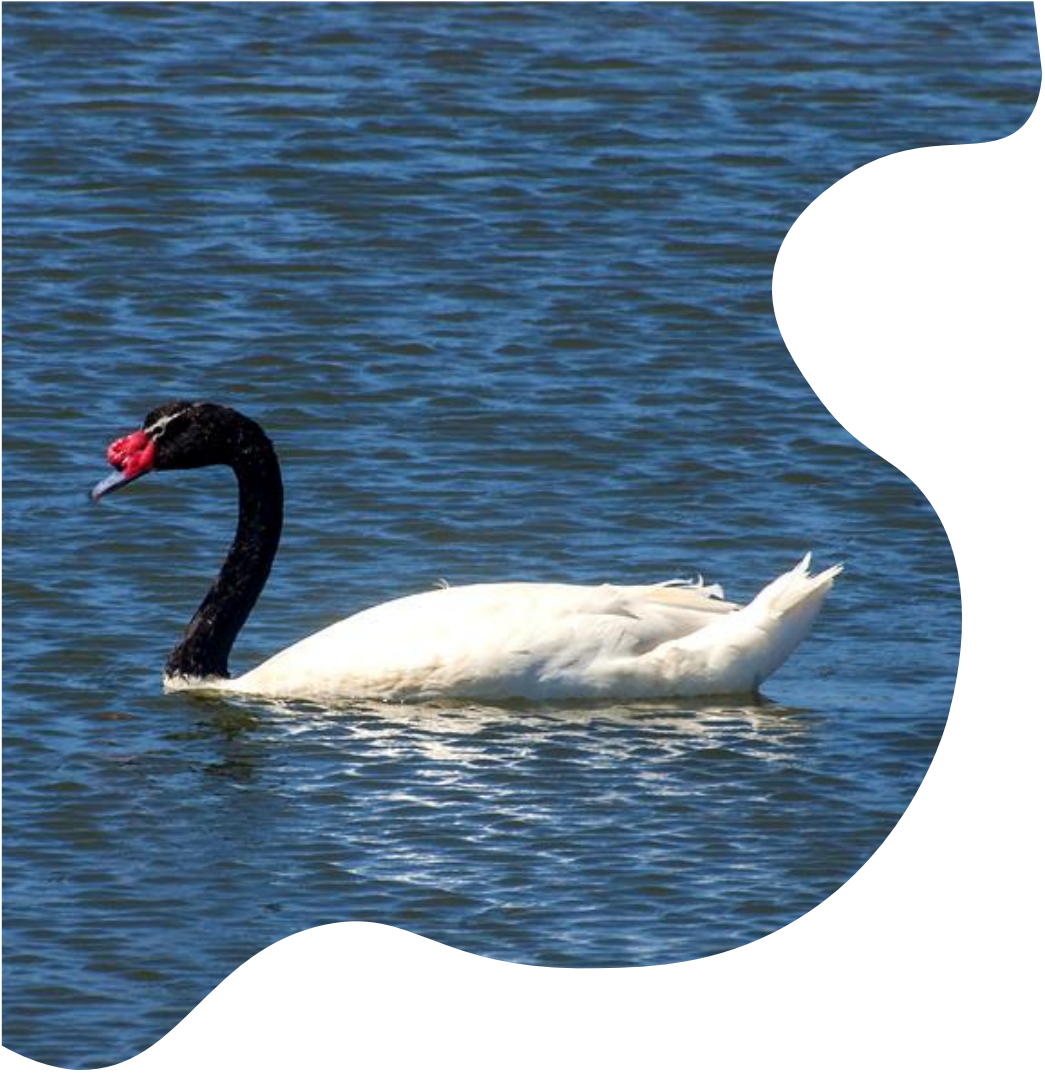

Abstract Book

SETAC Latin America 14th Biennial Meeting

Latin America, Diversity of Knowledge for a Sustainable Future

26–29 SEPTEMBER 2021 • VIRTUAL

Abstract Book

SETAC Latin America 14th Biennial Meeting

Table of Contents

Abstracts by Session

Indices

This book comprises the abstracts of the presentations for the platform and poster sessions of the Society of Environmental Toxicology and Chemistry (SETAC) Latin America 14th Biennial Meeting, conducted virtually from 26–29 September 2021. The abstracts are reproduced as accepted by the Scientific Program Committee and appear in numerical order. In each abstract, the presenting author's name is underlined. The author index cross-references the corresponding abstract numbers.

About SETAC

The Society of Environmental Toxicology and Chemistry (SETAC), with offices in North America and Europe, is a nonprofit, professional society established to provide a forum for individuals and institutions engaged in the study, analysis and solution of environmental problems, the management and regulation of natural resources, environmental education, and research and development.

Specific goals of the society are:

- Promote research, education and training in the environmental sciences
- Promote the systematic application of all relevant scientific disciplines to the evaluation of chemical hazards
- Participate in the scientific interpretation of issues concerned with hazard assessment and risk analysis
- Support the development of ecologically acceptable practices and principles
- Provide a forum (meetings and publications) for communication among professionals in government, business, academia and other segments of society involved in the use, protection and management of our environment

These goals are pursued through the conduct of numerous activities, which include:

- Conduct meetings with study and workshop sessions, platform and poster presentations, and achievement and merit awards
- Publish scientific journals, a newsletter and special technical publications
- Provide funds for education and training through the SETAC Scholarship/Fellowship Program
- Organize and sponsor chapters and branches to provide a forum for the presentation of scientific data and for the interchange and study of information about local and regional concerns
- Provide advice and counsel to technical and nontechnical persons through a number of standing and ad hoc committees

SETAC membership currently comprises about 5,300 individuals from government, academia, business and nongovernmental organizations with backgrounds in chemistry, toxicology, biology, ecology, atmospheric sciences, health sciences, earth sciences, environmental engineering, hazard and risk assessment, and life cycle assessment.

If you have training in these or related disciplines and are engaged in the study, use or management of environmental resources, SETAC can fulfill your professional affiliation needs.

All members receive the SETAC Globe newsletter highlighting environmental topics and SETAC activities, reduced fees for meetings and discounts on SETAC books. All members receive online access to *Environmental Toxicology and Chemistry* (ET&C) and *Integrated Environmental Assessment and Management* (IEAM), the peer-reviewed journals of the society. Members may hold office and, with the Emeritus Members, constitute the voting membership.

For further information, contact the Pensacola office if you are in Latin America, Asia-Pacific or North America, or the Brussels office if you are in Europe or Africa.

PO Box 12804
Pensacola, Florida, 32591-2804 USA
T +1 850 469 1500
E setac@setac.org

Avenue des Arts, 53
B-1000 Brussels, Belgium
T +32 2 772 72 81
E setaceu@setac.org

www.setac.org

Environmental Quality Through Science

Health of the Fish Oreochromis niloticus (Teleostei: Cichlidae)?

L. Souza Passos, Faculdade de Ciências Farmacêuticas - USP; T. Miura Pereira, A. Magalhães Bona, University of Vila Velha; A.P. Alves, ESALQ USP; J.A. Moretto, USP/CENA; T.M. Orlando, B.S. Cerozi, ESALQ USP; E. Pinto, CENA/USP

Changes in environmental conditions in aquatic ecosystems caused by anthropic actions (i.e., effluent release and aquaculture activities) can modify the composition of primary producers, promoting the excessive proliferation of cyanobacteria. These organisms can form blooms, which directly affect aquatic life (e.g., fish). Thus, the present study investigates the toxicity of the cyanobacterium *Sphaerospermopsis torques-reginae* (strain ITEP-024) producing-guanitoxin in relevant environmental concentrations. For this, specimens of *Oreochromis niloticus* (Teleostei: Cichlidae) were subjected to acute 96-hour exposure to different concentrations of aqueous extract of the strain. The fish were divided into five different treatments: C = control group; T1 = 31.25 mg L^{-1}; T2 = 62.5 mg L^{-1}; T3 = 125 mg L^{-1} and T4 = 250 mg L^{-1} of the aqueous extract of the strain. To assess toxicity, biochemical (acetylcholinesterase – AChE, catalase - CAT, superoxide dismutase - SOD, glutathione peroxidase - GPx, glutathione S-transferase - GST, thiobarbituric acid reactive substances - TBARS) biomarkers were analyzed. The results shown that fish from treatments T3 and T4 showed changes in oxidative stress (in the enzymes GST and CAT) and inhibition of the enzyme AChE. The increase in GST activity is probably a defense mechanism against the increase in the formation of reactive species and may have prevented an eventual increase in the formation of TBARS. On the other hand, the decrease in CAT may indicate an imbalance in the oxidative stress x antioxidant balance. The inhibition of AChE indicated the ability of the compounds produced by the strain ITEP-024 to cross the blood-brain barrier of fish. Therefore, our results indicate that the cyanobacterium *S. torques-reginae* producing-guanitoxin can cause damage to tilapia exposed in a condition similar to flowering in an aquatic environment.

06A.28 Explorando La Calidad De Aguas Subterráneas: Uso Del Camarón De Vega Parastacus Pugnax Como Bioindicador De Contaminación Por Metales Traza En Chile

S.A. Pérez, Universidad de Concepcion / Ciencias Ambientales; J.L. Arumí, Universidad de Concepcion / Recursos Hídricos; J.Y. Neira, Universidad de Concepcion / Análisis Instrumental; R.O. Barra, Universidad de Concepcion / Aquatic systems

Los ecosistemas subterráneos y su biodiversidad representan uno de los recursos naturales menos conocidos y protegidos del planeta. En estos, la infiltración de contaminantes en el subsuelo puede ser rápida y difícil de manejar, lo que los hace particularmente vulnerables a la contaminación. En Chile, la información y metodologías para caracterizar la calidad de las aguas subterráneas es escasa, siendo necesario establecer planes de monitoreo y gestión que aseguren su calidad y uso correcto, en este contexto, la utilización de organismos como indicadores biológicos se en una herramienta relevante para evaluar y controlar la salud de los ecosistemas y el impacto de la actividad humana en estos sistemas subterráneos. El camarón de vega *Parastacus pugnax* (Decapoda: Parastacidae) (Poeppig, 1835), es un buen modelo para evaluar niveles de bioacumulación de metales traza en ecosistemas dependientes de agua subterránea y su posterior efecto en la cadena trófica y salud de las comunidades que dependen de este recurso ya que estos desarrollan todo su ciclo al interior de las galerías que construyen en el subsuelo y son de gran importancia económica para las comunidades que los extraen. En el presente estudio se compararon los niveles de bioacumulación de diversos metales traza en cuatro zonas con distinta actividad antrópica, encontrándose que los camarones presentan concentraciones de estos elementos por sobre los límites máximos establecidos en nuestro país para el consumo humano, además adsorben una gran concentración de estos elementos respecto a las concentraciones que se encuentran en el ambiente, siendo estas más elevadas en lugares con mayor actividad antrópica pudiendo representar un riesgo para la salud de las personas que los extraen y dependencia de este recurso. El camarón de vega representa una herramienta útil para el biomonitoreo ambiental de la calidad de las aguas subterráneas al representar la carga de contaminación por metales en los ambientes subterráneos en los que habita. Financiado por CRHIAM ANID / FONDAP / 15130015. El camarón de vega representa una herramienta útil para el biomonitoreo ambiental de la calidad de las aguas subterráneas al representar la carga de contaminación por metales en los ambientes subterráneos en los que habita. Financiado por CRHIAM ANID / FONDAP / 15130015. El camarón de vega representa una herramienta útil para el biomonitoreo ambiental de la calidad de las aguas subterráneas al representar la carga de contaminación por metales en los ambientes subterráneos en los que habita. Financiado por CRHIAM ANID / FONDAP / 15130015.

06A.29 Biomarkers of Oxidative Stress in Bidens Laevis for Analyzing Pollution by Current Use Pesticides in La Brava Lake (Argentina)

L.R. Lombardero, Instituto de Investigaciones Marinas y Costeras / Departamento de Ciencias Marinas; F.G. Iturburu, Instituto de Investigaciones Marinas y Costeras; S. Medici, Instituto de Investigaciones en Producción Sanidad y Ambiente (IIPROSAM) CONICET, Instituto de Análisis Fares Taie.; J. Mendieta, Instituto de Investigaciones Biológicas (IIB), CONICET, UNMDP. CIC provincia Buenos Aires.; A. Crupkin, Instituto de Investigaciones Marinas y Costeras (IIMYC) CONICET, UNMDP. CIC provincia Buenos Aires.; D. Villagran, Instituto de Investigaciones Marinas y Costeras (IIMYC) CONICET, UNMDP.; D.J. Perez, INTA / Agronomy; M. Menone, Universidad Nacional Mar del Plata

La Brava lake is a protected landscape by the Provincial Agency for Sustainable Development of Buenos Aires Province (OPDS), Argentina. Despite this status, the lake is surrounded by important agricultural activities. The aim of the present study was to evaluate the pollution by current use pesticides (CUPs) in surface water of La Brava basin using biomarkers of oxidative stress in the aquatic macrophyte *Bidens laevis*. Two samplings per year were performed in Tajamar creek, one in spring and the other in summer when peak pesticides concentrations were expected. Samplings were performed for two consecutive years. Each time, macrophyte samples (n=10) for biomarkers analysis and surface water (n=3) for pesticides quantification using UPLC- MS/MS, were collected. Catalase (CAT), glutathione reductase (GR), and guaiacol peroxidase (POD) activity, as well as levels of hydrogen peroxide (H2O2) and malondialdehyde (MDA) in roots and leaves were spectrophotometrically analyzed. In the first year, in spring the herbicide glyphosate (3.5 µg/L) and the insecticide chlorpyrifos (0.7 µg/L) were detected while in summer glyphosate (2.0 µg/L), its metabolite AMPA (2.7 µg/L) and chlorpyrifos (2.4 µg/L) were detected. Leaf tissues presented higher levels of H2O2 and MDA as well as higher activities of GR but lower activity of POD in summer than in spring. Roots tissues showed higher levels of H2O2 and MDA and lower activities of CAT and POD in summer, in comparison to spring. In the second year, only chlorpyrifos in spring (3.1 µg/L) and summer (1.5 µg/L) was found. In

both analyzed tissues, higher activity of POD, lower levels of H2O2 but higher levels of MDA in summer than in spring were detected. These results show that the oxidative stress biomarkers in summer increased respect the spring, mainly the oxidative damage, according to the highest levels of CUPs detected in La Brava lake. More studies will be carried out to elucidate the direct relationship between the CUPs and the adverse effects in *B. laevis*.

06A.30 Liver Morphological Alterations Induced by Glyphosate-Based Herbicide Exposure in Zebrafish (Danio rerio)

C.E. Davico, A. Guimarães Pereira, M. Silveira de Melo, E.M. Nazari, Y.M. Rauh Müller, Federal University of Santa Catarina / Department of Cell Biology, Embryology and Genetics

The increasing use of pesticides in agricultural practices around the world is alarming. In this context, Brazil is one of the largest agricultural producers in the world, using large amounts of pesticides, among them, glyphosate-based herbicides (GBH) are the most used. GBH can reach and contaminate aquatic ecosystems, causing a reduction of the environmental quality and being able to affect non-target organisms. Zebrafish is considered a vertebrate model organism widely used in different areas of research such as genetics, developmental biology and toxicology. The liver plays an important role in biotransformation and excretion of contaminants, as well as in energy reserve and metabolism, biosynthesis of proteins, carbohydrates and in the accumulation of lipids. Therefore, the hypothesis of this study is that the liver is an important target organ of toxicity of GBH. The aims of this research were to characterize the cellular toxicity of the herbicide Roundup WG® on morphology and histochemistry of adult zebrafish (*Danio rerio*) liver. Females and males were exposed to two concentrations of GBH (0.065 and 6.5 mg/L) for 15 days (n = 5 fish/sex/group). The concentration of 0.065 mg/L was based on the maximum permissible concentration of glyphosate in Brazilian waters for human drinking by CONAMA (Resolution No. 357/2005). Non-exposed fish were used as controls (n = 5 fish/sex). The procedures were approved by the UFSC Animal Use Ethics Commission (No. 5466040416/2016). Fish were euthanized and livers were removed for morphological and histochemical analyzes by light microscopy. The organ index (I_{org}) was determined based on the importance factor of each observed alteration and its frequency, which indicates the extent of damage caused by the exposure. For histochemical analyzes, liver samples were stained with Coomassie Bright Blue (proteins) and Periodic Acid-Schiff (polysaccharides) and the integrated density with IMAGE J software was calculated. Result showed for both males and females, vasodilation and vacuolization in animals exposed to the two concentration. I_{org} values of exposed males and females were higher than control group. Polysaccharides and total proteins decreased significantly after GBH exposure compared to those of the control group. These results corroborated our hypothesis that GBH can promote hepatic morphological changes, being able to affect the biotransformation and detoxification function of liver.

06A.31 Mercury in Small Characids in the Brazilian Amazon

E. Oliveira, UNEMAT / Programa de Pós Graduação em Ciências Ambientais; W.L. Lazaro, Universidade Federal do Rio de Janeiro / Programa de Pós Graduação em Ecologia; M.D. Santos Filho, Universidade do Estado de Mato Grosso / Programa de Pós Graduação em Ciências Ambientais; A. Ignacio, UNEMAT / Ciencias Biologicas

Mercury is a global contaminant that mainly affects aquatic organisms. Analyzes of mercury contamination in small fish are generally neglected, as they are not used in the human diet. However, they are fundamental links for understanding the dynamics of mercury biomagnification. Characids Knodus heteresthes (Eigenmann, 1908) and Moenkhausia lepidura (Kner, 1858) were sampled in September and October 2016 in the Teles Pires and Juruena rivers in the Tapajós hydrographic basin, southern Amazonia. Stomach contents were analyzed for composition of the diet. Detection of THg in the samples with the aid of an atomic absorption spectrometer (240FS AAS, Agilent) with steam generation accessory (VGA 77 AA, Agilent) at the Ecotoxicology and Limnology Laboratory of the Center Research in Limnology, Biodiversity and Ethnobiology of the Pantanal (CELBE). In the Teles Pires river, both species were classified as omnivorous with an insectivorous tendency and average mercury concentration of 0.215 µg.g-1, in the Juruena river the insectivorous behavior occurs, with a mercury concentration of 0.131 µg.g-1, with significant differences when comparing both rivers ($t = -2.385$, $p = 0.023$). The concentrations were lower than those established by the World Health Organization for fish used for human consumption, but were considered high, because they are no larger than 5.5 cm, used in the diet of piscivorous birds and potentially piscivorous / carnivorous fish. The higher concentration of mercury in the fish of the Teles Pires River probably occurs due to a history of mining, deforestation and burning in the last decades in the region, and recently the implantation of hydroelectric dams in cascade.

06A.33 Effects of Acute Insecticide Exposures on Pomacea canaliculata

E.D. Mansilla, E. Albrecht, Universidad Nacional de Cuyo, Facultad de Ciencias Agrarias, Mendoza, Argentina; M. Giraud Billoud, 1IHEM, Universidad Nacional de Cuyo, CONICET. 2Universidad Nacional de Cuyo, Facultad de Ciencias Médicas, Instituto de Fisiología, Casilla de Correo 33, 5500-Mendoza, Argentina

The fresh water snail, *Pomacea canaliculata*, has particularities that makes it a potential good bioindicator. This species is affected by agrochemicals that can induce physiological and histopathological changes that have the potential to be characterized and could be used as biomarkers of freshwater contamination. In this study we a) identify the LC50 and $NOEC_L$ at 48 hours of exposure to the insecticides Deltamethrin (Decis forte® 10.5%), Chlorfenapir (Onfire® 24%) and Lambdacialothrin (Rafter® 5%); b) evaluate changes in the activity of antioxidant enzymes in the digestive gland after an acute exposure to $NOEC_L$ of these compounds, c) characterize whether exposure to these insecticides induces histological alterations in the digestive gland or in the presence of a symbiotic cyanobacterium that lives there. Adult animals (4 and 5 months) of both sexes cultured under laboratory conditions were used. Exposures of 48 hours to $NOEC_L$ doses were carried out in four experimental groups from which tissues samples were taken for protein extraction, evaluation of superoxide dismutase (SOD) and catalase (CAT) activities and for histological processing and subsequent morphometric analysis (Image ProPlus®), respectively. LC50 (48h) and $NOEC_L$ (48h) for Deltamethrin were 0.88 and 1.22 µg/mL, for Chlorfenapir were 2.85 and 1.00 µg/mL and for Lambdacialothrin 0.74 and 0.67 µg/mL. Acute exposure to insecticides produced a significant increase in SOD activity and also a significant decrease in CAT activity in Deltamethrin exposed animals (ANOVA I, Tukey post test). Likewise, the occupation of the glandular acini by symbiotic cyanobacteria was significantly decreased also in animals exposed to Deltamethrin (ANOVA I, Tukey post test). These results open the possibility of using *P. canaliculata* anatomical-physiological parameters as biomarkers of water contamination by insecticidal