WATER QUALITY IN NEARBY AREAS TO CANELONES CITY THROUGH THE USE OF MACROINVERTEBRATES AS BIOINDICATORS

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RESEARCHABLE QUESTION

Due to human activities of the inhabitants of the city of Canelones, is the freshwater quality of the stream studied affected differently along a spatial gradient according their proximity to the population?

SAMPLE SITES

PACIFIC CREEK

ARTIGAS PARK

CASCADITA DE LOS MONJES
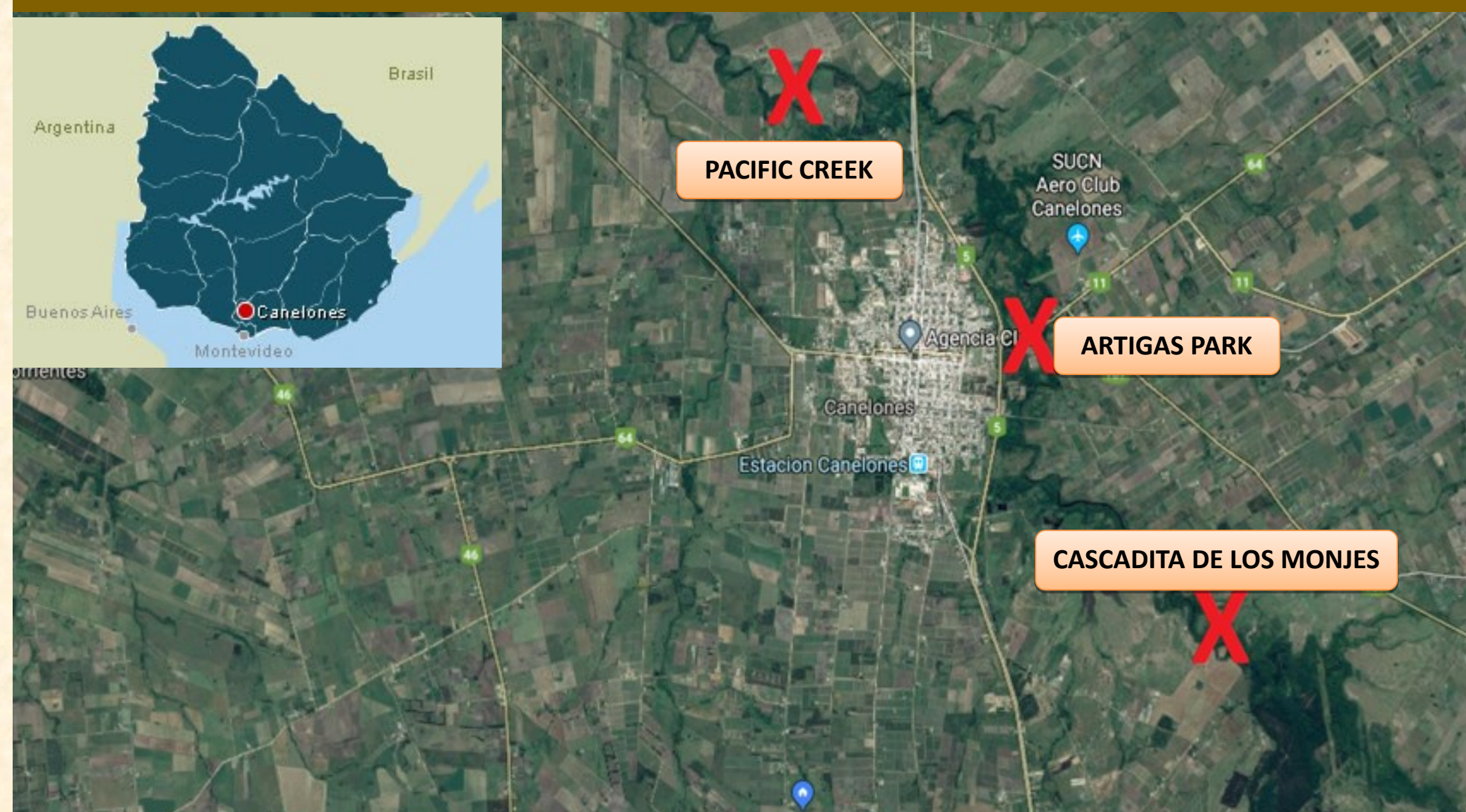
HYPOTHESIS

Hypothesis raised. In places with less human activity, far from Canelones City, the amount of macroinvertebrates is greater than in the area next to the city.

ABSTRACT

The situation of Canelón Chico creek was evaluated in three different study sites: before (Cascadita de los Monjes), next (Artigas Park) and after Canelones city (Pacífico creek), with the aim of verifying whether the activities of the inhabitants of this city affect the quality of freshwater of the mentioned stream in the same way.

This unique monthly assessment was done using MACROINVERTEBRATES as these beings are BIOINDICATORS of water quality according to its biotic index that is obtained from the sum of the scores assigned to the families that have been identified in the samples. The findings were supplemented with water physicochemical measurements (pH, transparency and temperature) using GLOBE protocols.

In the three different sampling points, 3 repetitions were made. At the end of the monitoring and after the establishment of correlations between the evaluated variables, it is concluded that in the PACIFICO CREEK water quality is VERY CRITICAL since it has a lower number of biotic index with respect to the other two sites. The results of this research will serve to raise awareness among residents of the area of influence of the creek, communicating the research results through different means.

RESEARCH METHODOLOGY

These protocols were performed by students in conjunction with the macroinvertebrates protocol as they enrich the discussion about the possible causes of the existence of these beings in the current study. The data is then recorded on the data entry sheet provided by GLOBE to be uploaded to the web.

Beyond performing protocols to know the pH, temperature and water transparency, the investigation focused on the collection, sorting and counting macroinvertebrates that were obtained in the three samplings. The sampling technique used was the one for muddy bottoms. (GLOBE, p. 15) This work was carried out at solar noon local time.
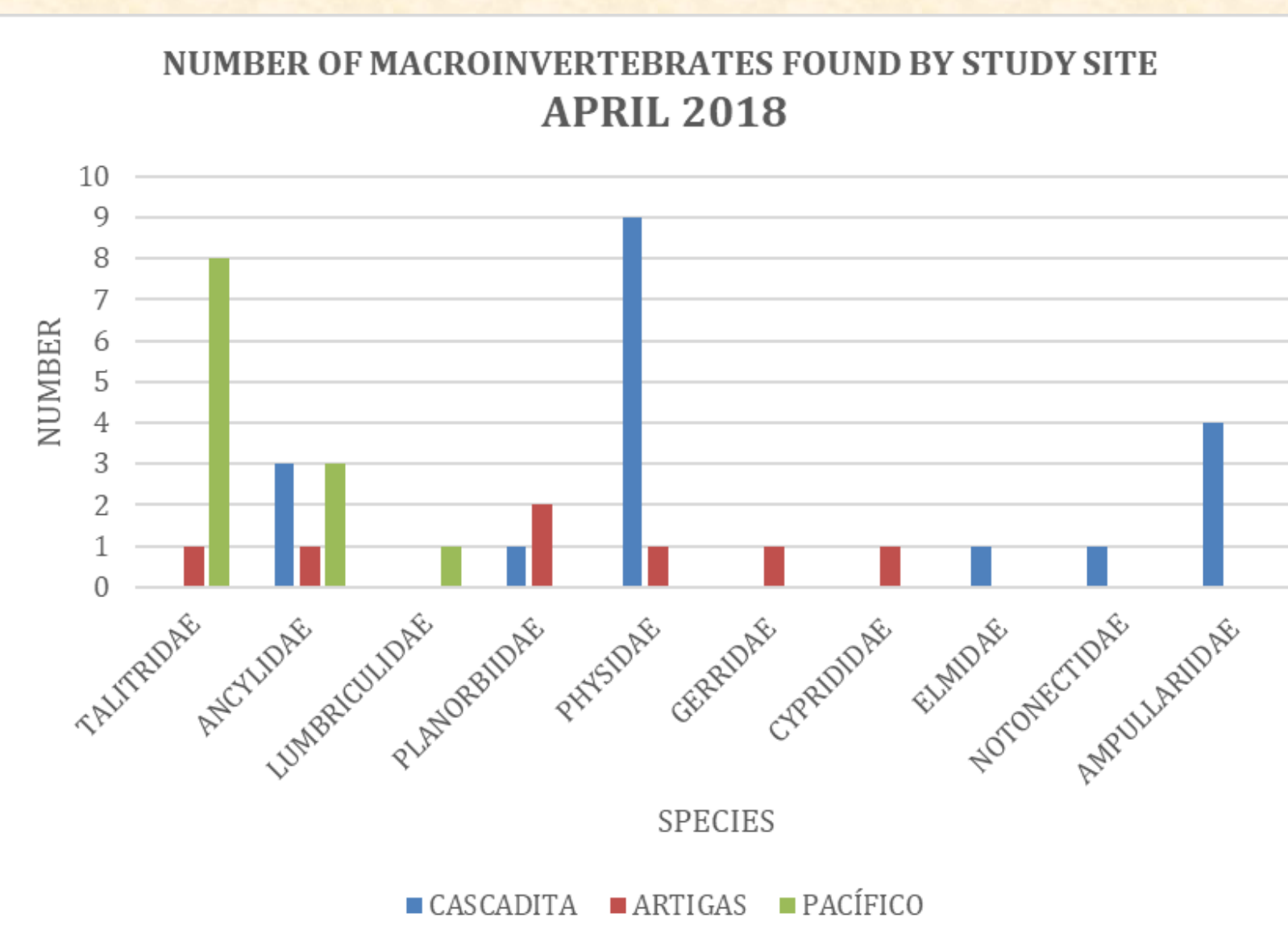
Three replicates were performed at each site by placing individuals found in jars with water from the stream of study. These jars were labeled and taken to classroom where the specimens were observed with magnifying glass, were classified and counted.

The Identification Key: Miniguía zooplankton y macroinvertebrados de agua dulce de Uruguay (s.d.) was used for species identification. Biologist Emanuel Machin, who accompanied all the research, provided this key and guided in using it for identification.

We chose macroinvertebrates, as these living beings are BIOINDICATORS of water quality according to their BIOTIC INDEX. The value of the index varies between 0 (absence of indicator invertebrates) and an indeterminate maximum, although it is not normal to exceed 250 points.

After the sum of the values corresponding to each of the families present in the study area, the water quality is obtained, which can be established in one of the five classes of water qualities (from I to V from highest to lowest quality), allowing depending on the value obtained from the index, assign a water sample to one of the established qualities, or visualize it cartographically, since each of the classes correspond to a color code for its cartographic representation.

SPECIES	CASCADITA DE LOS MONJES	ARTIGAS PARK	PACÍFICO CREEK	INDEX BMWP
TALITRIDAE		1	8	4
ANCYLIDAE	3	1	3	6
LUMBRICULIDAE			1	1
PLANORBIIDAE	1	2		4
PHYSIDAE	9	1		4
GERRIDAE		1		5
CYPRIDIDAE		1		4
ELMIDAE	1			4
NOTONECTIDAE	1			6
AMPULLARIIDAE	4			5
ABUNDANCE	19	7	12	
NUMBER OF FAMILIES	6	6	3	

NUMBER OF MACROINVERTEBRATES FOUND BY STUDY SITE APRIL 2018

SPECIES	CASCADITA DE LOS MONJES	ARTIGAS PARK	PACÍFICO CREEK	INDEX BMWP
TALITRIDAE	4			4
ANCYLIDAE				
LUMBRICULIDAE	3			1
PLANORBIIDAE	2			4
PHYSIDAE		1		4
GERRIDAE	5			5
CYPRIDIDAE				
ELMIDAE			35	4
NOTONECTIDAE				
AMPULLARIIDAE	14			5
HALIPIDAE			71	4
SPHAERIIDAE	1			4
ABUNDANCE	29	1	106	
NUMBER OF FAMILIES	6	1	2	

NUMBER OF MACROINVERTEBRATES FOUND BY STUDY SITE OCTOBER 2018

CONCLUSIONS

CASCADITA DE LOS MONJES

While the same number of families was found and the number of beings increased, the biotic index is lower in the 2nd sampling.

This could be due to:

Influence of human activities there was a clearing of trees greater than at the beginning of the year.

Maybe the water conditions have changed making the macroinvertebrates look for a new site with better conditions.

Upstream, there may have been some change in water quality.

The decrease in the channel limits the number of families found, as well as making it disappear those with the highest level of sensitivity.

The channel was modified due to the felling of trees as the discarded remains accumulated in the stream.

ARTIGAS PARK

In the second sampling, fewer beings and fewer families were found, therefore, the biotic index decreased, from critical to very critical.

It may be due to:

The modification of the habitat of the macroinvertebrates since the human short the stream of water in order to avoid flooding in that area of the city of Canelones.

The conditions are not given for the macroinvertebrates to inhabit there

The effluents that reach this current stagnate generating unfavorable conditions for the development of life.

PACÍFICO CREEK

Although more beings were found in the second sampling period, the number of families decreased as did the biotic index.

That may be due to:

The found beings are more resistant to the changes and the conditions of the place made possible the reproduction of these two families in particular.

The oily layer present in the month of April was not observed.

Being an area where there are soy plantations, the chemicals used in this crop can reach the water flow, altering the conditions that make life possible.

The waters were more stagnant.