



Fourth WDA Latin America Section Newsletter

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Interview with Ezequiel Hidalgo Hermoso: Current WDA-LA chair

By Gislaine Dalazen and Ana Carolina Ewbank

1) What do you think about the performance of WDA in Latin America?

WDA Latin America has become a great advertiser of the scientific activities performed worldwide by WDA Latin American researchers working in this region. In addition, WDA-Latin America has attracted new members to coordinate academic/scientific education and training activities, and encouraged members and nonmembers to attend the biannual congress of this section and the annual WDA congress to improve the exchange of information and establish new collaborations between local and international scientists.

2) What would be your suggestions to increase the interest wildlife disease research (WDR) and what is, in your opinion, the role of WDA regarding this issue?

It is a big deal, and several barriers are yet to be overcome. First, we need to acknowledge our low rates of scientific production in this field that is attracting more and more attention



Photo: Ezequiel Hidalgo. WDA-LA Chair. Director of Science and Conservation. Buin Zoo.

worldwide, thanks to concepts like emerging infectious diseases, One Health and Conservation Medicine. Unfortunately, Latin America has a low level of indexed scientific publications on the wildlife epidemiological challenges we face in this corner of the world. Educating people on human and wildlife health, and their risks and interactions, could promote more discussion and awareness from government authorities, ultimately leading to financial aid to invest in new WDR research and education. The role of WDA is to expose this situation and enable novel human resources and collaboration between researchers and government officials to generate and improve wildlife-related policies in the region, especially in the least favored countries of Latin America.

3) From your point of view, what improvements should be made to encourage collaboration between institutions?

Two big challenges need to be overcome: first, legal/political limitations regulating the exchange of information and biological samples among countries, preventing international scientific collaborations and institutional synergies like those currently seen in Europe, for example; and second, communication and collaboration between researchers, health and environmental government officials, independent researchers and NGO's to promote dialogue and place wildlife as a priority for local governments.

4) In your opinion, what are the current priority research topics?

It depends on the reality of each Latin American country. Aside from Brazil, a general goal would be to generate baseline information about the most concerning infectious agents, both in the field of

zoonosis and domestic animal health, but specially in wildlife health and conservation, the latter being the one where most of the work should be focused on. It is necessary to understand the infectious diseases responsible for mortalities both in captive and wild populations. Finally, deal with the areas least considered to date, e.g., amphibian disease, viral diseases of ruminants and carnivores, and agents of global importance that involve regional fauna in their epidemiology, such as tuberculosis in mammals and antibiotic resistances in different taxa.

5) Would you like to leave a message to the young researchers of Latin America?

To study and read as many JSR indexed papers as possible, and less literature for popularization of science or not indexed. Try not to repeat mistakes that have been reported and overcome by science in other areas of the world. Be critic towards your supervisors and yourself, because there is so much to be done in wildlife medicine in Latin America. Enroll in recognized post-graduation programs in respected and recognized schools abroad or in Latin America. Additionally, try being pioneers in study areas scarcely developed/neglected in our region that are the basis of wildlife diseases research (WDR), e.g., wildlife pathology.

6) What are your expectations as chair of our session?

To improve the local communication and collaboration between our institutions and researchers, and creating new centers of WDR scientific information in moderately developed countries with high biodiversity and threats (hotspots), like Ecuador, Venezuela, Colombia, Bolivia and Peru.

ZIKA VIRUS AND NEW WORLD MONKEYS: WHERE TO GO FROM HERE?

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Until 2015, very few people had ever heard about the zika virus, an exotic and remote virus hidden in the tropical forests of Equatorial Africa. However, it all has changed in the last few months. This arbovirus (virus transmitted by arthropods) is part of the family Flaviviridae, which also includes other well-known agents, e.g., yellow fever, dengue and West Nile. Zika virus is transmitted through the bite of infected *Aedes* sp., mosquitoes, sexual transmission (Hayes, 2009, WHO, 2016) and possibly through blood transfusions (Musso et al. 2016).

The first Zika virus detection was in Africa, in 1947, followed by an episode in Asia, in 1969. After a long break, Zika appeared in Oceania; with special emphasis on the 2007 outbreak in the YAP Islands, a small nation-archipelago in the northeastern Papua New Guinea, where three quarters of the population was infected by the virus (Duffy et al. 2009). Lately, Zika has been diagnosed in the Americas, with the first cases diagnosed in Brazil (Campos et al. 2016). The lineage detected in Brazil is highly similar to the Asiatic ones, responsible for the cases in Asia and Oceania, while the African lineage seems to be restricted to that continent (De Melo et al. 2015). Zika has found in Brazil the perfect scenario for a pandemic: the most populous South American country is also the home of a well-known Zika vector, the *Aedes aegypti*. In addition, Zika's fast

expansion could be related to the “El Niño” phenomenon, which in 2015 was the strongest ever recorded (Paz and Semenza, 2016). From 2015 to this date, 45 American countries and territories have confirmed vector-borne transmission of Zika virus, with the exception of Chile and Uruguay, the only countries in South America without reports of native cases (PAHO/WHO, 2016a).



Photo: Howler monkey. Source: Catia Dejuste De Paula

To date, the World Health Organization (WHO) has related Zika virus to microcephaly in newborn babies, Guillain-Barré syndrome, and possibly other neurological disorders (WHO, 2016), but what do we know about this virus in wildlife? Could the zika virus establish a sylvatic cycle similar to the one observed in non-human primates with yellow fever?

The Zika virus was named after the Zika Forest in Uganda, where the virus was diagnosed in Rhesus macaques (*Macaca mulatta*). These “exotic” (originally Asian) primates were maintained in platforms placed on trees tops to act as sentinels for a study that intended to detect the local circulation of yellow fever virus in the

region. Zika virus was then isolated from the brain of mice inoculated with sera from the yellow fever contaminated primates (Dick, 1952). An experimental study shows that vervet monkeys (*Chlorocebus pygerythrus*), endemic from Africa, could also get infected by zika (Henderson et al. 1970).

Subsequently, antibodies to Zika virus were found very far from Africa, in orangutans (*Pongo pygmaeus*) from the Borneo Island, in Asia (Wolfe et al. 2001). Now, in 2016, Zika virus infection has been identified, for the first time, in New World Monkeys from Brazil and Ecuador. A study performed in Ceará state, northeastern Brazil, diagnosed Zika by rt-PCR of blood and oral swab samples from four wild marmosets (*Callithrix jacchus*) living in close contact with local human populations, and from three capuchin-monkeys (*Sapajus libidinosus*) kept as pets (Favoretto et al., 2016). It is important to note that these animals had a history of synanthropic behavior. In another study, the Government of Ecuador reported Zika virus in cardiac and splenic samples from a wild howler monkey (*Alouatta* sp.) found dead in an unusual mortality event involving at least 39 individuals, in the vicinities of Refugio de Vida Silvestre Marino Costera of Pácoche, Province of Manabí (PAHO, 2016b). The same animals were negative for influenza, dengue, leptospirosis and yellow fever in serological tests.

The ecology of the Zika virus could be compared with a closely related flavivirus – the yellow fever virus - which has three cycles: the urban cycle, maintained by humans contaminated through the bite of infected *Ae. aegypti* mosquitoes; the intermediate (savannah) cycle, only present in Africa, with transmission of the virus from mosquitoes to humans living or working in the peripheral jungle areas, and also non-human primates; and the sylvatic cycle, involving mainly the bite of *Haemagogus* mosquitoes in the Americas or *Ae. africanus* in Africa, affecting non-human primates (Pecego Martins Romano. 2014). Yellow fever also affects local primate populations, causing mortality mainly in Neotropical species (Almeida et al. 2016), such as the one reported by Almeida et al. (2012) in which epizootics killed over 2,000 howler monkeys from Brazil.

Many countries were able to control the urban cycle of yellow fever infection, mainly through vaccination, but sporadic outbreaks of sylvatic origin still occur. We don't know if the zika virus could adopt a similar cycle in the Americas, which will probably happen in Africa, where the *Aedes africanus* is believed to be the vector

(Macnamara, 1954). In Latin America, the main vector is apparently a different mosquito species, the *Ae. aegypti*, which prospers in the periphery of forested areas, but does not have a tendency to penetrate into these ecosystems, limiting the possibility of infection in Neotropical primates. However, *Ae. albopictus*, which prospers in the areas in between forests and urban areas (Maciel de Freitas et al. 2006) could potential become zika vectors.

The information on zika virus in non-human primates is still limited. Their susceptibility to the infection and potential consequences on local primate populations are still unknown. Some very important questions still remain to be answered, such as; could the *Haemagogus* mosquitoes act as zika hosts, and potentially trigger a sylvatic cycle, with all the epidemiological implications that it involves? What are the differences between the African and Asian lineages of the zika virus? Once again, a virus jumps from jungle to the city. Which virus will be the next?

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CURRENT MORTALITY EVENTS IN AMERICA LATINA

MASS SEI WHALE STRANDING IN THE CHILEAN PATAGONIA

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On November 22nd of 2015, Nat Geo published on its website a report covering a mass stranding event of cetaceans on the Chilean Patagonia. The news immediately called the attention of the international scientific community because of the number of animals involved (337) and because of the affected species - Sei whales (*Balaenoptera borealis*). Mass stranding events of mysticete whales are extremely rare and even some investigators stretch that actual “mass strandings” do not occur in this cetacean group, as has been extensively recorded worldwide in several species of odontocetes. Although the news regarding this episode were released in November, the corpses were found by researchers Carolina Simon Guttstein and Vreni Hausserman in the austral winter of that same year, between June and August, during monitoring flights performed by their

research group. At that time, the corpses were already in an advanced state of decomposition, although apparently, their death had occurred with a short period of time. This finding complemented a previous field investigation conducted by several Chilean researchers, members of the subsecretary of fisheries and the Chilean Navy, on May 2015, when 37 corpses of Sei Whales were found in the region of Golfo de Penas.

A number of corpses were measured, georeferenced and a few necropsies were performed in animals that were stranded on the beach (many other corpses were in the water). To this date there is still no official report on the findings of that expedition, but through interviews and open presentations in scientific meetings, some of the involved field researchers have mentioned that intoxication by marine biotoxins (algal blooms, a/k/a “red tides”) is one of the main theories under investigation. Regarding this same subject, the Chilean subsecretary of fisheries organized an international workshop to bring experts on marine mammal stranding together to facilitate communication and interaction between the Chilean researchers involved in the case of the Sei Whales stranding and international experts. Approximately 20 Chilean scientists, government and

navy officials, and 5 renowned international experts attended this workshop. The final reports on the last year's field expedition and the workshop should be released and available online in the upcoming months. Additionally, in 2016, the same ecoregion in Chile has experienced the worst algal bloom (red tide) in decades, thought to be linked with massive strandings of marine invertebrates, fish, seabirds and some sea lions. This "red tide" crisis resulted in the termination of local shellfish fisheries - one of the most important economic activities in this region, producing a major social crisis.

It is probably too soon to state that all these events are connected, but one factor definitely stands out from precedent years' austral summers and early falls in comparison with the same time frame in 2015 in this part of the Pacific ocean: extremely high sea surface temperatures (SST).

Hopefully the joint efforts of academia, government agencies, independent researchers and NGO's who are investigating these phenomena will help give us clues about the origin and consequences of such events.



Photo: Sei whale (*Balaenoptera borealis*).

LA-WDA CALL-OUT !!!

As we all know, our Latin American section is still in its infancy, but we are hoping that with your contributions, suggestions and constructive criticism we will be able to grow together and be even more informative!

It does not matter from which Latin American country you are or if you are from any other country in the world: join us on the task of making this newsletter by suggesting topics you might be interested in and news updates on wildlife medicine and conservation, and One Health issues.

The purpose of LA-WDA is sharing information and exchanging experiences, so let's work together in order to do so! Your participation will be greatly appreciated! Best regards,

LA-WDA Editorial Team