



Contribution to the assessment of the specific diversity of benthic macrofauna of aquatic ecosystems of Haiti in a conservation perspective

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Context

In recent decades, water pollution have become complex and severely affects biological communities

In biotic integrity diagnosis, benthic macroinvertebrates are the most frequently used indicator.

➤ Many reasons:

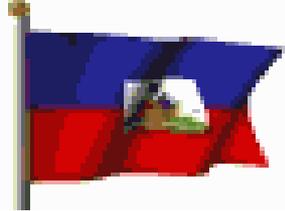
- ✓ Taxonomic diversity
- ✓ Abundance





Context

Despite their ecological importance, little is known about benthic macrorinvertebrates in Haiti, which has a dense hydrographic network and experiences favorable conditions for endemism and biological richness



Context

Area: 27,750 km²

Location

18° - 20° North latitude

72° - 74° West longitude

Relief

- 5 mountain ranges (75%)

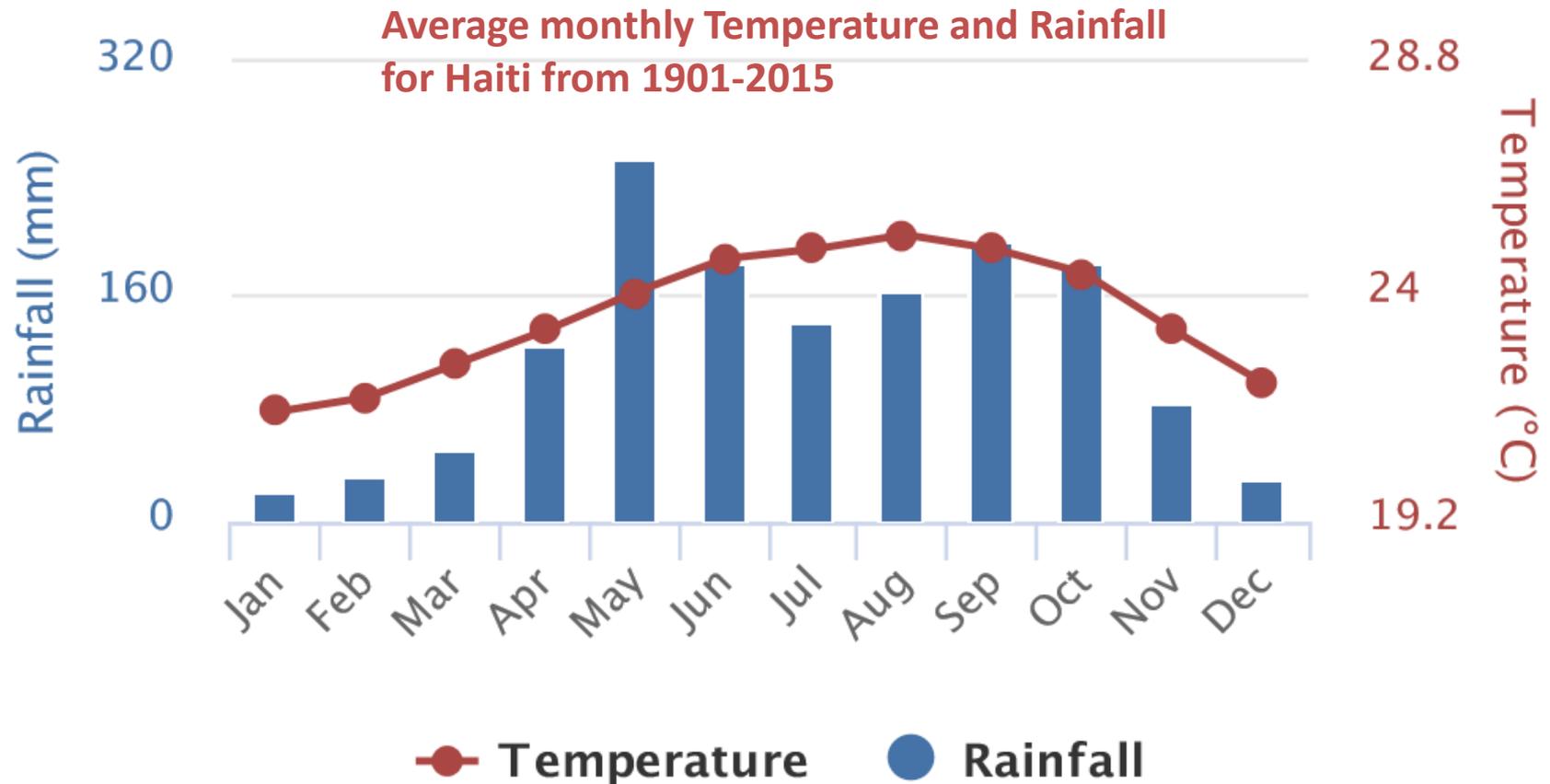
of the area and the
highest (2,684m.a.s.l)

- 4 large flat planes





Context



Source: Climatic Research Unit (CRU) of University of East Anglia (UEA)



Haitian biodiversity

Haitian Flora

A total of 5000 to 5600 species of plants:

- 3000 vascular plants;
- 600 species of ferns;
- 350 species of orchids.

36% are endemic in Haiti

Haitian Fauna

Rich fauna with more 2,000 species of vertebrates already listed

75% are considered endemic

Haiti



Species Makers



Haitian biodiversity

Invertebrate fauna ??????????

- In less than 8 days, 111 species of Mollusks were collected (31% endemic).
- On the Navasa (Island of 7km²), on 800 species collected, 90 were invertebrates (spiders). (Center Marine Conservation)



Haitian biodiversity

What about aquatic invertebrates?

Nothing, despite its dense hydrographic network

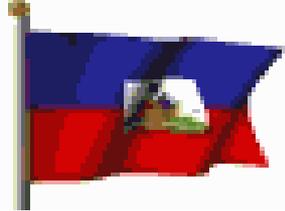
Basin or Zone	Catchment Area/ Km ²	Basin or Zone	Catchment Area/km ²
Môle St Nicolas-Moustique	987	Cap Haïtien	312
Bombardopolis_Gonaïves	1147	Grande Rivière du Nord	699
Trois Rivières	897	Limonade-Ouanaminthe	1065
Port de Paix-Port Margot	543	Estère	834
La Quinte	690	Artibonite	9500
Limbé	312	St Marc-Cabaret	1090
Fonds Verettes	190	Cul-de-Sac	1580
Cayes-Jacmel-Anse à Pitres	1219	Côte de Fer-Baïnet	1060
Léogane-Carrefour	651	Petite Rivière de Nippes – Grand Goâve	661
Grande Rivière de Jacmel	535	St Louis du Sud-Aquin	706
Cavaillon	380	Grande Rivière de Nippes	459
Corail-Anse à Veau	877	Tiburon-St Jean	660
Cayes	634	Ile de la Tortue	179
Roseaux-Voldrogue	540	Ile de la Gonâve	680
Grande Anse	556	Jérémie-Les Irois	364



33 watersheds

158 watercourses

S_t=2,177 ha



Wetlands

The wetlands for freshwater ecosystems in Haïti are represented by lakes and ponds.

- 2 aim lakes:

- ✓ Azuei or Etang Sautmatre: $S=113\text{km}^2$ and $D=24\text{m}$
- ✓ Peligre (artificial lake) : $S= 48\text{km}^2$ and $D= 170\text{m}$
- ✓ Main pond : $S= 9$ to 20 km^2 and $D= 45\text{m}$



Etang saumatre



Lac Peligre



Etang de
Miragoane



Wetlands

This lack of knowledge, would be an obstacle to any possible biomonitoring of haïtian aquatic ecosystems that could be considered

Hence the need to make an inventory in these ecosystems

- Identify the richness of benthic macorinvertebrates;
- assess the ecological profiles of the various species

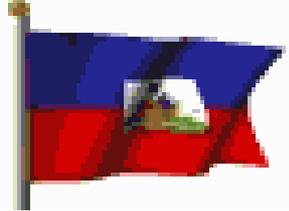


Objective

Main objective: Assess the specific diversity of benthic macrofauna in aquatic ecosystems of Haiti

Specific objectives:

- ✓ Determine the specific composition of the benthic macrofauna of Haiti;
- ✓ Develop a guide for the determination of invertebrate species in aquatic ecosystems of Haiti;
- ✓ Identify the ecological profiles of macroinvertebrate communities (abiotic parameters structuring their populating).



Methods

To that end, 12 water bodies :

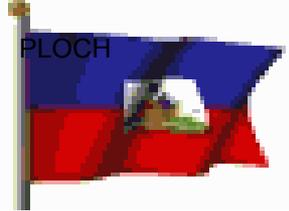
- ✓ 6 watercourses
- ✓ 6 stagnant water bodies

Located in different geographical regions will be sampled.

WATERCOURSES	GEOGRAPHICAL LOCATION		STAGNANT WATER BODIES	GEOGRAPHICAL LOCATON
Jean-Rabel River	North West			North West
Marion River	North East		Pond of Lagon aux Boeufs	Nord'Est
Montrouis River	Intersection	Ouest- Artibonite	Pond of Bos-neuf	West-Artibonite
Guayamouc River	Centre			Centre
Tiburon River	Extrémité de la Péninsule Sud		Pond of Pernele	Péninsule Sud
Cote-de-Fer River	Nippes		The northern part of the Pond of Miragoane	Nippes
Marigot River	South East		Pond of Bosier	South East



N.B: Large and deep watercourses will be discarded



Methods

Watercourses: Sampling according to the XP T 90- 2016 norm (AFNOR)

(Surber sampler)



Stagnant water bodies: Sampling according to the standardized method developed in Switzerland, **PLOCH**

(Hand net sampler)





Methods

Physico-chemical parameters

- ✓ Substrate nature;
- ✓ Flow velocity;
- ✓ Depth;
- ✓ pH;
- ✓ Turbidity;
- ✓ Conductivity;
- ✓ MES, DCO, DBO5.





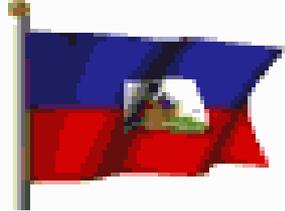
Methods

After sampling, the specimens will be
Fixed in alcohol (95°) and stored at -18°C



The specimens will be identified under at the species or family
levels in the laboratory, using morphological characters





Methods

For unidentified specimens, molecular taxonomy will be conducted

- ✓ Extraction and Purification (DNeasy Blood & Tissue de Qiagen)
- ✓ **PCR** (RedTaq (Sigma))
- ✓ Sequencing (Big-Dye Terminator Sequencing associated to sequencer **ABI 3100**)
- ✓ **BLAST**  Genbank
- ✓ The **R** software will be used for statistical analysis



Period

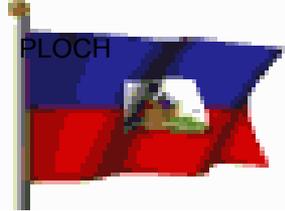
This project is intended to last for 3 years (2018-2020)

Expected results

- ✓ Starting knowledge about the specific richness of the benthic macrofauna of Haitian aquatic ecosystems;
- ✓ Possibly forming the basis for a species determination guide;
- ✓ The influence of physical parameters on species richness and relative abundance will also be assessed.



THANK YOU FOR YOUR ATTENTION



Materials

Field equipment

- ✓ GPS
- ✓ Map
- ✓ Camera
- ✓ Multiparameter Recorder
- ✓ Forest ribbon
- ✓ Life jackets
- ✓ Sieve (3) diameter 20 cm
- ✓ Bucket
- ✓ Brush
- ✓ Sample containers/plastic jars
- ✓ Large freezers
- ✓ Tweezers
- ✓ Hand net sampler (**500 μm rectangular frame**)
- ✓ Surber (500 μm)
- ✓ Indelible Pencil
- ✓ Submersible Labels
- ✓ Antibacterial liquid soap
- ✓ Alcohol

Laboratory equipment

PC, Microscop, Petri dishes, Centrifuge, thermocycler, Sieves, Buffer AL, Buffer ATL , determination guide and others