Parasitological Society of Southern Africa

The following are the abstracts of papers presented at the Annual Meeting of the Society, held at the Rand Afrikaans University, Johannesburg, on 15 and 18 July, 1986.

Parasitologiese Vereniging van Suidelike Afrika

Die uittreksels van referate wat tydens die jaarlikse vergadering van die vereniging, op 15 en 18 Julie 1986 by die Randse Afrikaanse Universiteit, Johannesburg, aangebied is, word hieronder aangegee.

The importance of parasitic diseases of man in the RSA

C.H.J. Schutte
RIDTE, South African Medical Research Council, Congella 4013.

Large numbers of people in South Africa, particularly those living in the rural areas, are infected with a variety of helminth and protozoan parasites. However, even when high prevalences of infection occur, the numbers of infected individuals actually suffering or dying from them are usually rather small. The question therefore arises: how important are these parasitic diseases in South Africa and is there sufficient justification for drawing on sparse financial resources for research on them?; can we marshall strong enough arguments to persuade the authorities to invest considerable sums in research on these diseases and their causative agents? In an attempt to answer such questions, the relative importance of some of the major parasitic diseases occurring in the RSA, such as malaria, schistosomiasis, cysticercosis and ascariasis, are discussed. It is concluded that we cannot allow these parasitic diseases to become neglected and forgotten problems and that they merit greater emphasis if we are to achieve the goal of 'Health for all by the year 2000'.

Absence of human *Schistosoma mansoni* infection in Tongaland – an ecological explanation

C.C. Appleton
Department of Zoology, University of Natal, P.O. Box 375, Pietermaritzburg 3200.

Transmission of the human intestinal bilharzia parasite, *Schistosoma mansoni,* in Tongaland is believed to be prevented by two independent processes, both due to the effects of the rapid warming of water bodies during spring and the high temperatures reached. These high temperatures cause (i) a form of hyperthermia in the uninfected host snail, *Biomphalaria pfeifferi,* resulting in a retardation of gametogenesis and a consequent decline in population density during summer; (ii) a reduction in the duration of cercarial shedding from the infected snail and the early death of the parasite's intramolluscan stages.

Analysis of 10 years of malaria case data from KwaZulu

B.L. Sharp and S. Ngxongo
RIDTE, South African Medical Research Council, P.O. Box 17120, Congella 4013.

The malaria case data from areas of KwaZulu for the period 1976 to 1985 were analysed. Annual case totals varied from a low of 75 during the drought to a high of 1199 during a wet year (mean = 643). Malaria was distinctly seasonal, consistently showing a peak during the months of April, May and June. Only 19,3% of the total number of cases occurred between July and December and 90% of these cases were detected by active surveillance. 66,9% of the total number of cases for the 10-year period were detected by active surveillance and 33% passively. Imported cases (mainly from Mozambique) made up 19% of the total number and during the July to December period accounted for 31% of the cases. 72% of the total number of malaria cases were accounted for by people under the age of 25 years. This closely followed the population structure in the area, where 71% of the people were under 25 years of age. Cases of malaria were reported from 14 districts within KwaZulu, but 93% of the cases came from Ingwavuma, Ubombo, Hlabisa and as imports.

Chloroquine-resistant malaria in South Africa

C.F. Hansford
National Institute for Tropical Diseases, P.O. Box 33, Tzaneen 0850

Chloroquine-resistant malaria was reported in East Africa in 1977 and, following its spread to adjacent countries, indigenous infections were reported in Namibia in 1984 and Venda in 1985. In South Africa vector control, together with active and passive detection of malaria infections, are used intensively to control the disease. Migration from Mozambique and favourable climatic conditions were responsible for the increased number of infections during 1985. To date, 12 indigenous chloroquine-resistant infections have been detected in the Transvaal and Venda as well as 46 in the malarious areas of the Transvaal and Natal originating from Mozambique. A single dose of chloroquine/pyrimethamine has been given pending confirmation of infection, to alleviate symptoms and prevent mosquito infection, but the use of primaquine instead of pyrimethamine is being considered to overcome resistance.

Contracaecum infections of indigenous freshwater fish and piscivorous birds in the northern Transvaal

J.E. Saayman, N.M. Mokgalong, S.N. Mashego and J. Theron
Limnological Research Unit, Department of Zoology and Biology, University of the North, Private Bag X1106, Sovenga 0727.

The genus *Contracaecum* (Nematoda : Heterocheilidae) has a worldwide distribution and was also found to be a common parasite of a number of indigenous freshwater fish species as well as piscivorous birds in the northern Transvaal. Larval stages of *Contracaecum* spp. occur as heavy infections in *Clarias gariepinus, Eutropius depressirostris* as well as in a number of *Barbus* species. *Contracaecum* infections in *Anhinga melanogaster, Phalacrocorax africanus* and *Phalacrocorax carbo* are discussed. The following species of *Contracaecum* were procured from the above hosts: *Contracaecum microcephalum, C. rudolphii, C. rodhaini, C. carlislei, C. lawrencei* and *C. tricuspe.*

Cestoda of cormorants and darters from the northern Transvaal

N.M. Mokgalong and J.E. Saayman
Limnological Research Unit, University of the North, Private Bag X1106, Sovenga 0727.

A total of 229 birds was examined for gastrointestinal helminths over a period of 42 months. This report deals with six species of cestodes from *Anhinga melanogaster, Phalacrocorax africanus* and *Phalacrocorax carbo.* The following cestode species were procured: *Amirthalingamia macracantha, Echinorhynchotaenia tritesticulata, Hymenolepsis cormoranti, Ligula intestinalis, Paradilepis delahauxi* and *Paradilepis scolecina.* Some of these cestode infections are correlated with larval cestode infections of indigenous fish species.

Observations in the crustacean fish ectoparasite *Ergasilus*

W.H. Oldewage and J.G. van As
Department of Zoology, Rand Afrikaans University, Johannesburg 2001.

Fourteen species of the genus *Ergasilus* have been recorded from the African continent. The majority of records are from the great lakes of Central Africa and the Congo and Volta river systems. *E. seiboldi* is a cosmopolitan species, which has also been recorded from Angola and

Mozambique but no work has been done further south of these localities. However, the presence of this parasite has been established by the co-author in the Chobe, Zambezi, Limpopo and Pongola river systems.

As the life-cycle of *Ergasilus* is completed as a freeliving copepod and the adult female attaches itself to a host, this offers an opportunity to study host-parasite interaction in a non-totally committed parasite. This is discussed with reference to the parasite's biology from available as well as original information.

Monogenetic parasites of *Clarias* species in Southern Africa

S.N. Mashego
Limnological Research Unit, Department of Zoology and Biology, University of the North, Private Bag X1106, Sovenga 0727.

This interim report deals with a survey of monogenetic parasites of *Clarias* spp. in the Transvaal and Caprivi Strip, Namibia. The following parasites were recovered: *Quadricanthus clariadis clariadis* Paperna, 1979; *Q. clariadis allobychowskiella* Paperna, 1979; *Q. clariadis* subsp. nov.; *Macrogyrodactylus clarii* Gissiev, 1961; *Macrogyrodactylus* cf. *congolensis* (Prudhoe, 1957) and a *Gyrodactylus* sp.

These parasites are discussed in relation to similar or closely related Monogenea which have been reported from Central and North Africa. Heavy infestations of *Clarias gariepinus* post-larvae by *Quadricanthus clariadis clariadis,* resulting in mortalities, were recorded in two aquaria at the University of the North. The post-larvae were successfully treated with Dipterex, which killed all the parasites within 12 hours.

Morphology of the reproductive system of a paradiplozoon gill parasite

G. Cloete and J.H. Swanepoel
Department of Zoology, Rand Afrikaans University, Johannesburg 2001.

The genus *Paradiplozoon* Achmerov 1974 was originally described as *Diplozoon* Nordman 1832. Currently, 12 species of the former genus have been described. However, detailed information concerning the reproductive system of these species remains inadequate. A comparison between specimens of *Paradiplozoon* collected from *Barbus kimberleyensis* and two other species described from Africa (*D. aegyptensis* Fischthal and Kuntz, 1963 and *D. ghanensis* Thomas, 1957) shows extensive differences in the morphology of their reproductive systems. Firstly, the testes of the specimens from *Barbus kimberleyensis* are highly lobed whereas those of the two other African species are described as being compact. Secondly, the testes in *Paradiplozoon* sp. and *D. aegyptensis* are situated in the opisthaptoral region, whereas those of *D. ghanense* are located in the area of fusion. Thirdly, the eggs of *Paradiplozoon* sp. do not have the attaching filaments present in the two other species. Also, the eggs of the former species are slightly larger than those of *D. aegyptensis* and *D. ghanense.*

For total preparations special techniques were applied to illustrate the general location of most sexual structures. In addition, transverse sections illustrate interesting features not previously described. Of these, the location of what seems to be the remains of a ventral sucker and the presence of sperm cells in the uterine duct are notable. The uterus is connected to the degenerated ventral sucker by means of a highly ciliated duct. However, it would appear that this duct, together with the ventral sucker remnants, have no specific role in the reproduction of the parasite.

Reconstructions from transverse sections clearly show positions where certain ducts enter or leave the sexual organs. This procedure seems to be the most feasible method to gain adequate knowledge and a better understanding of the morphological characteristics of the reproductive system of this unique parasitic animal.

Aspects of the relationship between the sero-epidemiology and zymodemes of *Entamoeba histolytica.*

T.F.H.G. Jackson, V. Gathiram and A.E. Simjee
RIDTE, P.O. Box 17120, Congella 4013.

Isoenzyme electrophoretic studies over a number of years have established that this is an invaluable method for differentiating between pathogenic and non-pathogenic stocks of *E. histolytica.* The serological response of subjects known to be harbouring pathogenic and non-pathogenic zymodemes was determined. To aid interpretation of the results, patients with proven amoebic liver abscess, amoebic dysentery, as well as healthy subjects from an endemic area, were included in the study. It was found that clinically healthy subjects from whom pathogenic zymodemes of *E. histolytica* were isolated had serological responses which were analogous to the patients with invasive disease; these carriers constituted 1% of the population of the area endemic for amoebiasis. On the other hand, subjects from whom non-pathogenic zymodemes were isolated had serological responses analogous to the general population of the endemic amoebiasis area from which they originated. From this work a clearer understanding of previous sero-epidemiological studies has emerged.

A *Pirhemocyton* and other blood parasites in lizards

F.W. Huchzermeyer, Catherine C. Williamson and Martha L. Swanepoel
Veterinary Research Institute, Onderstepoort 0110.

Blood smears taken from 12 live lizards from the Ceres area in the western Cape were submitted for bacteriological examination; blood parasites were found in 5 of the specimens. A severe infection with an organism closely resembling *Pirhemocyton tarentolae* Chatton and Blanc, 1914 was found in a gecko, *Pachydactylus bibroni bibroni.*

Numerous gametocytes of a *Plasmodium* were observed in one specimen of *Agama atra atra* as well as a single gametocyte of a *Hepatozoon,* and a single *Plasmodium* gametocyte was detected in another specimen of the same species. Several *Hepatozoon* gametocytes were found in the blood of a *Mabuya variegata variegata* and of a *M. sulcata sulcata.*

Ecological studies on host-parasite associations in South African anuran Polystomatidae (Monogenea)

D.J. Kok and L.H. du Preez
Department of Zoology, University of the Orange Free State, Bloemfontein 9300.

A new South African species of *Polystoma,* harboured in *Natalobatrachus bonebergi,* offers excellent opportunities for experimental studies on those stages infecting the tadpole host. *N. bonebergi* tadpoles do not develop dense pigment in the body wall ventral to the branchial chambers. Parasite establishment, maturation, egg production and mortality can therefore be studied in experimental and natural infections without killing the host.

Recruited oncomiracidia become established mainly in the left branchial chamber. Within eight days virtually all parasites have migrated towards the right branchial chambewr, where they develop towards neotenic maturity in tadpoles infected when younger than 45 days. Owing to persistent parasite mortality, less than 50% of established parasites reached neotenic maturity. Egg production rates of neotenic parasites varied between 12 and 30 eggs per parasite per day but were much lower when hosts harboured more than two parasites. Although tadpoles became strongly anaemic in the presence of more than two mature neotenics, parasite-induced mortalities never occurred.

In tadpoles infected when older than 45 days, there was a gradual increase in the prevalence of bladder-destined parasites, typically showing retarded growth and enlarged hamuli. Development towards neotenic maturity still occurred, even in tadpoles infected only 16 days before metamorphosis. Neotenic and bladder-destined parasites often developed together in the same tadpole. There was also a high prevalence of indeterminate development, parasites showing various combinations of the characteristics of both neotenic and bladder-destined parasites.

'n Morfologiese vergelyking tussen die kopluis (*Pediculus humanus capititis*) en die skaamteluis (*Phthirus pubis*) aan die hand van skandeerelektronmikroskopie

J.P. van Niekerk, E. Waller en H.J. Els
Elektronmikroskoopeenheid, MEDUNSA 0204.

Deur gebruik te maak van SEM, is die morfologie van twee bekende luise van die mens, nl die kopluis, *Pediculus humanus capititis,* en die skaamteluis, *Phthirus pubis,* bestudeer. Morfologiese verskille en ooreenkomste word uitgewys asook die funksionele belangrikheid van sekere strukture. Sodanige strukture sluit in die groef aan die ventrale gedeelte van die kop

en protoraks, die ontwikkeling van sterk kloue op die pote, die teenwoordigheid van sensoriese setas op die terminale segmente van die antennas en die gonopodium van die volwasse wyfie. Geslagsverskille word bespreek en die nete (eiers) van albei soorte luise word geïllustreer.

Probleme geassosieer met monsterversameling van helminte voor fiksasie vir skandeerelektronmikroskopie

E.L. Visser en H.J. Els†
**Helmintologie, NIV, Onderstepoort 0110, en † Departement Elektronmikroskopie, Posbus 84, MEDUNSA 0204.*

Gedurende die afgelope 5 jaar is verskillende rondewurm- en lintwurmspesies vir SEM versamel. Dit het spoedig duidelik geword dat die behandeling van die monster voor fiksasie tot 'n baie groot mate die sukses van die eindresultaat bepaal. Verder moet elke wurmsoort- of groep as 'n entiteit gesien en as sodanig behandel word om aan die vereistes vir SEM te voldoen, nl 'n skoon monster wat so gou moontlik gefikseer word.

'n Paar faktore wat die resultate kan beïnvloed, is die volgende:

i) Grootte van die dier en die tyd wat dit neem om die wurm tydens nadoodse ondersoek te versamel.
ii) Die temperatuur van die omgewing.
iii) Ligintensiteit.
iv) Die toksisiteit van die omgewing na herwinning uit die dier.
v) Die chemiese samestelling van die medium waarin die wurm voor fiksering versamel en gehou word.

Immunization of sheep against the larval stage of *Taenia* multiceps

Anna Verster and R.C. Tustin
Faculty of Veterinary Science, Veterinary Research Institute, P.O. Box 12662, Onderstepoort 0110.

Two hundred Merino and Merino-cross ewes with synchronized oestrus cycles were mated and divided into two groups. Two months and again one month before they were due to lamb, the ewes in group A were vaccinated with Oncosphere Secretory Antigen (OSA) derived from *Taenia multiceps* ova. The ewes in group C were not treated. The lambs were divided in 6 groups (A1-3, C1-3). When the lambs were 4 to 8 weeks old, the lambs into groups A1 and C1 were given an injection of OSA and a second injection 4 weeks later. The lambs in groups A2 and C2 were vaccinated when they were 12 to 16 weeks old and again 4 weeks later. The animals in groups A3 and C3 were not vaccinated. When the lambs were 20 to 24 weeks old, they were challenged with 4 600 *T. multiceps* ova and necropsied 12 weeks later. Four out of 85 (4,7%) vaccinated lambs and 22 out of 42 (52,3%) of the control lambs had cerebral lesions. Vaccination of the lambs at 4 to 8 and at 12 to 16 weeks was equally effective in protecting them from infestation. The lambs of the vaccinated ewes (group A3) were as susceptible to infestation as those of the untreated ewes.

In another trial, one out of 9 lambs given a single dose of OSA had a viable cerebral coenurus. There were no coenuri in the brains of 10 lambs given two doses of OSA, nor in 10 lambs given two doses of freeze-dried OSA. Cerebral lesions were present in 8 out of 10 untreated control lambs.

Fifteen ewes were treated individually with freeze-dried OSA 90 and again 120 days after mating. When their lambs and those of 15 treated ewes were 21 days old, they were each dosed with 100 *T. multiceps* ova. At necropsy a viable coenurus was present in one lamb of a treated ewe but there were no coenuri in the remaining 29 lambs.

It is concluded that two doses of OSA give lambs good protection against this metacestode. The attempts to produce passive immunity in lambs by treating the ewes gave inconclusive results.

Substraatgekoppelde morfologiese aanpassings van die sessiele Ciliophora en afleibare filogenetiese tendense

S.A. Viljoen
Departement Dierkunde, Potchefstroomse Universiteit vir CHO, Potchefstroom 2520.

Die sessiele Ciliophora (Ciliophora: Peritrichida) is akwatiese Protozoa wat vir die grootste gedeelte van hulle lewensloop aan 'n bepaalde substraat vasgeheg is. Die sessiele Peritrichida is 'n hoogs suksesvolle groep organismes wat in feitlik alle moontlike akwatiese habitatte, op 'n groot verskeidenheid van gashere of substrate, voorkom. Dié sukses kan deels toegeskryf word aan die besondere morfologiese aanpassings wat by die groep organismes aangetref word, soos bv die radiale simmetrie en duidelike polariteit, die ontstaan van doeltreffende vashegtingstrukture en die afwesigheid van siliums, behalwe waar noodsaaklik vir voeding en verspreiding. Filogenetiese tendense wat hieruit afgelei kan word sluit o.a. die ontstaan van die sessiele organismes vanuit 'n volledige gesilieerde, vryswemmende voorouer in, asook 'n neoteniese terugkeer na 'n sekondêre vryswemmende lewenswyse.

Coccidia and haemosporidia of lower vertebrates

Ilan Paperna
Department of Animal Sciences, Faculty of Agriculture, Hebrew University of Jerusalem, Rehovot, 76100.

Piscine coccidia, eimerians, haemogregarines and dactylosomes, of fishes differ distinctly in structure and biology from coccidians of mammals and birds. In reptiles we find coccidia and haemosporidia common to mammals and avian hosts, together with a variety of coccidian and haemosporidian groups, unique to reptiles. Thus, among vertebrates, we find in reptiles a higher diversity and variety of coccidians and haemosporidians. The limited number of coccidians known from amphibians reflects not only the small size of this group, but also the limited research done thus far on the coccidia of this vertebrate group.

Most of the apparent differences in structure and transmission between piscine and reptilian parasites can be linked to their different habitats, e.g. aquatic versus terrestrial. On the other hand haemogregarines, transmitted by leeches and found in fish, as well as amphibians and aquatic reptiles, appear to conform in structure and biology and are apparently of a common phylogenic origin. Structural similarities among piscine and reptilian coccidia – epithelial location in the host cell, bivalved sporocysts and divergence from a progeny of 8 sporozoites per oöcyst (characteristic to eimerians of vertebrates) – could suggest phylogenetic affinities; however, it appears more likely that these structural features are relics of a primitive organization; the same structural features also occur in the coccidia of invertebrate hosts.

Diagnostic techniques for *Pneumocystis* pneumonia and intestinal coccidiosis in man

Jean B. Bush and M.B. Markus
Department of Zoology, University of the Witwatersrand, Johannesburg 2001.

Methods of staining *Pneumocystis carinii* were briefly reviewed. Silver staining techniques appear to be the most reliable for the detection of *Pneumocystis* infection. Of these, we found the Pintozzi modification of Grocott's methenamine silver nitrate stain to be comparatively rapid, requiring approximately 25 minutes for sections and 17 minutes for impression smears. The results compare well with those obtained in the 2½ hour Grocott's procedure. Giemsa's stain, used on impression smears, was our preferred non-silver staining method for the diagnosis of *Pneumocystis* pneumonitis.

Cryptosporidium, Isospora belli and *Sarcocystis* (formerly known from human faeces as *'Isospora hominis'*) have all been found to stain with heated safranin. Methylene blue was used as a counterstain. *Cryptosporidium* antigen is being prepared for an enzyme-linked immunosorbent assay and for the indirect fluorescent antibody test.

Micro-organisms in the blood of naturally infected girdled lizards *Cordylus vittifer*

M.B. Markus, N.H.G. Jacobsen*, M.J. Chidrawi and B. McClain†
*Department of Zoology, University of the Witwatersrand, Johannesburg 2001, *Transvaal Department of Nature Conservation, Pretoria, and †Department of Physiology, Medical School, University of the Witwatersrand.*

Blood smears were prepared from a total of 87 girdled lizards *Cordylus vittifer* captured in five widely separated localities in the Transvaal: Die Berg, Fochville, Middelburg, Pretoria and Soutpansberg. Microscopical screening of the stained blood films revealed a high prevalence of *Pirhemocyton, Plasmodium* and *Sauroplasma*. Double or triple infec-

tions were common. No obvious geographical or seasonal variations in parasitaemia have so far been detected. However, lizards from additional localities are to be examined.

Erythrocytes infected with *Pirhemocyton* contained one or more colourless 'albuminoid bodies', which are vacuoles in the host cell cytoplasm. A transmission electron microscopic study of *Pirhemocyton* has shown that the organism may be a virus but the association between the vacuoles and the *Pirhemocyton* particles has not been clarified [Stehbens & Johnston (1966). *J. ultrastruct. Res.* **15**, 543 – 554]. Two species of *Plasmodium* were seen; they can be separated morphologically if mature gametocytes and schizonts are present. *P. zonuriae* Pienaar, 1962 has gametocytes and schizonts which exceed the size of the host cell nuclei by a factor of 2 or more. Gametocytes are mostly elongate, and tend to curve around the host cell nucleus. Schizonts contain 12 to 28 large merozoites. The second species (which is new) has smaller gametocytes and schizonts with 10 to 14 small merozoites (S.R. Telford, pers. comm.). *Sauroplasma* is of uncertain taxonomic position. It may be a piroplasm, but a minority of workers are of the opinion that it is an artifact [Frank (1974). *Proc. 3rd Int. Congr Parasit., Munich*)].

Comparative study on the infection characteristics of the antelope schistosomes, *Schistosoma margrebowiei* and *Schistosoma leiperi* in BALB/c mice

C.D. Dettman, Susan B. Higgins-Opitz, Kristen Brock and Rita van Deventer
RIDTE, South African Medical Research Council, PO Box 17120, Congella 4013.

The ability of the antelope schistosomes, *S. margrebowiei* and *S. leiperi*, to induce resistance to challenge infections with other schistosome species is currently being investigated in our laboratory. To facilitate the design and interpretation of such studies, a basic knowledge of the pathobiological characteristics of these schistosomes in the particular experimental animal model being employed is essential.

Inbred male BALB/c mice, harbouring similar worm loads of *S. margrebowiei* and *S. leiperi*, were studied over a 4- to 12-week post-exposure period. The infection characteristics of the two species differed markedly in this host, in particular with regard to rate of worm maturation, the onset of egg-laying and distribution and density of eggs in the tissues. The percentage worm recoveries of *S. margrebowiei* and *S. leiperi* were 36% and 30%, respectively. *S. margrebowiei* worms reached maturity considerably earlier, with the onset of egg-laying occurring at 4 to 5 weeks of infection as opposed to 6 to 7 weeks in the case of *S. leiperi*. Far more eggs were recovered from the tissues of animals infected with *S. margrebowiei*. Although the gastrointestinal tract was the preferred site for the accumulation of *S. margrebowiei* eggs, faecal output of eggs was surprisingly low. *S. leiperi* eggs accumulated predominantly in the liver.

The results of this study have demonstrated that the two antelope schistosomes differ markedly, certainly in terms of their pathobiological characteristics, in the BALB/c mouse model.

Enzyme-linked immunosorbent assay for antibodies to *Schistosoma mansoni* soluble egg antigens in the cerebrospinal fluid

M.D. Pammenter
RIDTE, P.O. Box 17120, Congella 4013.

Neurological infection by the blood flukes, *Schistosoma* species, or their eggs, is a rare form of schistosomiasis but of uncertain prevalence. Infections of the spinal chord can cause localised lesions with various neurological complications. Diagnosis is difficult as the lesions may have several causes including parasitic cysts. In an attempt to improve diagnosis we have established an enzyme-linked immunosorbent assay (ELISA) for antibodies to soluble egg antigens of *S. mansoni*. Cerebrospinal fluid (CSF) from 164 patients with neurological complications (including 37 who were serologically positive for cysticercosis) was tested for anti-schistosome antibodies. In one case cross-reaction between the two tests was detected using competitive inhibition assays. In five patients high anti-schistosome antibody titres were detected. This titre was significantly raised above the CSF anti-schistosome antibody titre of a control group, who were selected on the basis of having neurological complications and a high serum anti-schistosome antibody titre.

Interspecific relationships between South African *Schistosoma mattheei* and *S. haematobium* using enzyme electrophoresis

F.J. Kruger
RIDTE, P.O. Box 634, Nelspruit 1200.

A comparative electrophoretic study on four populations of South African *S. mattheei* and one population of South African *S. haematobium* was performed using 12,5% starch gels and 5% IEF PAG plates (pH 3,5 – 9,5). Eleven enzymes, representing 16 gene loci, were studied. Ten of these loci were monomorphic, 5 exhibited interspecific polymorphism, whereas one, malate dehydrogenase-1 (MDH-1), varied intraspecifically. In *S. mattheei* populations which exist sympatrically with *S. haematobium*, certain MDH-1 bands were similar to the latter species, while in an allopatric population these bands were dissimilar.

Pathophysiological effects of *Schistosoma margrebowiei* infection in BALB/c mice

Susan B. Higgins-Opitz, C.D. Dettman, A.D. Naran* and Kristen Brock
*RIDTE, South African Medical Research Council, P.O. Box 17120, Congella 4013 and *Department of Anatomical Pathology, Faculty of Medicine, University of Natal, Durban.*

Experimental studies on *S. margrebowiei* infection have thus far focused primarily on the biological and developmental aspects of this schistosome during the early phase of infection. The aim of the present study was to investigate the pathophysiological responses induced by *S. margrebowiei* infection in the mouse model.

Infections in BALB/c mice were studied over a period of 6 to 20 weeks. As previously reported, worm maturation was rapid and ova production high, with the majority of eggs accumulating in the intestines. Hepatomegaly and marked splenomegaly were noted from 6 weeks, and high antibody titres were measured from 8 weeks post-infection. Ova were characteristically deposited in large clusters, in both the liver and intestines. The size of hepatic granulomata was found to reach a maximum at 12 weeks of infection, the mean diameter being 211 ± 9,8 μm. By 20 weeks of infection the mean diameter of hepatic granulomata had decreased significantly (176 ± 12,0 μm). A similar modulation of the granulomatous response was found to occur in the gastro-intestinal tract. However, at all stages, the relative sizes of the hepatic granulomata were significantly larger than those found in the intestines. Significant portal hypertension was a characteristic feature from 8 weeks post-infection.

The characteristics of *S. margrebowiei* infection in BALB/c mice bear certain similarities to the disease caused by both *S. mansoni* and *S. japonicum*. This parasite may therefore prove valuable as an alternative model for the study of immunopathogenesis of hepatosplenic schistosomiasis.

Concomitant immunity studies with the antelope schistosomes in BALB/c mice

C.D. Dettman, S.B. Higgins-Opitz, K. Brock and R. van Deventer
RIDTE, S.A. Medical Research Council, PO Box 17120, Congella 4013.

Schistosoma margrebowiei and *S. leiperi* worm-loads were challenged with the different strains of *S. mansoni*, either at a time corresponding to the onset of egg-laying, i.e. 4½ weeks for *S. margrebowiei* and 6½ weeks for *S. leiperi*, or after egg-laying had been in progress for approximately 4½ weeks, i.e. 9 weeks and 11 weeks respectively.

Substantially greater resistance to re-infection, as measured in terms of reduction in challenge infection worm-loads, was induced by *S. margrebowiei* than by *S. leiperi*. Of particular interest, however, was the finding that the resistance induced by both species against the SA strains of *S. mansoni* was much stronger than that against the PR strain. In animals infected initially with *S. leiperi* and challenged after either 6½ or 11 weeks with the PR strain, no resistance could be demonstrated; in contrast, in groups challenged with the SA strain challenge worm-loads were reduced by 28% and 47% respectively. Similarly, in animals infected initially with *S. margrebowiei* and challenged after 4½ or 9 weeks, reduction of PR challenge worm-loads was 20% and 30% respectively, whereas that of the SA strain was 39% and 72% respectively.

The results of this study support the concept that tissue egg accumulation resulting from the initial infection is a partial prerequisite for the

development of substantial resistance to re-infection in the Concomitant Immunity Model. However, it also appears that the pathobiological characteristics of the challenge infection plays an important role.

Anthemosoma sp. from *Thallomys paedulcus* (Sundevall, 1847) from Namibia – a new host record

Arnon E. Gunders
Department of Tropical Pathology, School of Pathology of the S.A. Institute for Medical Research and the University of the Witwatersrand, P.O. Box 1038, Johannesburg 2000.

The genus name *Anthemosoma* was proposed in 1969 by Landau *et al.* (C.R. *Acad Sci. Paris* **268**, Ser. D, 873–875) for a new parasite, *Anthemosoma garnhami,* which they had isolated from *Acomys percivali* in the Omo Valley of Ethiopia. Because of the peculiar characteristics of this parasite, Levine [(1981). *J. Parasitol.* **67**, 440–441] proposed a new family, Anthesomatidae, to accommodate this genus. The second isolate of an *Anthemosoma* sp. was obtained from *Aethomys namaquensis* in Namibia [Gunders (1985). *S. Afr. J. Sci.* **81**, 48]. This isolate was assayed in several laboratory and feral rodents, one of them being *Thallomys paedulcus.*

During field work in 1986, there was an opportunity to trap wild rodents on the same farm on which the infected *Aethomys* had been caught. Of 11 *Thallomys* examined, three were found to have enormously enlarged spleens, and following splenectomy, two were found to be infected with *Anthemosoma,* which is morphologically indistinguishable from the *Aethomys* strains. *Thallomys paedulcus* is thus a new (and the third) naturally infected host of *Anthemosoma* to be discovered. It is the second naturally infected host to be found in Namibia, where it was found to be sympatric with *Aethomys namaquensis.*