

# GENERANDO CONOCIMIENTO PARA UNA SALUD EQUITATIVA E INCLUSIVA



## Monthly ecotoxicological assessment of medium Uruguay River - Brazil using *Caenorhabditis elegans* as model animal in toxicity tests

Kuhn, Eugênia C.<sup>1</sup>; Oliveira DS, Maria E.<sup>1</sup>; Sigal Carriço, Murilo R.<sup>1</sup>; Roehrs, Rafael<sup>1</sup>; Foster Mesko, Márcia<sup>2</sup>; Silva De Ávila, Daiana<sup>1</sup>.

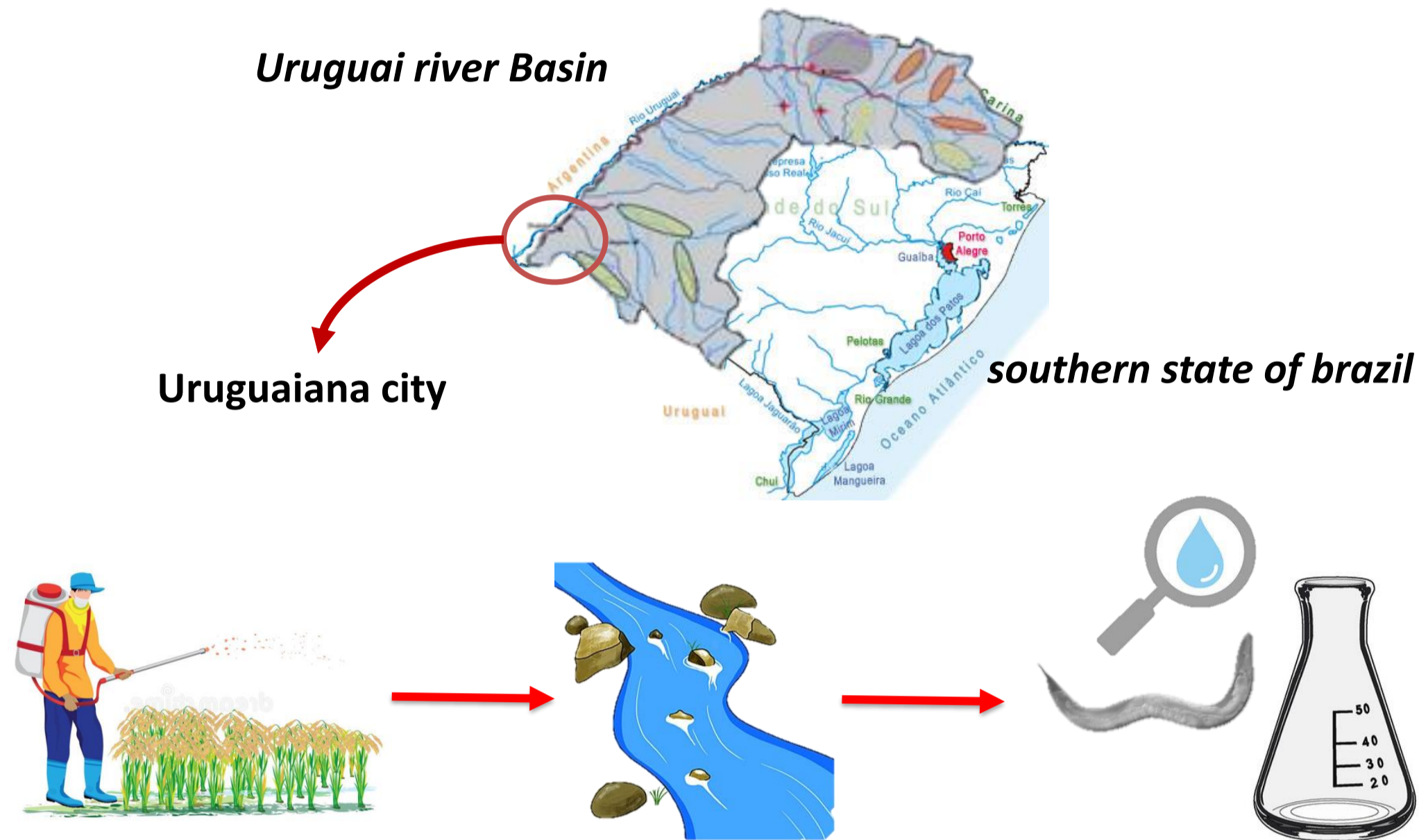
<sup>1</sup> Unipampa/Campus Logradouro: BR 472- Km 585, CEP: 97501-970 Tel: (55) 55 3911-0200;

<sup>2</sup> Universidade Federal de Pelotas – UFPel.

[eugeniakuhn95@gmail.com](mailto:eugeniakuhn95@gmail.com)

### INTRODUCTION

### RESULTS



In this project we evaluate the water quality of the Uruguay River in different periods through physicochemical analyses, quantification of metals and pesticides and using *C. elegans* as a model in Toxicity Tests.

### METHODS

The samples were collected on the 10th day of month (February 2019 to January 2020),

Most of the limnological analyzes were done on site using a Multiparameter.

**K medium:** NaCl, KCl, CaCl<sub>2</sub>, MgSO<sub>4</sub>, cholesterol.

- K medium 5ml for control or Sample water 5ml for treated Worms;
- 50µl *E. coli* OP50
- 1000 Worms in L1 stage

After 24 hours

We evaluate **Survival, Brood Size, Body length and Longevity** in *C. elegans*.

Samples	Dissolved O <sub>2</sub> (mg/L)	pH	Salinity (ppt)	Conductivity (µS/cm)
February 19	7.2	5.12	0.03	50.3
March 19	5.0	6.24	0.05	87.6
April 19	9.6	6.9	0.03	53.5
May 19	8.3	5.96	0.03	54.0
June 19	8.6	6.7	0.06	58.0
July 19	7.9	5.2	0.04	64.21
August 19	8.9	5.4	0.03	95.51
September 19	6.6	6.1	0.05	178.97
October 19	4.7	6.9	0.05	143.2
November 19	4.3	6.7	0.03	75.16
December 19	7.2	8.4	0.03	159.87
January 20	6.5	7.2	0.03	112.63
RV	>5	6-9	NA	NA

Table 1: Physico-chemical data obtained at the collection site.

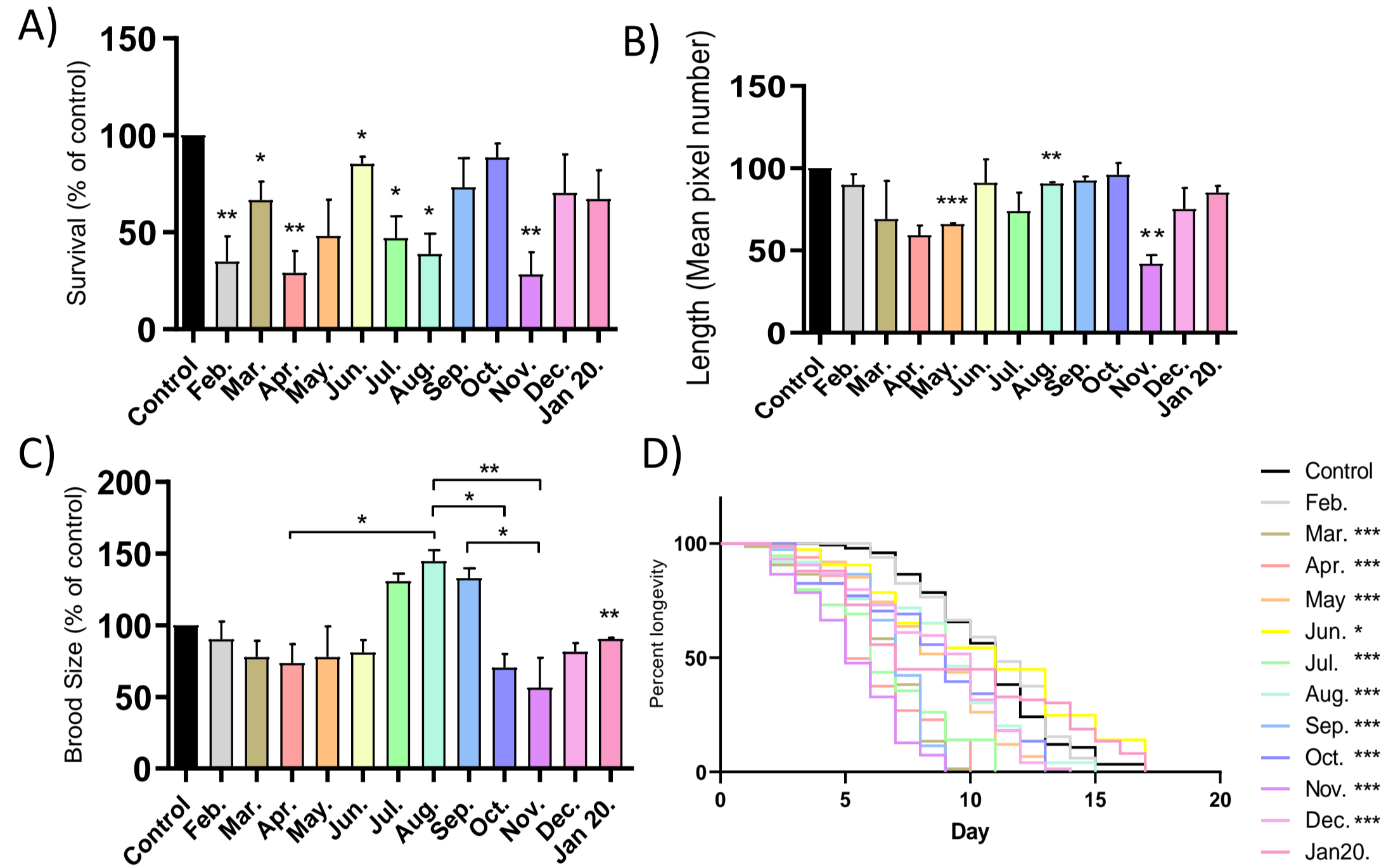


Fig 1. A) Reduced survival in *C. elegans*. B) Body length in *C. elegans*. C) Altered reproduction in *C. elegans*. \* indicates significant differences from control after one-way ANOVA, Tukey's post-hoc test (p<0.05 = \*, p<0.001 = \*\* and p<0.0001 = \*\*\*). D) Reduced longevity in *C. elegans*. From longevity, \* indicates significant differences from control after Kaplanmeier Curve (p<0.05 = \*, p<0.001 = \*\* and p<0.0001 = \*\*\*).

Samples	Pesticides		
	imazethapyr ( µg/L)	sulfentrazone ( µg/L)	2,4-D ( µg/L)
February	26.01 ± 23.49	-	-
March	15.13 ± 4.16	-	47.29 ± 0.45
September	-	5.57 ± 0.23	-

Table 2: Concentration of pesticides detected in the different months (-) indicates not detected. Results are expressed as mean ± standard deviation.

Samples	<sup>75</sup> As <sup>†</sup>	<sup>112</sup> Cd <sup>†</sup>	<sup>200,201,202</sup> Hg <sup>‡</sup>	<sup>55</sup> Mn <sup>†</sup>	<sup>208</sup> Pb <sup>†</sup>	Fe (239.562 nm) <sup>†</sup>	Mn (257.610 nm) <sup>‡</sup>
February	< 0,05*	< 0,05*	< 0,05*	0,164 ± 0,015 (9,1%)	< 0,05*	< 5,00*	< 1,00*
March	< 0,05*	< 0,05*	< 0,05*	0,104 ± 0,011 (11,0%)	< 0,05*	< 5,00*	< 1,00*
April	0,124 ± 0,007 (5,5%)	< 0,05*	< 0,05*	0,688 ± 0,013 (1,9%)	0,056 ± 0,003 (5,0%)	< 5,00*	< 1,00*
May	< 0,05*	< 0,05*	< 0,05*	0,586 ± 0,021 (3,7%)	< 0,05*	< 5,00*	< 1,00*
June	< 0,05*	< 0,05*	< 0,05*	< 0,05*	< 0,05*	< 5,00*	< 1,00*
July	< 0,05*	< 0,05*	< 0,05*	1,028 ± 0,054 (5,2%)	< 0,05*	< 5,00*	1,128 ± 0,051 (4,5%)
August	< 0,05*	< 0,05*	< 0,05*	0,116 ± 0,006 (5,5%)	< 0,05*	< 5,00*	< 1,00*
September	< 0,05*	< 0,05*	< 0,05*	1,254 ± 0,096 (7,7%)	< 0,05*	< 5,00*	1,470 ± 0,102 (6,9%)
October	< 0,05*	< 0,05*	< 0,05*	0,204 ± 0,015 (7,3%)	< 0,05*	< 5,00*	< 1,00*
November	< 0,05*	< 0,05*	< 0,05*	1,658 ± 0,104 (6,3%)	< 0,05*	< 5,00*	1,814 ± 0,160 (8,8%)
December	< 0,05*	< 0,05*	< 0,05*	0,892 ± 0,015 (1,6%)	< 0,05*	< 5,00*	0,904 ± 0,054 (6,0%)
January 2020	< 0,05*	< 0,05*	< 0,05*	1,402 ± 0,060 (4,3%)	< 0,05*	< 5,00*	1,466 ± 0,035 (2,4%)

Table 3: As, Cd, Hg, Mn and Pb concentrations determined by ICP-MS, and Fe and Mn concentrations determined by ICP-OES, µg L<sup>-1</sup>, n = 3, mean ± SD (RSD). † Determination by ICP-MS. ‡ Determination by ICP-OES.\* Instrumental LOQ. \* = indicates undetected values

### CONCLUSION

- We detected the presence of pesticides and metals in water samples from the Uruguay River, these same samples caused several physiological changes in exposed *C. elegans*, indicating that the water from the Uruguay River may be impacted by various contaminants.