

INTRODUCTION

The first major studies on the parasites of Latvian fishes were those of S.S. Shulman, who conducted pioneering research of the fauna occurring in Latvia's freshwaters and also in the Gulf of Riga and the Baltic Sea (Shulman 1949, 1959). Shulman's works are important because they contain not only descriptions of the parasite fauna and its species composition, but also examine many parasitological questions from an ecological perspective.

Other early studies on the parasites of Latvian fishes were made by A.D. Reinsone (1955a, 1955b, 1959) and K. Vismanis (1961). In the following years, great attention was given to studying the parasitological situation of fish grown in ponds, hatcheries and cages in lakes and the coastal zone of the Baltic Sea (Grapmane 1957, 1962; Vismanis 1962, 1964, 1966, 1967b, 1968, 1971, 1972, 1978, 1979; Lullu *et al.* 1989). More recently many of the country's natural waterbodies were investigated by K. Vismanis and M. Kirjusina (Vismanis *et al.* 1986, 1987, 1989, 1989a 1990, 1993, 1999; Kirjusina *et al.* 2000, 2001, 2002, 2003, 2004). At present, work on fish parasites is being conducted at the National Diagnostic Centre (NDC) and Latvian University (LU).

The theses of Shulman, Reinsone, Vismanis and Kirjušina, as well as their published reports became the basis for the Russian version of *Parasites of Freshwater and Marine Fishes of Latvia. Systematic Catalogue*, which was published in 2004 (Kirjusina and Vismanis 2004). This monograph, in turn, became the basis for the present checklist, which also includes more recent publications.

The Parasite-Host List is a taxonomically arranged listing of all parasites reported from the fishes of Latvia. The higher classification used is as follows: for the Protista and Myxozoa, that of Lom and Dyková (1992, 2006)¹; for the Trematoda, that of Olson *et al.* (2003); for the Monogenoidea, that of Boeger and Kritsky (1993); for the Cestoidea, that of Khalil, Jones and Bray (1994); for the Nematoda, that of Moravec (1994, 1998); for the Acanthocephala, that of Amin (1985); for the Crustacea, that of Martin and Davis (2001); and for the Hirudinida, that derived from the recent molecular studies of Siddal *et al.* (2001) and Erséus and Källersjö (2004).

The **Parasite-Host List** contains information for all parasite species reported from the fishes of Latvia. For each parasite, the currently recognized **scientific name**, including authors and dates, and any synonyms under which original records appeared are given. This is followed by the **environment** in which the parasite normally completes its life cycle, indicated as freshwater (F), brackish (B) or marine (M). The **Location** gives the site of infection where the parasite was found in or on the host. Under **Hosts**, the hosts are listed alphabetically by their currently recognized scientific names, generally in accordance with Froese and Pauly (2006). In parentheses, following each host name, are given the numbers for the references (**Records**) reporting the parasite from the host in question. The distribution (**Dist.**) provides a summary of the reported distribution of the parasite in Latvia, given by major waterbody. For freshwater systems, these include lakes, water reservoirs and rivers (including, in the case of the Daugava River, its mouth), while marine systems include the Gulf of Riga and the territorial waters of Latvia in the eastern part of the Baltic Sea (see Figure 1). Under **Records** are given the numbered individual references containing the parasite records, each followed by detailed information on the locality(ies) (waterbodies) to which they pertain. Where records pertain only to aquaculture facilities (e.g. farm ponds, hatcheries, tanks etc.) the precise name(s) are not given, the record simply being indicated as pertaining to "pond", "hatchery" etc. Under **Remarks** are given comments on various aspects, such as synonymies, pathogenicity, life cycles and zoonotic importance. The **Host-Parasite List** is organized following the classification of Eschmeyer (2006). For each host, the following information is given: the currently recognized **scientific name**, including species author(s), followed by any synonyms under which original parasite records were made, the **English common name**, the **Latvian common name** and the **Russian common name**²; the host's **Status** in Latvia (native or exotic), and its typical **Environment** (freshwater, brackish, marine). This is followed by a listing of the parasites reported for the host in question, arranged by higher taxon and listed alphabetically, each parasite being followed by a list of the localities (waterbodies) from which

¹Readers should be aware that a new hierarchical system without formal rank designations for the higher level classification of eukaryotes (with emphasis on the taxonomy of the protists) has been put forward by Adi *et al.* (2005).

² Spelling of scientific names, dates of species authorships and English common names are taken from Froese and Pauly (2006).

it has been reported (unnamed localities such as fish ponds, hatcheries, tanks, etc. are not listed here except in cases where no other locality has been reported).

Records for parasites considered to be based on probable misidentifications or requiring substantiation are indicated with a “?” before the host name. Finally, where appropriate, **Remarks** are included to provide information on such topics as host taxonomy, distribution and introductions.

Under **References** are listed all the papers containing the records, as well as other works cited in the text. A short **Supplementary References** lists some additional articles dealing with Latvian fisheries parasitology but not containing any original reports. A **Parasite Index** and a **Host Index** complete the volume.

As at least 114 species of fish occur in the waters of Latvia (Froese and Pauly 2006). The majority of these are freshwater, anadromous or euryhaline species (71 species), while only 43 marine fishes occur in the Latvian waters of the Baltic Sea (including the Gulf of Riga).

An important feature of the eastern Baltic Sea, including the Gulf of Riga, is its very low salinity, which allows many species of freshwater fishes to be found there. The Baltic Sea's salinity is much lower than that of ocean water (which averages 3.5 per cent). It varies from 0.1 percent in the north to 0.6–0.8 percent in the center. Below a depth of 40–70 m, it can be as much as 1.5–2.0 percent. The flow of freshwater into the sea from rivers and the flow

of seawater from the south builds up a gradient of salinity in the Baltic Sea, the salinity steadily decreasing towards the north and east. The chemical composition of water, especially its salinity, and the migratory nature of many of its fish species are some of the main factors influencing the parasite fauna of fish in the Baltic Sea. That's why in the coastal zone, where water is less salty, freshwater parasites are more common (e.g. *Diplostomum* spp., *Pomphorhynchus laevis* and also protistans). In the central and southern parts of the Baltic Sea the salinity level is higher and there euryhaline and stenohaline species prevail. Stenohaline marine species (e.g. *Anisakis*) are also brought in to Baltic waters from the North Sea during fish migration.

The fish parasite literature for Latvia contains records for slightly more than 50 fish species, with the parasite faunas of many common freshwater species (particularly those having economic importance, such as the cyprinids, percids, esocids and salmonids) being particularly well studied. A good general picture of the parasite fauna of these fishes is thus available and these data have value for use in faunistic analyses. To date, a total of 305 named species of parasites (42 Protista, 49 Myxozoa, 38 Digenea, 81 Monogenoidea, 33 Cestoda, 31 Nematoda, 11 Acanthocephala, 2 Hirudinida, 6 Mollusca, 2 Branchiura, 10 Copepoda) have been reported from Latvian fishes.

Figure 1. Map of Latvia showing the location of waterbodies mentioned in the text.

