluviatilis* distinctly increased. Directly below the reservoir a greater share of *L. cephalus* and *P. phoxinus* was observed. The abundance of *B. barbus* and *B. carpathicus* (Kotlík et al.) decreased, while *C. nasus* was absent. The devastation of stream beds in the course of forest works caused a decreased abundance and lower condition coefficient of fish. Angling and, above all, poaching (a common occurrence) contributed to a disturbed age structure in the population of *S. trutta* m. *fario*. In the drainage basin of the upper San, significantly higher mean body weights and total lengths of *S. trutta* m. *fario* were observed at sites where no visible signs of poaching could be found. In the upper Wisłoka the poachers' ways of fishing brought about significant differences between assemblages at the stations compared. Of the introduced fish species, none appears numerous in the discussed catchment areas. *Thymallus thymallus* (L.), introduced in the basin of the Wisłoka and San, was more frequently encountered, although it is endangered in the areas of its natural occurrence.

Key words: fish, mountain streams, threatened species, dam reservoirs, pollution, poaching.