



CIAM



Those who beat the hurricane

Recovery of benthic macroarthropods after an extreme event

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Objectives

To compare years 2016 to 2018 at Yunes River

- Chemical parameters
- Benthic macroarthropod abundance
- Ecosystem recovery after hurricane Maria

Problem

After extreme events...

- Is the Simuliidae family still the most abundant?
- Does the abundance of families increase or decrease?

Hypothesis



- Not mattering the extreme events and levels of nitrogen and phosphorus decay, the *Simuliidae* family will still resist the changes and will keep being the most abundant macroarthropod in the Yunes river.

Background

2015	2016	2017
Drought	Recovery from drought	Hurricane Maria
	84% canopy	No canopy cover
	Rainy season	Heavy rainy season
	Flashy river	Flashy river
	High agricultural activity	Less agricultural activity
	Poor algae production	Poor algae production
	<i>Simuliidae</i> was the most abundant	<i>Simuliidae</i> still the most abundant

YUNES RIVER - RGA Yns 430

2016



2017



2018 conditions

- 4% canopy cover
- Flashy River
- Rainy season
- Heavy sediment
- Poor algae production
- Less agricultural activity



YUNES RIVER 2018

Habitat assessment

September




December




Methodology



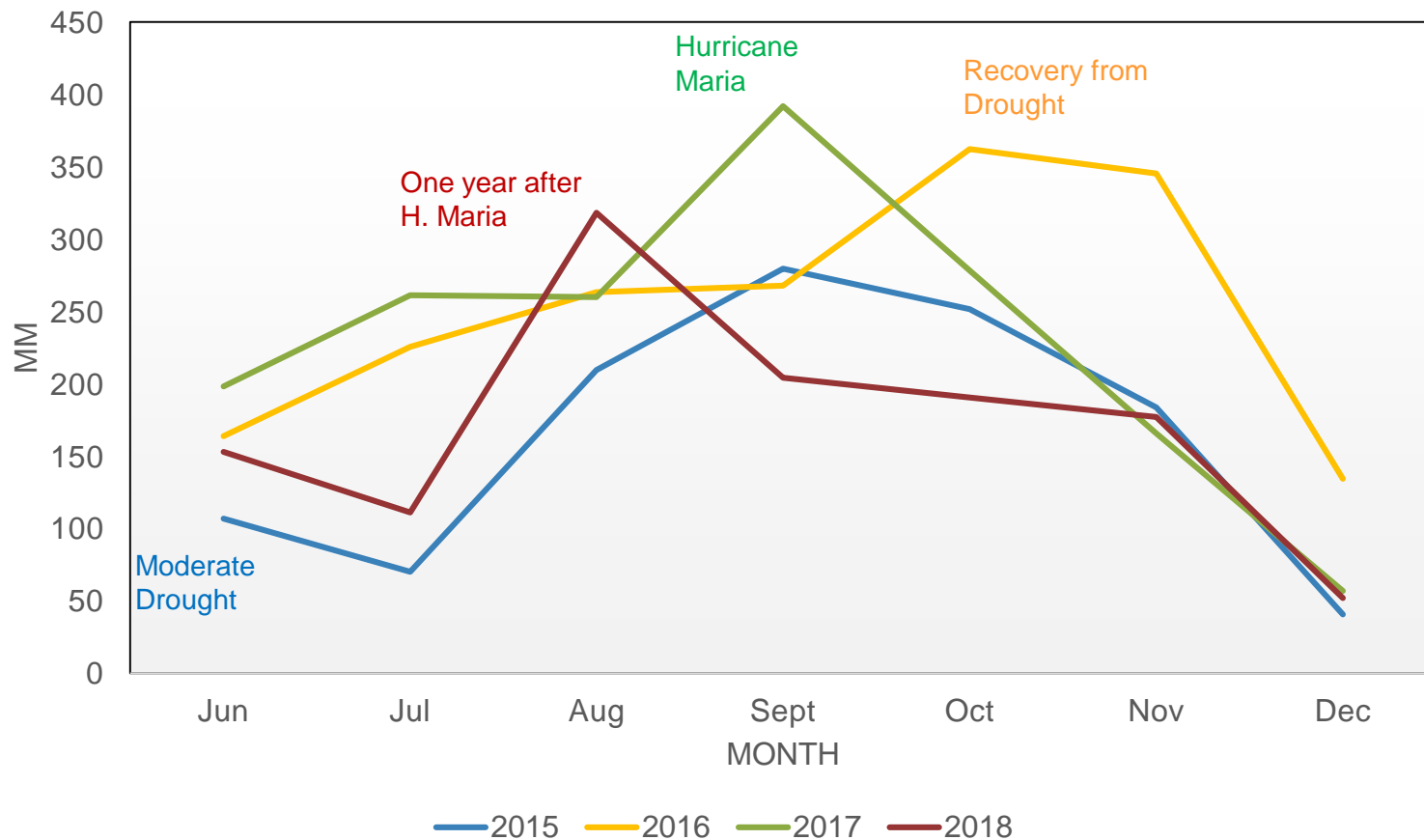
Results



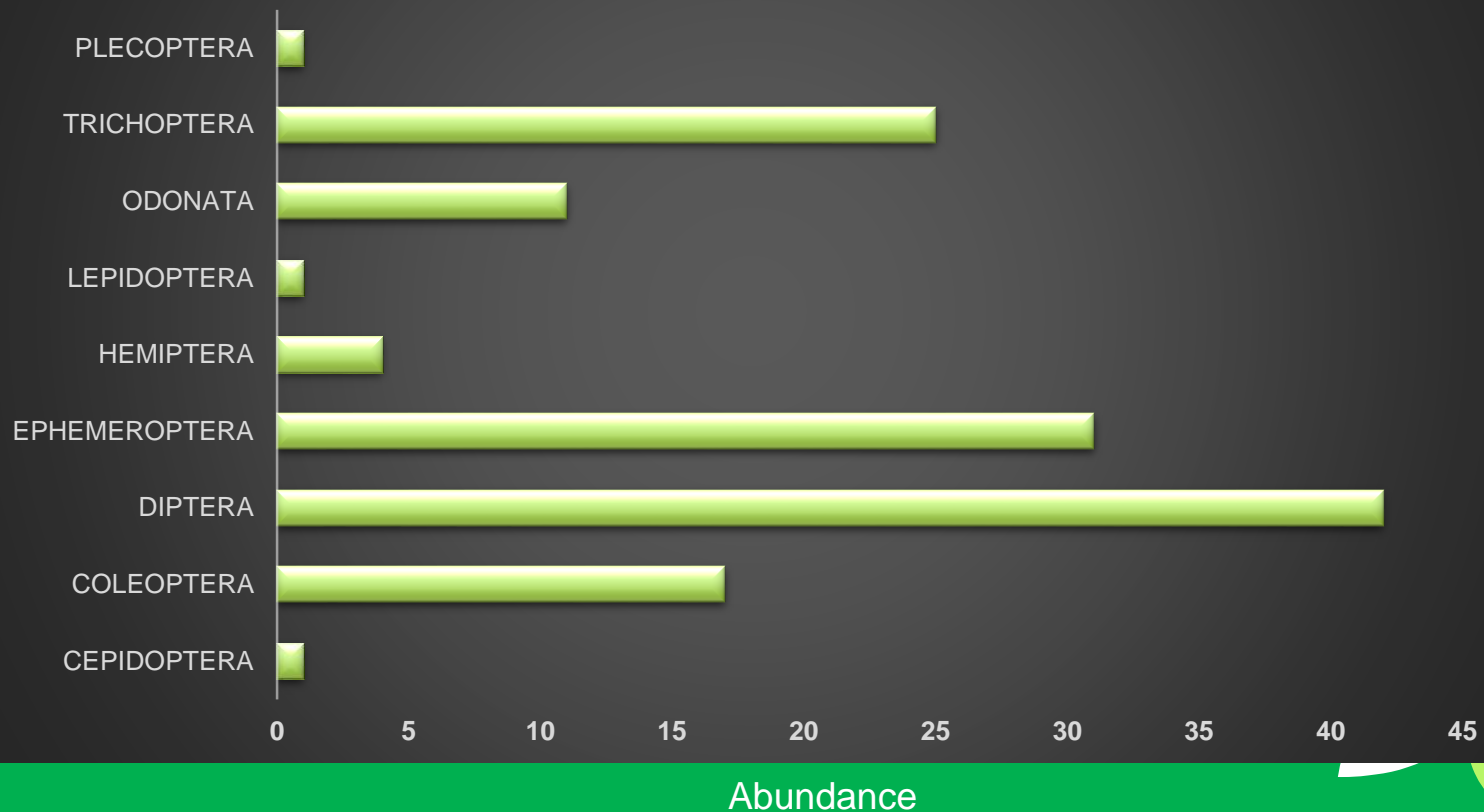
Parameters	2016	2017	2018
Water Temp (°C)	25.3	26.1	24.37
pH	8	7.52	7.73
Dissolved Oxygen (ppm)	7	7.75	9
Phosphate (ppm)	45.9	41.3	36.6
Nitrate (ppm)	5.67	3.5	0.5
Canopy (%)	80	70.5 (0 after sept.)	4



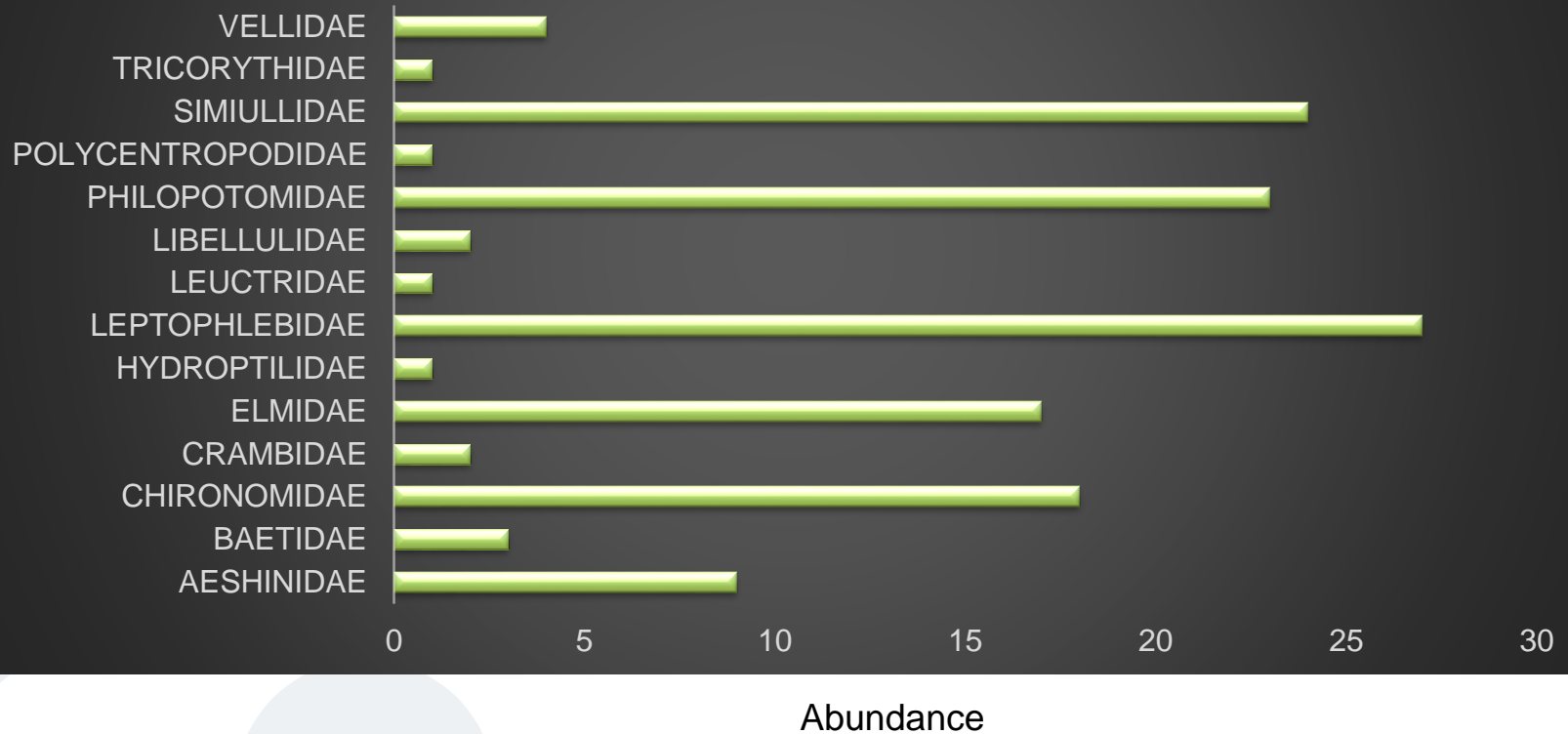
Yunes River Basin Average Rainfall Data



MACROBENTHICS BY ORDER COLLECTED ON SEPTEMBER 2018

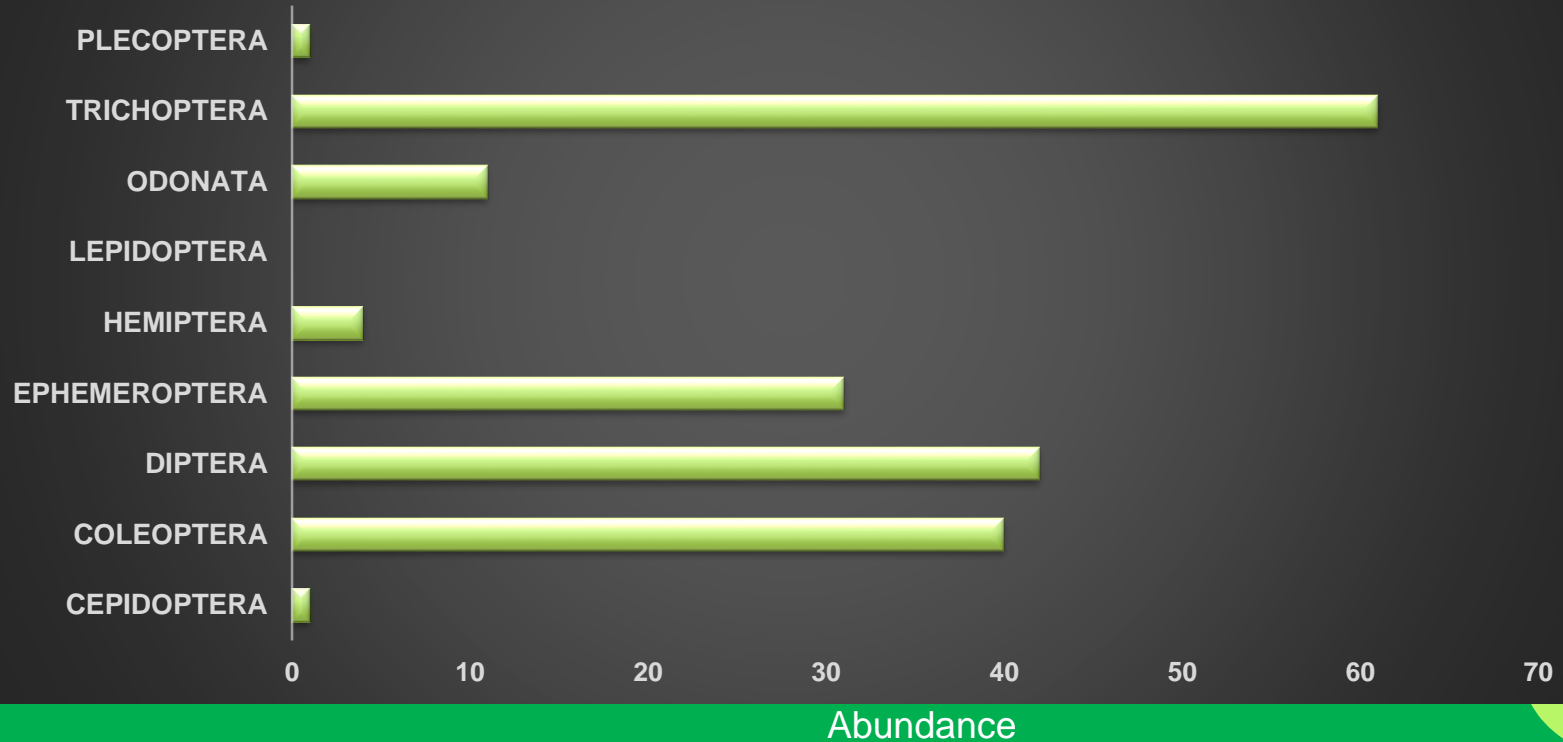


MACROBENTHICS FAMILIES COLLECTED ON SEPTEMBER 2018

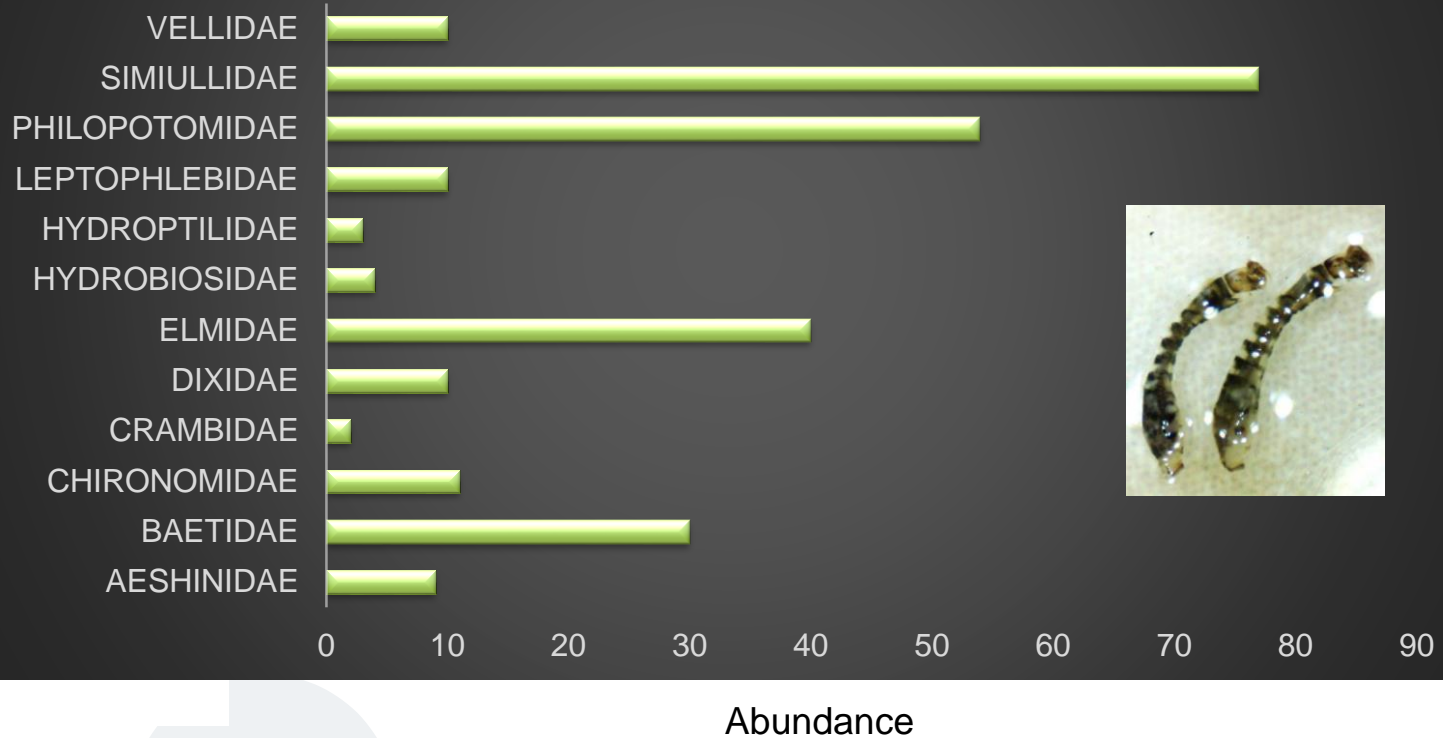


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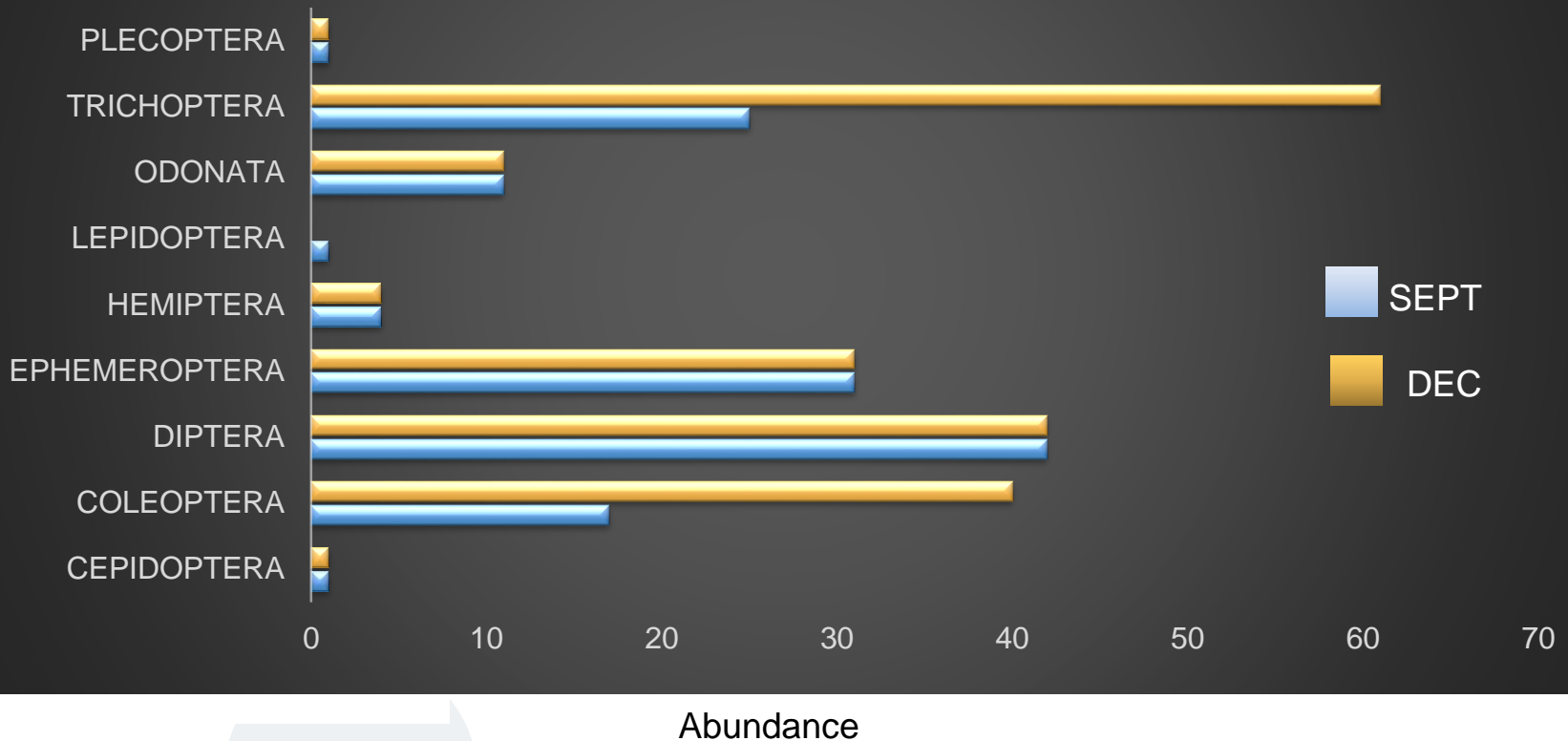
MACROBENTHICS BY ORDER COLLECTED ON DECEMBER 2018



MACROBENTHICS FAMILIES COLLECTED ON DECEMBER 2018



COMPARISON DIVERSITY AND ABUNDANCE SEPT VS DEC 2018

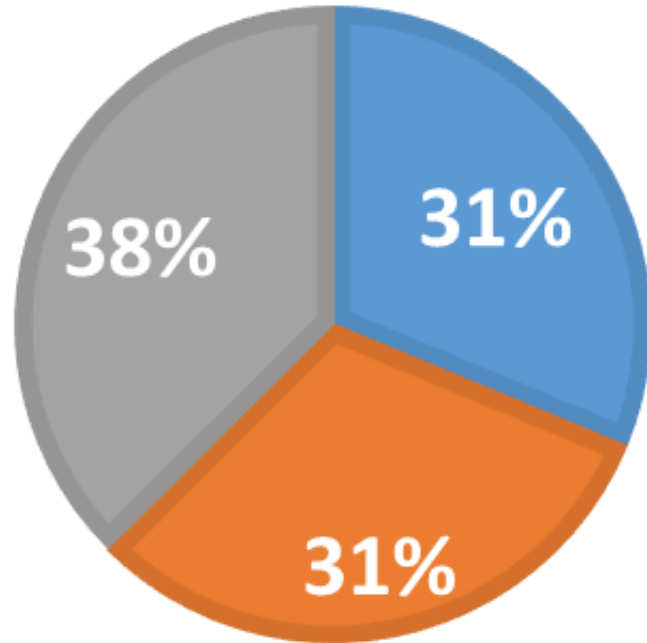


THE LAW OF THE JUNGLE: ONLY THE STRONGEST SURVIVE

Only present in 2016	Reappeared after H. Maria (Dec 2017 and 2018)	New after H. Maria (Dec 2017 and 2018)	Always present (2016 to 2018)
Heptagenidae	Libellulidae	Vellidae	Simuliidae
Gerridae	Chironomidae	Crambidae	Elmidae
Hydropsychidae	Hydroptilidae	Leptophlebiae	Philopotomidae
Limnephilidae	Dixidae	Leuctridae	
Psephenidae	Aeshnidae	Tricorythidae	
Pyralidae		Baetidae	
Corydalidae		Hydrobiosidae	
		Polycentropodidae	

FEEDING HABITS

■ Filteres ■ Plant eaters ■ Predators



- According to the feeding habits and the number of families present a year after Hurricane Maria, a tendency to balance is observed.

Conclusions

- Nitrogen and phosphate levels have declined as agricultural activity has declined. The change doesn't affect *Simuliidae*.
- Only the best adapted macroarthropods families reappeared after the hurricane.
- *Simuliidae* family has shown the resistance and abundance to colonize again as we expected.
- The proportion of numbers of families and its feeding habits shows recovery and equilibrium.

And for another year...



Simuliidae

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