

EDITORIAL

NEW APPROACH ABOUT NEOTROPICAL HELMINTHOLOGY

Jorge Cárdenas-Callirgos*; José Iannacone

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Helminths are a group of invertebrates of major scientific interest due to their high impact on public health and the diverse evolutionary histories that some of its members have followed in order to adapt to the parasitic lifestyle. In the Neotropical region, though, helminth research has been traditionally associated with their effect on public health. This topic awaits more reflection and political support for its beneficial implementation, especially in rural zones where the prevalence of infection by helminth parasites in humans can be very high (Cabrera, 2003).

One of the most studied parasitized organisms is fish. Research on helminths of marine fish has been well documented in Mexico since the 30s (Pérez- Ponce de León *et al.*, 1996). These efforts have also led to the description of new species and genera to this field of science. The lists of helminth species of inland water fish in Mexico are good examples, where the presence of 209 taxa of helminth parasites (Pérez-Ponce de León *et al.*, 1996), and the biodiversity of helminth parasites associated with 114 species of marine and estuarine fish (Pérez-Ponce de León *et al.*, 1999) have been reported.

Another significant effort is the Catalog of the National Helminth Collection of Mexico, where an annotated list of helminthic parasites deposited in the National Helminth Collection at the Institute of Biology of the Universidad Nacional Autónoma de México (UNAM), founded in Mexico in 1932 by Dr. Eduardo Caballero y Caballero (Lamothe-Argumedo *et al.*, 1997) have been recorded.

Some limitations to the expansion and dissemination of the research in Neotropical helminthology stem from the available information on parasites of vertebrates in Tropical America usually being published in Spanish and Portuguese. Further more, they are published in regional magazines with severely limited distribution, making them unavailable for researchers from other parts of the world. One attempt to produce relevant information on Neotropical helminthology in English was the

publication entitled *Metazoan parasites in the Neotropics: a systematic and ecological perspective*, where contributions were collected on the systematics and ecology of monogeneans, trematodes, cestodes, nematodes, acanthocephalans, and some other metazoan parasites (Salgado-Maldonado *et al.*, 2000).

Another important contribution was made by Dr. Frantisek Moravec with his book *Nematodes of Freshwater Fishes of the Neotropical Region* (1998), which reviewed the taxonomy and some ecological information of the nematodes in continental fish from the Neotropical region (South and Central America, the Caribbean, and southern Mexico). The book also demonstrates that many countries rich in fish had poorly known helminth fauna and limited opportunities for ichthyohelminthic research in the Amazonian countries.

In this area other important contributions have been made in recent years, where Dr. Vernon Thatcher should be mentioned for his efforts to collect information on the subject in his book on parasites of Amazonian fish. Here, he detailed data on the life cycles, modes of transmission, and pathology associated with the infections from the different groups of helminths (Thatcher, 2006) obtained from the freshwater fish. Helminth parasites of marine fishes important to sport fishing in Puerto Rico were also reported by Bunkley-Williams & Williams (1994).

Although the Egyptian papyri have already documented data on some nematodes such as *Ascaris lumbricoides* (Linnaeus, 1758) and *Dracunculus medinensis* (Linnaeus, 1758); in Peru, the study on the helminthic parasites is much more recent, noting that since 1940 the knowledge has greatly expanded based on the collections of helminths of domestic animals and the production of the first publications on this subject (Sarmiento *et al.*, 1999). They have recently begun to investigate the parasitism caused by helminths in the Peruvian wildlife, recording that out of the more than 2900 species of vertebrates that

inhabit the territory of Peru, only 179 have been studied with respect to their helminth fauna, which is only 6.13% of the total (Tantaleán, 2008).

In this historical context, and knowing that there has been inadequate progress in the field of helminthology, a considerable effort has been made by various researchers from the Neotropical region to develop this specialized discipline and to diversify its various technical and practical applications. A very young association founded in February 12, 2005, the *Peruvian Association of Helminthology and Associated Invertebrates (APHIA)* (Iannacone, 2005), started organizing a Congress in March 2008 that has a strong international impact, the “*First Peruvian Congress of Helminthology and Associated Invertebrates – International Event: New Approaches in Neotropical Helminthology*”. We are very aware that this type of activity involves great deal of effort with little available funding in countries like Peru, where there is also poorly promoted scientific research.

Moreover, it was sought in this Congress to launch a new proposal from an integrated and holistic approach, joining regional forces and enriching ourselves with the valuable contributions of colleagues from other parts of the globe, also providing various initiatives to avoid false dichotomies. The meeting was planned with a humanitarian theme at which everyone was invited to the scientific solidarity. At this international event, highlighting these points, there was a lecture given on the Neotropical sociocultural reality that displayed the necessity to work together for the common good and to effectively contribute to the development of our peoples. Unlike the meetings held in Peru from 1993 to 2008, where the emphasis was on human parasitic diseases (86.4%) (Table 1), this Congress sought to diversify the topics and thus innovate related proposals to ichthyohelminthology, impact of the helminthic infections in the wildlife, and the ecolhelminthology (68.5%). This will allow for better evaluation and comparison of the information jointly published in the Abstract books of the Peruvian Congresses of Parasitology I (1993), III (1997), IV (2000), V (2002), and VI (2008) organized by the Peruvian Society of Parasitology (SOPEPA) with details of this event organized by APHIA (Table 2). In these five Congresses of SOPEPA, 32.7% of the abstracts are on protozoans, 15.7% on helminths, 30.5% on the human endoparasite, and 9.4% on ectoparasites.

Our event made some contributions with respect to the previous meetings on Parasitology in our country

(Table 2), as far as including lectures, panel discussions, oral and poster sessions, a book of abstracts presented in English to facilitate the reading of the helminthologists from various parts of the world, and conduction of the expositions in three official languages: Spanish, English, and Portuguese. Another innovation was the attendance of 24 international presenters from Chile, Brazil, Mexico, USA, Canada, France, United Kingdom, Portugal, Italy, Finland, China, Japan, and Venezuela, thus allowing it to become the most important event, in recent years, on helminthology in the Neotropical region. These speakers provided very high-level presentations, touching on issues that were rare or developing for the first time in Peru, and expanding new horizons of scientific exploration for the Latin American researchers throughout the 62 conferences.

Thanks to the above mentioned, the First Congress of Helminthology and Associated Invertebrates (APHIA)–International Meeting, has been listed as a historic milestone in the development of Neotropical helminthology in Peru. This congress was held in the city of Lima, from October 30 to November 1, 2008, at the School of Biological Sciences of the Universidad Ricardo Palma (URP). As a prelude to this event, there was an International Pre-Conference Workshop, “*Fundamentals of Helminthology: Monogenea*”, where we had the presence of the international presenter MSc. María del Carmen Gómez del Prado-Rosas from the Autonomous University of Baja California Sur, Mexico, who is a specialist in *parasitology in aquatic ecosystems*. Nationally known helminthologists participated also.

A crucial moment was the inaugural Conference: *Helminths and Host: Challenges for the future*, presented by Dr. David Rollinson, President of the World Federation of Parasitologists (WFP) and member of the Department of Zoology of the Museum of Natural History of London, who addressed the issue of Neglected Tropical Diseases (NTD). Other international presenters covered various topics such as: 1) the influence of climate change on helminth infections, 2) the molecular study of pharmacological and ethnobotanical research related to the action of anthelmintics, 3) life cycles, morphology, ultrastructure, and physiological interactions between larval stages of trematodes and mollusks, 4) advances in diagnostic techniques, epidemiology, and molecular studies on zoonotic diseases such as: anisakiasis, schistosomiasis, cysticercosis, and fascioliasis equinocoquiasis, plus new emerging zoonoses, 5) ultrastructure of Monogenea, 6) proposed educational helminthology, 7) ethnoparasitology, 8)

the impact of helminth infections in wild animals such as: nematodes in rodents, acanthocephalans in birds, life cycle of pentastomiasis in the Peruvian jungle, helminthiasis in primates and their relationship to anthropogenic disturbances, and impact of helminths in captive wild animals; behavioral, physiological, immunological, hormonal, and pathological aspects associated with helminth infections, 9) helminthiasis in South American camelids and horses, 10) Ecological investigations on seasonal population dynamics, studies on the role of the habitat in metapopulations, comparison of communities, parasitic specificity, ecotoxicity, quantitative aspects of infection, and life cycles, 11) the use of worms as a tool for ecological studies of different types such as: populations of global biodiversity, biological invasions, trophic relationships, population genetics, habitat fragmentation, phylogenetic and evolutionary relationships, and finally 12) the relation between bioaccumulation of heavy metals, environmental pollution, and disturbances of aquatic ecosystems.

This event included a scientific committee comprised of researchers from 92 different nationalities across the globe, such as: United Kingdom, Brazil, France, Israel, Portugal, Italy, the Caribbean, Ireland, United States of America, Russia, Germany, Chile, Mexico, Canada, Australia, Czech Republic, Holland, Finland, Spain, Kenya, Uruguay, Peru, Argentina, Switzerland, Slovakia, Turkey, Japan, China, and Thailand.

One of the objectives of this event was to create a link between professionals from academia, the government, the business world, nongovernmental organizations, and public institutions with sights on figuring out how to apply the knowledge about helminths and associated invertebrates in the regional sense, by emphasizing its importance in Conservation, Biodiversity, and Public Health (Iannacone, 2006; Iannacone & Cárdenas-Callirgos, 2008).

Likewise, it generated space to meet and share scientific information on the problems of helminthology in Peru and the region, as a brotherhood. It was an opportunity to establish links and ties to work together and also, to open new lines of investigation, or fully develop those in incipient stages. With this in mind two activities were proposed: 1) implementation of a short-term *Workshop on Neotropical Helminthology*, where various national and regional specialists generate a group discussion over the guidelines that should set

frame the action of helminth research in our region, 2) establishment of a *Research Network on Neotropical Helminthology* as an effective means of cooperation between the foreign and regional researchers interested in developing joint research projects focused on solving the most urgent problems in this field.

A very important and emotional moment was the Tribute conducted by APHIA, to Dr. Manuel E. Tantaleán-Vidaurre, in recognition of his contributions to the development of helminthology in our región, due to the fact that his research has laid the groundwork and left precedence for the next generations of helminthologists to develop it. He has opened these new pathways working at a high scientific level and exemplifying the genuine professionalism that has characterized him from his youth. Dr. Juan Carvajal-Garay, who came from Chile, presented him with a diploma that was dedicated as a tribute to his fruitful academic and scientific displays.

This Congress helped strengthen the Peruvian Association of Helminthology and Associated Invertebrates (APHIA), outlining the full scope of our mission and service in favor of the Peruvian society and the entire Neotropical region. The end of the congress launched the Second Congress of Helminthology and Associated Invertebrates – International Meeting for 2010, with hopes that this event, and those previous to it, displays the unfolding horizon of our scientific action in the Neotropical region.

We want to thank all of the international and national presenters who generously gave their time in order to determine and enrich the guidelines for research in Neotropical helminthology as to face the new challenges that are presented before us today. We also want to thank all the members of the Organizing and Support Committees, the professionals and students from various Peruvian universities, who enthusiastically shared their time and effort to accomplish this event, making history in the becoming science of our region.

Finally, we hope that this initiative is not the culmination of our work, but rather the first step in a fruitful journey of national, regional, and international cooperation, looking to expand the potential of Neotropical research and make progress in serving the human community in order for its complete and integral development.

Table 1. Distribution of the Miscellaneous Research Themes (Oral Sessions and Posters) presented at the Five Peruvian Congresses of Parasitology between 1993 and 2008.

Miscellaneous Themes	1993	1997	2000	2002	2008	Total
Amebiasis, Giardiasis, Trichomoniasis - Coccidios	33	21	10	4	6	74
Chagas Disease	36	20	10	25	15	106
Leishmaniasis	28	18	14	15	10	85
Malaria - Toxoplasmosis	21	5	20	13	0	59
Human Enteroparasites	58	30	116	80	18	302
Fascioliasis, Paragonimiasis, Hydatidosis, Taeniasis, Cysticercosis and Medical Malacology	71	17	18	33	17	156
Parasites of Domestic Animals, Wild Animals and Rodents	16	10	14	17	6	63
Parasites of Aquatic Animals	10	18	8	16	1	53
Ectoparasites, Vectors and Poisonous Animals	25	7	15	15	12	74
Parasites of Plants	0	0	1	0	0	1
Others	4	2	3	7	2	18
Total Works	302	148	229	225	87	991

1993 = 1st Peruvian Congress of Parasitology. 1997 = 3rd Peruvian Congress of Parasitology.
2000 = 4th Peruvian Congress of Parasitology. 2002 = 5th Peruvian Congress of Parasitology.
2008 = 6th Peruvian Congress of Parasitology.

Table 2. Distribution of the Miscellaneous Research Themes (Oral Sessions and Posters) presented at the First Peruvian Congress of Helminthology and Associated Invertebrates – International Meeting.

Miscellaneous Themes	2008
Impact on Public Health	5
Taeniasis, Cysticercosis, and Hydatidosis	9
Fascioliasis and Paragonimiasis	1
Free-living Helminths and Associated Invertebrates	2
Emergency Helminthiasis in Wildlife	6
Domestic Animals: Current Situation	3
Ichthyohelminthology and the Role of Invertebrates	14
Legislation and Education	1
Immunology and Pathology	1
Biology and Ecology of Helminth Infections	10
Open Category	2
Total Works	54

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* Correspondence to author/Autor para correspondencia: Jorge Cárdenas-Callirgos. Asociación Peruana de Helminología e Invertebrados Afines (APHIA).

El Laurel Rosa. 181.A. Urbanización Los Sauces. Surquillo. Lima. Perú.

E-mail/ Correo electrónico:
jmcardenasc@gmail.com

Home Tel: (+51-1) 2734715.
Movil Tel: (+51-1) 997626480.

