

An overview of ecological relations between aquatic birds and trematodes (Digenea)

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This synthetic overview of the results of many years of research on trematodes (Digenea) occurring in aquatic birds is an attempt to elucidate how differences between bird species in the qualitative and quantitative structure of trematodes are linked to differences in host biology and ecology and to the life cycles of trematodes. The material for the synthesis comprises the results of faunistic and ecological studies of trematodes of birds belonging to different morphological and ecological groups, from northern Poland (1999–2009; different groups of trematodes) and from southern parts of the Czech Republic (1962–2013; family Diplostomidae): aquatic phytophages (*Anas platyrhynchos*), diving benthophages (*Aythya fuligula*, *A. marila*, and *Bucephala clangula*), including sea ducks (*Melanitta nigra*, *M. fusca*, *Clangula hyemalis*, and *Somateria mollissima*) and diving ichthyophages (*Gavia arctica*, *Gavia stellata*, and *Mergus merganser*).

Faunistic studies showed that the order Strigeida is represented by 18 species belonging to 8 families (including Diplostomidae – 8 sp.). The order Echinostomida is represented by 16 species belonging to 3 families (including Echinostomatidae – 9 sp.). In the order Plagiorchiida 8 species belonging to 6 families were recorded (with one or two species belonging to each family).

The sources of trematode infection in the birds are heterogeneous, and are mainly components of the birds' diet: snails, bivalves, leeches, gammarids, and fish. In both freshwater birds and sea ducks there have been records of trematodes whose life cycle is associated with freshwater ecosystems (e.g., *Apatemon minor*, *A. gracilis*, *Echinoparyphium recurvatum*, *Psilotrema simillimum*, *Catatropis verrucosa*, *Notocotylus attenuatus*, and *Prosthogonimus ovatus*) and with brackish and marine biotopes (e.g., *Psilostomum brevicolle*, *Paramonostomum alveatum*, *Levinseniella propinqua*, *Gymnophallus bursicola*, *Stephanoprora pseudoechinata*, and *Cryptocotyle concava*). Differences in trematode fauna and epidemiological parameters between duck species are mainly due to differences in host feeding strategies and feeding behaviour of birds. Certain biological and ecological traits of the birds analysed may play an important role; these include migration dates, the period during which the birds were present in the areas where they were acquired for research, and movement of birds between different freshwater and saltwater areas or between the coastal and open-sea zones of the Baltic.