



Taylor & Francis Group
London • New York • Philadelphia

Parasitism and Host Behaviour

Edited by **C. J. Barnard** and **J. M. Behnke**, *University of Nottingham, UK*

This book brings together recent work across the disciplines of Parasitology and Animal Behaviour which reveals the fundamental role of parasitism in the evolution of behaviour. The aim is to look broadly at the relationship between parasitism and behaviour from pathology and epidemiology to strategies of exploitation and counter-exploitation. In doing so the book will traverse the phylogenetic scale from enteric protozoa and nematodes to colouration and courtship of birds and human cultural traditions.

ISBN: 0-85066-498-5 **343pp** **August 1990** **Cloth Price: £45.00/\$90.00**

Parasites: Immunity and Pathology

The Consequences of Parasitic Infection in Mammals

Edited by **J. M. Behnke**, *University of Nottingham, UK*

In this book, acknowledged experts have contributed studies, illustrated by landmark experiments, that emphasize the interdependence of parasitism and host response. How the immune responses are evoked and how they express host-protective resistance at various tissue locations in the mammalian body are considered in some detail. In addition, the pathological sequelae accompanying infections and resistance are emphasised.

ISBN: 0-85066-499-3 **445pp** **August 1990** **Cloth Price: £49.00/\$98.00**

Hookworm Disease: Current Status and New Directions

Edited by **G. A. Schad**, *University of Pennsylvania, USA* and **K. S. Warren**, *Maxwell Communication Corporation, New York, USA*

This book arising out of the symposium held in Bellagio, Italy, in September 1988 brought together experts from around the world to discuss the current worldwide status of hookworm disease.

ISBN: 0-85066-762-3 **450pp** **November 1990** **Cloth Price: £60.00/\$120.00**

Strongyloidiasis: A Major Roundworm Infection of Man

Edited by **D. I. Grove**, *Sir Gairdner Hospital, Western Australia*

This comprehensive summary of the important features of human strongyloidiasis will be a useful reference tool for all parasitologists and tropical health workers concerned with this major human pathogen. The book considers all aspects, from morphology and life cycle to pathological and immunological responses in humans, clinical manifestations, diagnosis, treatment and epidemiology.

ISBN: 0-85066-732-1 **332pp** **1989** **Cloth Price : £40.00/\$80.00**

Please note prices subject to change

For more information or to order please contact:

Marketing Dept., Taylor & Francis, Rankine Rd., Basingstoke, Hants., RG24 0PR UK

Marketing Dept., Taylor & Francis Inc., 1900 Frost Rd., Suite 101, Bristol,

PA-19007 USA

PARASITE IMMUNOLOGY

Editors

G.A.T. Targett *London School of Hygiene and Tropical Medicine,
London, England*

Bridget M. Ogilvie *Wellcome Trust, London, England*

Parasite Immunology is an international journal devoted to research on parasite immunology in the general sense. Emphasis is placed on how hosts control parasites, and the immunopathological reactions which take place in the course of parasitic infections. The journal welcomes original work on all parasites: helminths, fungi, protozoa, ectoparasites, bacteria and viruses. Each issue covers the spec-

trum of parasite immunology through the original papers published, and through 'viewpoint' articles, designed to interest as well as instruct.

Subscription Information

Parasite Immunology is published bi-monthly. Subscription rates for 1990 are £148.00 (UK), £170.00 (overseas) and US\$282.50 (USA & Canada) post free.

Order Form

Please tick the appropriate box and return to:

Blackwell Scientific Publications Ltd, P.O. Box 88, Oxford, England.

- I would like to subscribe to *Parasite Immunology*
- I wish to pay by cheque and enclose the sum of £ _____ US\$ _____
- I wish to pay by Access/American Express/Barclaycard/Diners Card/
VISA/Mastercard (delete as necessary)

Please debit my credit card no.

Expiry date _____ with the sum of £ _____ US\$ _____

Signature _____ Date _____

- Please send me a specimen copy of *Parasite Immunology*

Name _____

Address _____

BSP

BLACKWELL SCIENTIFIC PUBLICATIONS LTD

P. O. Box 88, Oxford, UK Tel: (44) 0865 240201

Parasitology

EDITORS

F. E. G. COX *and* C. ARME

EDITORIAL ASSISTANT

M. ELISABETH PAINTER, Ph.D.

ADVISORY BOARD

L. G. GOODWIN, F.R.S. (Chairman)

R. M. ANDERSON, F.R.S.

J. R. BAKER

D. C. BARKER

J. BARRETT

D. A. P. BUNDY

A. E. BUTTERWORTH

ELIZABETH U. CANNING

L. H. CHAPPELL*

D. W. T. CROMPTON

D. I. GIBSON

R. E. HOWELLS

C. R. KENNEDY

A. E. KEYMER

D. L. LEE

D. J. McLAREN

D. P. McMANUS

D. H. MOLYNEUX

BRIDGET M. OGILVIE

D. ROLLINSON

M. ELAINE ROSE

V. R. SOUTHGATE*

R. C. TINSLEY

K. VICKERMAN, F.R.S.

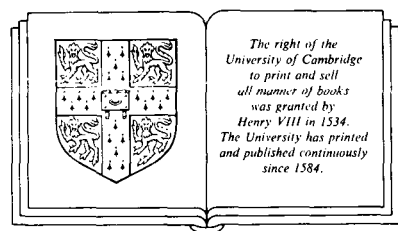
D. WAKELIN

P. J. WHITFIELD

H. H. WILLIAMS

R. A. WILSON

* Representing the British Society for Parasitology.



CAMBRIDGE UNIVERSITY PRESS

CAMBRIDGE

NEW YORK PORT CHESTER MELBOURNE SYDNEY

Published by the Press Syndicate of the University of Cambridge
The Pitt Building, Trumpington Street, Cambridge CB2 1RP
40 West 20th Street, New York, NY 10011, USA
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© Cambridge University Press, 1990

Printed in Great Britain by the
University Press, Cambridge

CONTENTS

PART 1 AUGUST 1990

ELLIS, J. and BUMSTEAD, J. <i>Eimeria</i> species: studies using rRNA and rDNA probes	1
GALVAO-QUINTAO, L., ALFIERI, S. C., RYTER, A. and RABINOVICH, M. Intracellular differentiation of <i>Leishmania amazonensis</i> promastigotes to amastigotes: presence of megasomes, cysteine proteinase activity and susceptibility to leucine-methyl ester	7
CONSTANT, S. L., MOUNTFORD, A. P. and WILSON, R. A. Phenotypic analysis of the cellular responses in regional lymphoid organs of mice vaccinated against <i>Schistosoma mansoni</i>	15
RUPPEL, A., SHI, Y. E. and MOLONEY, N. A. <i>Schistosoma mansoni</i> and <i>S. japonicum</i> : comparison of levels of ultraviolet irradiation for vaccination of mice with cercariae	23
MITCHELL, G. F., GARCIA, E. G., WOOD, S. M., DIASANTA, R., ALMONTE, R., CALICA, E., DAVERN, K. M. and TIU, W. U. Studies on the sex ratio of worms in schistosome infections	27
MCCARTHY, A. M. Speciation of echinostomes: evidence for the existence of two sympatric sibling species in the complex <i>Echinoparyphium recurvatum</i> (von Linstow 1873) (Digenea: Echinostomatidae)	35
MCCARTHY, A. M. The influence of second intermediate host dispersion pattern upon the transmission of cercariae of <i>Echinoparyphium recurvatum</i> (Digenea: Echinostomatidae)	43
MCLINTOCK, L. M. L., TURNER, C. M. R. and VICKERMAN, K. A comparison of multiplication rates in primary and challenge infections of <i>Trypanosoma brucei</i> bloodstream forms	49
BÓZNER, P., DEMEŠ, P. and ŠTEFANOVIČ, J. Proteolytic activity in <i>Tritrichomonas mobilensis</i>	57
ELSE, K. J., WAKELIN, D., WASSOM, D. L. and HAUDA, K. M. The influence of genes mapping within the major histocompatibility complex on resistance to <i>Trichuris muris</i> infections in mice	61
KEYMER, A. E., TARLTON, A. B., HIORNS, R. W., LAWRENCE, C. E. and PRITCHARD, D. I. Immunogenetic correlates of susceptibility to infection with <i>Heligmosomoides polygyrus</i> in outbred mice	69
SCOTT, M. E. An experimental and theoretical study of the dynamics of a mouse–nematode (<i>Heligmosomoides polygyrus</i>) interaction	75
MURRAY, D. S. and WHARTON, D. A. Capture and penetration processes of the free-living juveniles of <i>Trichostrongylus colubriformis</i> (Nematoda) by the nematophagous fungus, <i>Arthrobotrys oligospora</i>	93
WHARTON, D. A. and MURRAY, D. S. Carbohydrate/lectin interactions between the nematophagous fungus, <i>Arthrobotrys oligospora</i> , and the infective juveniles of <i>Trichostrongylus colubriformis</i> (Nematoda)	101
MCKAY, D. M., HALTON, D. W., JOHNSTON, C. F., FAIRWEATHER, I. and SHAW, C. <i>Hymenolepis diminuta</i> : changes in intestinal morphology and the enterochromaffin cell population associated with infection in male C57 mice	107
LAMSAM, S. and MCMANUS, D. P. Molecular characterization of the surface and cyst fluid components of <i>Taenia crassiceps</i>	115
MCMANUS, D. P. and LAMSAM, S. <i>Taenia crassiceps</i> surface immunoglobulins: parasite- or host-derived?	127
GUYATT, H. L., BUNDY, D. A. P., MEDLEY, G. F. and GRENFELL, B. T. The relationship between the frequency distribution of <i>Ascaris lumbricoides</i> and the prevalence and intensity of infection in human communities	139
GEMMELL, M. A., LAWSON, J. R., ROBERTS, M. G. and GRIFFIN, J. F. T. Population dynamics in echinococcosis and cysticercosis: regulation of <i>Taenia hydatigena</i> and <i>T. ovis</i> in lambs through passively transferred immunity	145
SHARP, G. J. E., SECOMBES, C. J. and PIKE, A. W. The laboratory maintenance of <i>Diphyllobothrium dendriticum</i> (Nitzsch, 1824)	153

PART 2 OCTOBER 1990

ERRATUM

ELLIS, J. and REVETS, H. <i>Eimeria</i> species of the chicken contain virus-like RNA molecules	163
DAILEY, D. C., CHANG TE-HUNG and ALDERETE, J. F. Characterization of <i>Trichomonas vaginalis</i> haemolysis	171
STUART, M. K. and GREEN, T. J. Monoclonal IgM rheumatoid factor-like anti-globulins enhance the inhibitory effects of <i>Plasmodium falciparum</i> -specific monoclonal antibodies <i>in vitro</i>	177
RIDLEY, R. G., TAKACS, B., ETLINGER, H. and SCAIFE, J. G. A rhoptry antigen of <i>Plasmodium falciparum</i> is protective in <i>Saimiri</i> monkeys	187
FELDMANN, A. M., BILLINGSLEY, P. F. and SAVELKOUL, E. Bloodmeal digestion by strains of <i>Anopheles stephensi</i> Liston (Diptera: Culicidae) of differing susceptibility to <i>Plasmodium falciparum</i>	193
YOUNG, A. S., MARITIM, A. C., KARIUKI, D. P., STAGG, D. A., WAFULA, J. M., MUTUGI, J. J., CUMMINGS, J. M., RICHARDS, A. B. and BURNS, C. Low-dose oral administration of human interferon alpha can control the development of <i>Theileria parva</i> infection in cattle	201
RILEY, E. M. and CHAPPELL, L. H. Praziquantel treatment of <i>Biomphalaria glabrata</i> infected with <i>Schistosoma mansoni</i> – influence on snail fecundity	211
PAX, R. A. and BENNETT, J. L. Studies on intrategumental pH and its regulation in adult male <i>Schistosoma mansoni</i>	219
SKUCE, P. J., JOHNSTON, C. F., FAIRWEATHER, I., HALTON, D. W. and SHAW, C. A confocal scanning laser microscope study of the peptidergic and serotonergic components of the nervous system in larval <i>Schistosoma mansoni</i>	227
FRAME, I. A., ROSS, C. A. and LUCKINS, A. G. Characterization of <i>Trypanosoma congolense</i> serodemes in stocks isolated from Chipata District, Zambia	235
DIRIE, M. F., ASHFORD, R. W., MUNGOMBA, L. M., MOLYNEUX, D. H. and GREEN, E. E. Avian trypanosomes in <i>Simulium</i> and sparrowhawks (<i>Accipiter nisus</i>)	243
HAYES, D. J. and SELWOOD, D. L. Glucose transport in <i>Acanthocheilonema viteae</i>	249
ANDERSEN, K. I. and VALTONEN, E. T. On the infracommunity structure of adult cestodes in freshwater fishes	257
HOLDEN-DYE, L. and WALKER, R. J. Avermectin and avermectin derivatives are antagonists at the 4-aminobutyric acid (GABA) receptor on the somatic muscle cells of <i>Ascaris</i> ; is this the site of anthelmintic action?	265
HOBBS, R. P., LYMBERY, A. J. and THOMPSON, R. C. A. Rostellar hook morphology of <i>Echinococcus granulosus</i> (Batsch, 1786) from natural and experimental Australian hosts, and its implications for strain recognition	273
LYMBERY, A. J., THOMPSON, R. C. A. and HOBBS, R. P. Genetic diversity and genetic differentiation in <i>Echinococcus granulosus</i> (Batsch, 1786) from domestic and sylvatic hosts on the mainland of Australia	283
LAMMAS, D. A., MITCHELL, L. A. and WAKELIN, D. Genetic influences upon eosinophilia and resistance in mice infected with <i>Mesocestoides corti</i>	291
LEE, D. L. and BIGGS, W. D. Two- and three-dimensional locomotion of the nematode <i>Nippostrongylus brasiliensis</i>	301
SMITH, G. The population biology of the free-living phase of <i>Haemonchus contortus</i>	309

PART 3 DECEMBER 1990

PONNUDURAI, T., LENSEN, A. H. W., VAN GEMERT, G. J., BOLMER, M., VAN BELKUM, A., VAN EERD, P. and MONS, B. Large-scale production of <i>Plasmodium vivax</i> sporozoites	317
BUTCHER, G. A. and CLARK, I. A. The inhibition of <i>Plasmodium falciparum</i> growth <i>in vitro</i> by sera from mice infected with malaria or treated with TNF	321
STRELKOVA, M. V., SHURKHAL, A. V., KELLINA, O. I., ELISEEV, L. N., EVANS, D. A., PETERS, W., CHAPMAN, C. J., LEBLANCQ, S. M. and VANEYS, G. J. J. M. A new species of <i>Leishmania</i> isolated from the great gerbil <i>Rhombomys opimus</i>	327

DAVIES, C. R., COOPER, A. M., PEACOCK, C., LANE, R. P. and BLACKWELL, J. M. Expression of LPG and GP63 by different developmental stages of <i>Leishmania major</i> in the sandfly <i>Phlebotomus papatasi</i>	337
MOHAMED, H. A. and MOLYNEUX, D. H. Developmental stages of <i>Cyclospora talpae</i> in the liver and bile duct of the mole (<i>Talpa europaea</i>)	345
CREWS, A. E. and YOSHINO, T. P. Influence of larval schistosomes on polysaccharide synthesis in albumin glands of <i>Biomphalaria glabrata</i>	351
GRAHAM, S. V., MATTHEWS, K. R., SHIELS, P. G. and BARRY, J. D. Distinct, developmental stage-specific activation mechanisms of trypanosome VSG genes	361
STILES, J. K., INGRAM, G. A., WALLBANKS, K. R., MOLYNEUX, D. H., MAUDLIN, I. and WELLBURN, S. Identification of midgut trypanolysin and trypanoagglutinin in <i>Glossina palpalis</i> ssp. (Diptera: Glossinidae)	369
TURNER, C. M. R., STERNBERG, J., BUCHANAN, N., SMITH, E., HIDE, G. and TAIT, A. Evidence that the mechanism of gene exchange in <i>Trypanosoma brucei</i> involves meiosis and syngamy	377
SPOONER, P. R. Oxytetracycline inhibition of mitochondrial protein synthesis in bovine lymphocytes infected with <i>Theileria parva</i> or stimulated by mitogen	387
STITT, A. W. and FAIRWEATHER, I. Spermatogenesis and the fine structure of the mature spermatozoon of the liver fluke, <i>Fasciola hepatica</i> (Trematoda: Digenea)	395
DYE, C. Epidemiological significance of vector–parasite interactions	409
GRENFELL, B. T., DAS, P. K., RAJAGOPALAN, P. K. and BUNDY, D. A. P. Frequency distribution of lymphatic filariasis microfilariae in human populations: population processes and statistical estimation	417
DAS, P. K., MANOHARAN, A., SRIVIDYA, A., GRENFELL, B. T., BUNDY, D. A. P. and VANAMAIL, P. Frequency distribution of <i>Wuchereria bancrofti</i> microfilariae in human populations and its relationships with age and sex	429
HARNETT, W., WORMS, M. J., GRAINGER, M., PYKE, S. D. M. and PARKHOUSE, R. M. E. Association between circulating antigen and parasite load in a model filarial system, <i>Acanthocheilonema viteae</i> in jirds	435
HAYES, D. J. and CARTER, N. S. An investigation of fructose utilization in <i>Acanthocheilonema viteae</i>	445
MUNRO, M. A., REID, A. and WHITFIELD, P. J. Genomic divergence in the ecologically differentiated English freshwater and marine strains of <i>Pomphorhynchus laevis</i> (Acanthocephala: Palaeacanthocephala): a preliminary investigation	451
PAPPAS, P. W. and UGLEM, G. L. <i>Hymenolepis diminuta</i> (Cestoda) liberates an inhibitor of proteolytic enzymes during <i>in vitro</i> incubation	455
WASTLING, J. M., GERRARD, D., WALKER, J. and CHAPPELL, L. H. Action of cyclosporin A on the tapeworm <i>Hymenolepis diminuta</i> in mice	465
ALLAN, J. C., AVILA, G., GARCIA NOVAL J., FLISSER, A. and CRAIG, P. S. Immunodiagnosis of taeniasis by coproantigen detection	473

Continued from back cover

Grenfell, B. T., Das, P. K., Rajagopalan, P. K. and Bundy, D. A. P. Frequency distribution of lymphatic filariasis microfilariae in human populations: population processes and statistical estimation	417
Das, P. K., Manoharan, A., Srividya, A., Grenfell, B. T., Bundy, D. A. P. and Vanamail, P. Frequency distribution of <i>Wuchereria bancrofti</i> microfilariae in human populations and its relationships with age and sex	429
Harnett, W., Worms, M. J., Grainger, M., Pyke, S. D. M. and Parkhouse, R. M. E. Association between circulating antigen and parasite load in a model filarial system, <i>Acanthocheilonema viteae</i> in jirds	435
Hayes, D. J. and Carter, N. S. An investigation of fructose utilization in <i>Acanthocheilonema viteae</i>	445
Munro, M. A., Reid, A and Whitfield, P. J. Genomic divergence in the ecologically differentiated English freshwater and marine strains of <i>Pomphorynchus laevis</i> (Acanthocephala: Palaeacanthocephala): a preliminary investigation	451
Pappas, P. W. and Uglem, G. L. <i>Hymenolepis diminuta</i> (Cestoda) liberates an inhibitor of proteolytic enzymes during <i>in vitro</i> incubation	455
Wastling, J. M., Gerrard, D., Walker, J. and Chappell, L. H. Action of cyclosporin A on the tapeworm <i>Hymenolepis diminuta</i> in mice	465
Allan, J. C., Avila, G., Garcia Noval J., Flisser, A. and Craig, P. S. Immunodiagnosis of taeniasis by coproantigen detection	473

Parasitology

Back volumes. Vols. 1–71: Inquiries should be addressed to Wm. Dawson & Sons Ltd, Cannon House, Folkestone, Kent. Vols. 72 onwards: quotations for parts still in print may be obtained from Cambridge or the American Branch of Cambridge University Press.

Copying. This journal is registered with the Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970. Organizations in the USA who are also registered with C.C.C. may therefore copy material (beyond the limits permitted by sections 107 and 108 of US copyright law) subject to payment to C.C.C. of the per-copy fee of \$5.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0031–1820/90 \$5.00+.00.

ISI Tear Sheet Service. 3051 Market Street, Philadelphia, Pennsylvania 19104, USA, is authorized to supply single copies of separate articles for private use only.

For all other use, permission should be sought from Cambridge or the American Branch of Cambridge University Press.

Claims for missing issues can only be considered if made immediately after receipt of the subsequent issue.

Advertising. Details of advertising in *Parasitology* may be obtained from the publisher.

Parasitology

CONTENTS

	PAGE
Ponnudurai, T., Lensen, A. H. W., van Gemert, G. J., Bolmer, M., van Belkum, A., van Eerd, P. and Mons, B. Large-scale production of <i>Plasmodium vivax</i> sporozoites	317
Butcher, G. A. and Clark, I. A. The inhibition of <i>Plasmodium falciparum</i> growth <i>in vitro</i> by sera from mice infected with malaria or treated with TNF	321
Strelkova, M. V., Shurkhal, A. V., Kellina, O. I., Eliseev, L. N., Evans, D. A., Peters, W., Chapman, C. J., Le Blancq, S. M. and van Eys, G. J. J. M. A new species of <i>Leishmania</i> isolated from the great gerbil <i>Rhombomys opimus</i>	327
Davies, C. R., Cooper, A. M., Peacock, C., Lane, R. P. and Blackwell, J. M. Expression of LPG and GP63 by different developmental stages of <i>Leishmania major</i> in the sandfly <i>Phlebotomus papatasi</i>	337
Mohamed, H. A. and Molyneux, D. H. Developmental stages of <i>Cyclospora talpae</i> in the liver and bile duct of the mole (<i>Talpa europaea</i>)	345
Crews, A. E. and Yoshino, T. P. Influence of larval schistosomes on polysaccharide synthesis in albumin glands of <i>Biomphalaria glabrata</i>	351
Graham, S. V., Matthews, K. R., Shiels, P. G. and Barry, J. D. Distinct, developmental stage-specific activation mechanisms of trypanosome VSG genes	361
Stiles, J. K., Ingram, G. A., Wallbanks, K. R., Molyneux, D. H., Maudlin, I. and Wellburn, S. Identification of midgut trypanolysin and trypanoagglutinin in <i>Glossina palpalis</i> spp. (Diptera: Glossinidae)	369
Turner, C. M. R., Sternberg, J., Buchanan, N., Smith, E., Hide, G. and Tait, A. Evidence that the mechanism of gene exchange in <i>Trypanosoma brucei</i> involves meiosis and syngamy	377
Spooner, P. R. Oxytetracycline inhibition of mitochondrial protein synthesis in bovine lymphocytes infected with <i>Theileria parva</i> or stimulated by mitogen	387
Stitt, A. W. and Fairweather, I. Spermatogenesis and the fine structure of the mature spermatozoon of the liver fluke, <i>Fasciola hepatica</i> (Trematoda: Digenea)	395
Dye, C. Epidemiological significance of vector-parasite interactions	409

Continued inside back cover

© Cambridge University Press 1990

The Pitt Building, Trumpington Street, Cambridge CB2 1RP
 40 West 20th Street, New York, NY 10011, USA
 10 Stamford Road, Oakleigh, Melbourne 3166, Australia

Printed in Great Britain by the University Press, Cambridge