INVASIVE SPECIES OF AQUATIC MACROPHYTES AFFECTING MANGROVE FORESTS STRUCTURE AND CONSERVATION IN PROTECTED AREAS

Marília Cunha-Lignon and Ricardo Palamar Menghini
INTRODUCTION

Invasive species represent strong damage to biodiversity and ecosystem services.

The Cananéia-Iguape Coastal System (São Paulo state, Brazil) was used as study cases to analyze invasive species of aquatic macrophytes affecting mangrove forests structure and conservation in Protected Areas.
INTRODUCTION

The Cananéia-Iguape Coastal System (São Paulo state, Brazil) is considered the most conserved and wide mangrove area (15.193 ha) along the São Paulo coast.

The Cananéia-Iguape Coastal System (CICS), consists of a complex of lagoon channels, and is part of a World Heritage site by UNESCO.

The Lagamar Mosaic: a continuum of Atlantic rain forest and mangroves in 55 Protected Areas
INTRODUCTION

Biodiversity
INTRODUCTION

The conserved mangroves support different sectors of fishery.
MANGROVE SPECIES

Rhizophora mangle

Laguncularia racemosa

Avicennia schaueriana
INTRODUCTION

The CICS can be divided in two sectors, the northern and the southern, based on geomorphology and environmental conditions.
INTRODUCTION

In the northern sector important environmental changes occurred due to an artificial canal producing modifications in salinity and transforming the estuarine conditions.
THE VALO GRANDE CANAL

Atlantic Ocean

estuary

Valo Grande canal

Ribeira River
INTRODUCTION
METHODOLOGY

36 permanent plots were delimitated along the northern and southern sectors in the CICS, from 2011 to 2015.

In permanent plots, the characterization of structure forest development followed the methodology suggested by Cintrón and Schaeffer-Novelli (1984).

All plants were identified and tree diameter, height, incidence of associated species, and condition (live or dead) were recorded. Mean height, basal area dominance, and stem density were also assessed.
RESULTS AND DISCUSSION

The conserved mangrove forests (in the southern sector) reached less than 20% of dominance of basal area (BA) of dead trunks, between 2011 and 2015.
Conserved mangrove forests (the southern sector)

<table>
<thead>
<tr>
<th>Parcela</th>
<th>Estrutura Vegetal</th>
<th>Visão Geral</th>
<th>Dossel</th>
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RESULTS AND DISCUSSION

The altered mangrove forests, (on sites under the influence of the waters of the artificial canal) reached 60% of dominance of BA of dead trunks, between 2011 and 2015.
Altered mangrove forests (the northern sector)

<table>
<thead>
<tr>
<th>Parcela</th>
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RESULTS AND DISCUSSION

**Intersticial Salinity 2011**

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<th>VG1P4</th>
<th>VG2P1</th>
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<td>25</td>
<td>29</td>
<td>18</td>
<td>25</td>
<td>30</td>
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<td>50cm</td>
<td>30</td>
<td>31</td>
<td>26</td>
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**Intersticial Salinity 2015**

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<th>VG1P4</th>
<th>VG2P1</th>
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</thead>
<tbody>
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<td>26</td>
<td>26</td>
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<td>24</td>
<td>4</td>
</tr>
<tr>
<td>50cm</td>
<td>28</td>
<td>28</td>
<td>26</td>
<td>25</td>
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Conserved mangroves sites

Altered mangroves sites
Aquatic Macrophytes: about 26 species
RESULTS AND DISCUSSION

_Urochloa arrecta, Scirpus sp., Crinum americanum, Paspalum repens and Eichhornia crassipes_ dominated the landscape on sites under the influence of the waters of the artificial canal.

Over time, they are forming large populations in the northern sector of the coastal system.
RESULTS AND DISCUSSION

Aquatic macrophytes species showed different behavior and ecosystem services in relation to mangrove vegetation.

They don’t fix sediment and consequently don’t control erosion.
‘Control’ of aquatic macrophythes
RESULTS AND DISCUSSION

The decrease of mangrove areas in the northern sector highlights the serious transformation of mangrove forest structure submitted to invasive species of aquatic macrophytes, due to the low salinity and the lack of sewage treatment.
RESULTS AND DISCUSSION

Sewage Treatment Index by Watershed

São Paulo (2012)
RESULTS AND DISCUSSION

Sewage Treatment Index by Municipality

São Paulo (2012)
ESTUARINE FISHERY PRODUCTION - 2012

Southern Sector

1. Crassostrea spp.
2. Mugil spp.
3. Genidens barbus
4. Ucides cordatus
5. Cynoscion spp.
6. Farfantepenaeus spp.
7. Micropogonias furnieri

Northern Sector

70%: Anchoviella lepidentostole
15%: Genidens barbus

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Instituto de Pesca - SP
CONCLUSION

The results produced in this study were available to decision makers to use on protected area planning.

The mangrove forests monitoring, using permanent plots, is an important tool which data can be very useful to coastal management and mangrove conservation.
Financial Supports

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