Pike A.W., Lewis J.W. 1994: Parasitic Diseases of Fish. *Samara Publishing Limited. Samara House, Tresaith, Dyfed, Great Britain, ISBN 1 873692 02 1, 251 pp.*

Two British parasitologists, A. W. Pike from the University of Aberdeen, and J. W. Lewis from the University of London, edited a book presenting contributions of the meeting of the British Society of Parasitology held at the University of Leeds in the spring of 1993. In this meeting, attention was paid to economically important fish parasites, protozoans, helminths and crustaceans, and diseases caused by them. Other topics were fish defences, the prospects for vaccination of infected fishes, introductions of new parasites and management policies.

The first contribution by R. W. Hoffmann and M. El-Matbouli reviews briefly the main facts on the "Proliferative Kidney Disease (PKD) as an important myxosporean infection in salmonid fish". They present data on morphology, pathogenicity and possible etiology of the disease known from literature and obtained by their own experiments. The identity of the agent in rainbow trouts is still not known. We still ignore it, despite the discovery of *Sphaerospora oncorhynchi* suspected to be a possible agent of PKD in North America.

An excellent synopsis of the state of knowledge on "*Ichthyophthirius multifiliis* Fouquet, 1876: infection and protective response within the fish host" was prepared by R. A. Matthews who is leading authority in this field. Protective immunity has been known since 1910 and in spite of a tremendous amount of data obtained, its exact mechanism still poses a challenge to researchers. Matthews aptly analyses the role and features of immobilizing antigens and stresses the need to detect the actual protective antigens, a prerequisite for vaccine development. In this respect, molecular biology is seen as a prospective way to achieve this goal.

T. A. Mo summarizes "Status of *Gyrodactylus salaris* problems and research in Norway". This viviparous monogenean is one of the most serious fish pathogens in Norway and causes serious mortality among Atlantic salmon parr in that country, reducing the salmon populations down by 2–4 %. The introduction and spreading into salmon farms and free waters in Norway and recent distribution of *G. salaris* are reviewed. The chapter is concluded by recommendations how to eradicate the *G. salaris* infection, with the emphasis given to rotenone extermination of infected fish.

As an appendix, K. MacKenzie and T. A. Mo present results of their laboratory experiments with *G. salaris* ("Comparative susceptibility of native Scottish and Norwegian stocks of Atlantic salmon, *Salmo salar* L., to *Gyrodactylus salaris* Malmberg: laboratory experiments"). The results indicate that introducing this parasite into the UK and other countries might result in high mortality of infected salmon.

Two other contributions are devoted to eyeflukes of the genera *Diplostomum* and *Tylodelphys*, which commonly infect wild freshwater fishes. Metacercariae of these parasites are located either in humour body or eye lens, can be significant pathogens in commercial farms and can cause growth reduction or even fish mortality.

Several aspects of the life-cycles, epizootiology, pathogenesis, immune response of infected fishes and control, are discussed in the article entitled "Diplostomiasis: the disease and host-parasite interactions" by L. H. Chappel, L. J. Hardie and C. J. Secombes. The chapter devoted to evasion of the

immune response and immune response to *D. spathaceum* in fish should be mentioned. The authors consider the development of a vaccine to be appropriate and possible. Although the taxonomic status of parasites was reviewed in detail, it might have been useful to mention that some authors do not consider it appropriate to assign metacercariae in the eye lens of fish to *D. spathaceum* only.

The contribution by J. S. Field and S. W. B. Irwin ("The epidemiology, treatment and control of diplostomiasis on a fish farm in Northern Ireland") represents a very useful example of an epizootiological study and its result may be of importance mainly for fish farm managers and veterinary specialists.

R. S. Kirk and J. W. Lewis review the disease status of sanguinicoliasis in the UK ("Sanguinicoliasis in cyprinid fish in the UK"). The blood fluke *Sanguinicola inermis*, which develops in the circulatory system and viscera of cyprinid fish (common carp, crucian carp, tench), is pathogenic to young fish. It was introduced to the UK in the 1950s, becoming now rather prevalent in extensive fisheries in some parts of England. Data on host range, geographical distribution, life cycle, pathology, diagnosis, disease impact and control are provided.

Another paper (D. Hoole) is devoted to "Tapeworm infections in fish: past and future problems". Special attention is given to pseudophyllideans *Ligula intestinalis* and *Diphyllobothrium* spp., parasitizing fish as larvae (plerocercoids), and two intestinal tapeworms, recently introduced to the UK, *Khawia sinensis* and *Bothriocephalus acheilognathi*, which can induce gross pathological and physiological changes on their fish hosts. On page 121, one can find a small mistake in the life cycle of *Khawia sinensis* because there is no stage of coracidium, typical of pseudophyllidean tapeworms, and the oncosphere escapes from the egg capsule only after being swallowed by an intermediate host, a tubificid. In addition, the quality of this line drawing (and of that on p. 127) does not fully match to that of other figures or scanning electron photomicrographs presented in the book.

In the paper "Possible regulation in the *Anguillicola crassus* host-parasite system" (author S. T. Ashworth), the problem of density-dependent mechanisms which may operate the *A. crassus* host-parasite system is discussed. Possible regulation at the levels of intermediate (copepod) or definitive (eel) hosts are considered. Taking into account pathogenicity of this dracunculoid nematode, quite recently introduced to European waters, this contribution certainly will attract attention not only of fish parasitologists, but also of pathologists and fish farmers.

In the following contribution ("Parameters of infection and morphometric analysis of sea lice from sea trout (*Salmo trutta*, L.) in Scottish waters"), L. Sharp, A. W. Pike and A. H. McVicar provide data on the occurrence and morphology of two parasitic copepods *Lepeophtheirus salmonis* and *Calligus elongatus* in Scotland. Biometrical data indicate that there are significant differences in female *L. salmonis* populations from individual sampling areas.

The fauna of ergasilid crustaceans occurring in British fresh waters is reviewed by S. Alston and J. W. Lewis ("The ergasilid parasites (Copepoda: Poecilostomatoida) of British freshwater fish"). Two brackish water species, *Ergasilus gibbus* and *Thersitina gasterostei*, and three fresh water species, *E. sieboldi*, *E. briani* and *Neoergasilus japonicus* are found on the fins, gills and opercula of fish in Britain. Life cycles of ergasilid species, their distribution, epidemiology and effects on the host are also discussed.

The book is concluded by three contributions. C. R. Kennedy reviews the introduction of helminths and crustaceans of freshwater fish to Britain from an ecological point of view ("The ecology of introductions") and discusses attributes of invaders and colonists. In addition to general aspects, basic data on metazoan parasites (a total of 14 species) recently introduced into the British Isles are also presented, including distribution patterns of individual species.

C. J. Secombes reviews advances in the field of fish immunology ("Cellular defences of fish: an update"). Although our knowledge about fish immunology has not progressed in all areas, significant advances which have been made over the last five years, e.g. in molecular approaches to characterize key molecules in fish immune responses, suggest that some still unsolved problems might be elucidated rapidly.

P. G. Jenkins with co-authors (T. H. Grayson, J. Roper, J. V. Hone, A. B. Wrathwell, M. L. Gilpin, J. E. Harris and C. B. Munn) gives an overview of the development of a vaccine against the copepod parasite of Atlantic salmon ("The potential for vaccination against salmon louse *Lepeophtheirus salmonis* infection"). This ectoparasite seriously damages fish and makes it susceptible to secondary infections as a consequence. The identification and production of candidate vaccine antigens for vaccination studies are discussed in details.

The editors have to be congratulated on the very succicnt summary of all contributions which concludes the volume and is written with deep insight into the respective problems.

Despite the fact that a majority of papers are focussed on fish parasites in the British Isles only, the problems are of general importance. Thus they surely will be of interest not only for British fish parasitologists, pathologists and fish health managers but for all specialists dealing with fish health and ichthyoparasitology in other countries.

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