

## EDITORIAL

### OPPORTUNITIES FOR RESEARCH IN HELMINTHOLOGY IN PERU: MY OWN EXPERIENCE

### OPORTUNIDADES DE INVESTIGACIÓN EN HELMINTOLOGÍA EN PERÚ: MI PROPIA EXPERIENCIA

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As a professor of Parasitology and Invertebrate Biology at a small, private liberal arts college in the United States, where I study the transmission ecology of trematode parasites, to date my research experience studying helminths in the Neotropical region has been limited. Of course, many parasitologists in North America and elsewhere have relatively limited exposure to neotropical helminthology beyond textbooks and the primary literature; however, based on my own experience over the last year I believe there exists great opportunity for this to change. The potential for wonderful and productive collaborations continues to increase with greater ease of travel and levels of cooperation and information-sharing. So, while by definition my own experience in Peru is unique to me, I hope that it highlights some of the opportunities for research in helminthology in Peru and thus encourages additional collaborations in the future.

Certainly the most important part of my experience in Peru thus far has been the opportunity to interact with a wide range of researchers and students from universities as well as non-governmental organizations (NGOs). One of the important ways foreign researchers can become involved in Peruvian helminthology is to take advantage of the growing number of conferences, symposia and workshops that are being offered in this region. I was fortunate to be able to participate in the First Congress of Helminthology and Associated Invertebrates (APHIA) International Meeting held in Lima in 2008 at the Universidad Ricardo Palma. From this meeting, and particularly from my association and collaboration with Jorge Cárdenas-Callirgos and José Iannacone, three important (and related) opportunities have emerged.

There continues to exist a great opportunity in Peru for research on helminths of humans. Of course, Peru has a relatively long history of research work that has been done on many important diseases such as

Fascioliasis, Paragonimiasis, and Cysticercosis in addition to many of the soil-transmitted helminth infections which exist in the region. In my experience there is considerable opportunity for (and interest in) work on human helminths afflicting people who live in regions of extreme poverty (Hotez *et al.*, 2008). With the help of APHIA and Jorge Cárdenas-Callirgos in particular, I have been able to investigate potential collaborations with researchers at several universities in Peru (e.g., Universidad Ricardo Palma, Universidad Peruana Cayetano Heredia, Universidad Nacional Federico Villarreal and Universidad Nacional Mayor de San Marcos). Moreover, through my wonderful Peruvian colleagues we have begun discussions with different NGOs in order to establish survey- and education-based research in poor areas surrounding Lima as well as in the rain forest and Andean regions of Peru. Some of the organizations in Peru, with which I have interacted, such as Solidaridad en Marcha and CREATIO, represent NGOs interested in service-based opportunities for researchers and students to become involved in helminthological research in Peru, among other interests.

Much of the research on helminths in Peru has focused upon their impact on public health (Cárdenas-Callirgos & Iannacone, 2008). From my perspective, possible research opportunities in the areas of ecological and wildlife parasitology are nearly as diverse as the rich flora and fauna which exist in Peru. Very little is known about the parasitic helminths of most of the possible vertebrate host species in Peru (where most of the knowledge comes from various species of fish), and even less is understood about the patterns of infection and transmission ecology of larval helminths in invertebrate hosts, most of which will serve as intermediate hosts in the life cycles of helminth parasites. For instance, it is clear from recent work that knowledge of parasitic helminths can clarify what we know about ecosystem processes (e.g.,

Lafferty *et al.*, 2008); given the amazing biodiversity which exists in Peru from the coast to the mountains to the rain forest, there are endless opportunities for comparative ecological work on any number of infections. My own experience over this past year (again, influenced strongly by my association with new Peruvian colleagues) has opened up possibilities for work on trematode and fish-helminth communities in coastal wetlands, rain forest zones, and the Andean zones. Opportunities abound.

The third important opportunity for research in helminthology in Peru is an educational one, i.e., in the education and training of students of helminthology. In June--July of this past year (2009), one of my students from Wabash College in Indiana (USA) spent six weeks in Lima working on a variety of research projects involving helminths. Several members of APHIA helped him learn about different host-parasite systems and he gained valuable experience working at several different universities, working with Peruvian students, and learning by simply living in a large city in a foreign country. It is an experience that I am sure he will never forget.

Researchers and educators have wonderful opportunities in Peru to expose our students to diverse habitats, hosts, and problems in helminthology that will expand their (and our) knowledge. We also have the opportunity to teach our students larger lessons about the multi-dimensional problems of global health associated with parasitic infections, e.g., infections in people living in poor or rural zones and the environmental, socio-political, and economic factors that all play a role in maintaining these infections.

There is much to discover and learn about helminthology in Peru. I encourage other researchers – including those outside of Latin America and particularly those from smaller institutions with a

greater emphasis on teaching – to join the growing number of collaborations and opportunities for research in Peru and its impact on human communities, our knowledge of host-parasite biodiversity, and future generations of helminthologists.

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