

CONTENTS

Preface to the first edition	8
Preface to the second edition	9
INTRODUCTION	11
METHODS OF STUDY OF FISH NEMATODES	19
Examining fish for nematode parasites	19
Fixation and preservation of nematodes	21
Examination of nematodes	22
<i>En face</i> studies	23
Staining and mounting	24
Documentation	25
Cultivation of fish nematodes	25
MORPHOLOGY AND TAXONOMY OF FISH NEMATODES	27
BIONOMY OF FISH NEMATODES	37
Reproduction and dispersion of fish nematodes	37
Reproduction	37
Dispersion	41
Intermediate host-parasite relationships in fish nematodes	47
Representation of different groups of invertebrates and vertebrates as the intermediate hosts of fish nematodes	47
Specificity of fish nematodes at the intermediate host level	49
Ways of infection and localization in the intermediate host	49
Dependence of the speed of development in the intermediate host on the water temperature	51
The life span of infective larvae in the intermediate host	52
Cases of precocity in larval development in the intermediate host	53
Relation of infections to the body size of the intermediate host and state of its maturity ...	55
Influence of the mode of life of the intermediate host on the degree of infections and their seasonal changes	56
Effect of nematode infections on the intermediate host	58
Importance of intermediate hosts as a source of infections for the definitive host	61
Definitive host-parasite relationships in fish nematodes	61
Classification of hosts of adult nematodes from a viewpoint of their ontogenetic development and a suitability of definitive hosts	61
Mode of infection and migration to the site of localization in the definitive host	65
Rate of development and life span of nematodes in the definitive host	68
Seasonal cycles in maturation	69
Seasonal cycles in occurrence	73

Distribution of nematode infections within fish populations	76
Long-term changes in the populations of fish nematodes	82
Paratenic parasitism in fish nematodes	84
Classification of paratenic parasitism	84
Distribution of paratenic parasitism in nematodes maturing in fishes	89
Postcyclic parasitism in fish nematodes	94
Polyvalent hosts and alternative life cycles in fish nematodes	98
Influence of the environment on the species composition of nematodes parasitic in fishes	101
Geographically close populations of nematodes	101
Geographically distant populations of nematodes	103
Influence of geographical factor on the composition of the nematode fauna of fishes in the environment	106
Occurrence of nematodes in relation to the character of the environment	108
PATHOGENICITY OF NEMATODES PARASITIZING FISHES	111
MOLECULAR STUDIES OF FISH NEMATODES	115
SYSTEMATIC REVIEW OF THE NEMATODES PARASITIZING EUROPEAN FRESHWATER FISHES	119
ADULT NEMATODES	119
Order Enoplida	120
Family Capillariidae	121
Family Cystoospiidae	143
Order Ascaridida	148
Family Anisakidae	149
Family Quimperiidae	191
Family Cucullanidae	203
Order Spirurida	237
Family Camallanidae	239
Family Anguillicolidae	264
Family Daniconematidae	286
Family Lucionematidae	290
Family Micropleuridae	293
Family Philometridae	303
Family Skrjabillanidae	354
Family Rhabdochonidae	380
Family Cystidicolidae	426
NEMATODES PARASITIC IN FISHES AS LARVAE	472
Superfamily Trichinelloidea	472
Family Trichinellidae	472
Superfamily Dioctophymatoidea	475
Family Dioctophymatidae	475
Superfamily Ascaridoidea	487
Family Anisakidae	488
Family Ascarididae	506
Superfamily Seuratoidea	508
Family Quimperiidae	509
Family Cucullanidae	509
Superfamily Gnathostomatoidea	510

Family Gnathostomatidae	510
Superfamily Anguilliculoidea	517
Family Anguillicolidae	517
Superfamily Dracunculoidea	517
Family Dracunculidae	517
Family Philometridae	518
Superfamily Aproctoidea	519
Family Desmidocercidae	520
Superfamily Acuarioidea	521
Family Acuariidae	521
HOST-NEMATODE PARASITE LIST	529
References	547
Index	585