

**IECD
2022**

The 2nd International Electronic Conference on Diversity ANIMALS, PLANTS AND MICROBES 15–31 MARCH 2022 | ONLINE

Chaired by **PROF. DR. MICHAEL WINK**



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Contrasting Coastal Ecosystems in Cabo Frio, Brazil alter the correlations between Plant Species and Arbuscular Mycorrhizal Fungi Community

Abstract: Contrasting coastal ecosystems, dune and restinga, in Peró Beach, Cabo Frio, State of Rio de Janeiro altered the correlations between the spatial patterns of the Arbuscular mycorrhizal fungal (AMF) and the diversity of plants. We recorded, during rainy and dry seasons in 2014, a total of 35 plant species. *Ipomoea imperati*, *Stenotaphrum secundatum*, *Hydrocotyle bonariensis* and *Remirea maritima* were the most common. Higher plant species richness was found in restinga over dune in both seasons. Considering that coastal environments occupy large areas around the world, we consider that the AMF-plant relationships evidenced here may contribute to conservation of these environments.

Keywords: coastal ecosystems; dune; restinga; plant diversity; glomeromycota.

Peró Beach, Cabo Frio, Rio de Janeiro, Brazil

restinga

dune

Results and Discussion

Experimental area: Però Beach, Cabo Frio, Rio de Janeiro State, Brazil

delimitation of one transect at the dune site



Visualization of one point of sampling in the dune site.

Results and Discussion

Table A1: Botanical species frequency and abundance at two sites (dune and restinga) in rainy (May) and dry (November) seasons

Family/Species	HUNI number	Abreviattion	Habit	Frequency (%)				Abundance			
				Dune		Restinga		Dune		Restinga	
				Rainy	Dry	Rainy	Rainy	Rainy	Dry	Rainy	Dry
Amaranthaceae											
<i>Alternanthera littoralis</i> var. <i>maritima</i> (Mart.) Pedersen	3492	(Al.lit)	Subshrub	3.33	0	0	0	1	0	0	0
<i>Blutaparon portulacoides</i> (A.St.-Hil.) Mears	3493	(Bl.por)	Herb	10	16.67	0	0	3	5	0	0
Anacardiaceae											
<i>Schinus terebinthifolius</i> Raddi	3494	(Sc.ter)	Shrub/ Tree	0	0	36.67	30	0	0	11	9
Apiaceae											
<i>Hydrocotyle bonariensis</i> Lam.	3495	(Hy.bona)	Herb	26.67	60	10	6.67	8	18	3	2
Apocynaceae											
<i>Forsteronia leptocarpa</i> (Hook. & Arn.) A.DC.	3496	(Fo.lep)	Vine	0	0	0	3.33	0	0	0	1
Sp1		(Sp1)	Vine	0	0	6.67	0	0	0	2	0
Asteraceae											
<i>Sphagneticola trilobata</i> (L.) Pruski	3497	(S.tri)	Herb	3.33	0	0	0	1	0	0	0
Boraginaceae											
<i>Varronia curassavica</i> Jac.	3498	(Va.cur)	Shrub	3.33	0	3.33	3.33	1	0	1	1
Bromeliaceae											
<i>Bromelia antiacantha</i> Bertol.		(Br.ant)	Herb	0	0	10	6.67	0	0	3	2
Cactaceae											
<i>Cereus fernambucensis</i> Lem.	3499	(C.fer)	Shrub/ Subshrub	3.33	10	13.33	6.67	1	3	4	2
Calyceraceae											
<i>Acicarpha bonariensis</i> (Pers.) Herter	3500	(Ac.bona)	Herb	6.67	6.67	0	0	2	2	0	0
Capparaceae											
<i>Cynophalla flexuosa</i> (L.) J.Presl	3501	(Cy.fle)	Shrub	0	0	3.33	0	0			

Results and Discussion

Convolvulaceae

<i>Ipomoea imperati</i> (Vahl) Griseb.	3502	(Ip.imp)	Herb/ Vine	60	76.67	3.33	3.33	18	23	1	1
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<i>Ipomoea pes-caprae</i> (L.) R.Br.	3503	(Ip.pes)	Herb/ Vine	26.67	13.33	0	3.33	8	4	0	1
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Cyperaceae

<i>Fimbristylis cymosa</i> R.Br.	3504	(Fi.cym)	Herb	13.33	0	0	0	4	0	0	0
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<i>Fimbristylis</i> sp.	3505	(Fi.sp)	Herb	0	0	0	3.33	0	0	0	1
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<i>Lagenocarpus rigidus</i> Nees	3506	(La.rig)	Herb	0	0	3.33	0	0	0	1	0
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<i>Remirea maritima</i> Aubl.	3507	(Re.mar)	Herb	33.33	43.33	3.33	6.67	10	13	1	2
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Euphorbiaceae

<i>Chamaesyce</i> sp.	3508	(Cha.sp)	Herb	16.67	16.67	0	0	5	5	0	0
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Fabaceae

<i>Leucaena leucocephala</i> (Lam.) de Wit	3509	(Le.leu)	Shrub	0	0	13.33	6.67	0	0	4	2
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<i>Senna pendula</i> (Humb.& Bonpl.ex Willd.) H.S.Irwin & Barneby	3510	(Se.pen)	Shrub/ Tree / Vine	0	0	23.33	0	0	0	7	0
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<i>Sophora tomentosa</i> L.	3511	(So.tom)	Shrub	0	0	3.33	6.67	0	0	1	2
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Moraceae

<i>Maclura tinctoria</i> (L.) D.Don ex Steud.	3512	(Ma.tin)	Tree	0	0	6.67	0	0	0	2	0
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Myrsinaceae

<i>Myrsine parvifolia</i> A.DC.	3513	(My.par)	Shrub	0	0	36.67	0	0	0	11	0
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Myrtaceae

<i>Eugenia uniflora</i> L.		(E.uni)	Shrub	0	0	6.67	0	0	0	2	0
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Poaceae

<i>Cenchrus echinatus</i> L.	3514	(Ce.ech)	Herb	0	0	3.33	0	0	0	1	0
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<i>Panicum racemosum</i> (P. Beauv.) Spreng.	3515	(Pa.rac)	Herb	3.33	0	0	0	1	0	0	0
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<i>Paspalum maritimum</i> Trin.	3516	(P.mar)	Herb	0	0	16.67	6.67	0	0	5	2
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<i>Sporobolus virginicus</i> (L.) Kunth	3517	(Sp.vir)	Herb	10	0	3.33	3.33	3	0	1	1
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<i>Stenotaphrum secundatum</i> (Walter) Kuntze	3518	(St.sec)	Herb	40	60	10	20	12	18	3	6
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Polygalaceae

<i>Polygala cyparissias</i> A.St.-Hil. & Moq.	3519	(Po.cyp)	Herb/ Subshrub	3.33	3.33	0	0	1			
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Primulaceae

<i>Jacquinia armillaris</i> Jacq.	3520	(J.arm)	Shrub	0	0	0	6.67	0			
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Rhamnaceae

<i>Scutia arenicola</i> (Casar.) Reissek	3521	(Scu.aren)	Shrub	0	0	6.67	16.67	0			
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Sapotaceae

<i>Sideroxylon obtusifolium</i> (Roem. & Schult.) T.D.Penn.	3522	(Si.obt)	Shrub/ Tree	0	0	10	3.33	0			
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Indetermined

Sp2		(Sp2)	Tree	0	0	3.33	6.67	0			
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Results and Discussion

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Primulaceae											
<i>Jacquinia armillaris</i> Jacq.	3520	(J.arm)	Shrub	0	0	0	6.67	0			
Rhamnaceae											
<i>Scutia arenicola</i> (Casar.) Reissek	3521	(Scu.aren)	Shrub	0	0	6.67	16.67	0			
Sapotaceae											
<i>Sideroxylon obtusifolium</i> (Roem. & Schult.) T.D.Penn.	3522	(Si.obt)	Shrub/ Tree	0	0	10	3.33	0			
Indetermined											
Sp2		(Sp2)	Tree	0	0	3.33	6.67	0			

Results and Discussion

Table 1. Ecological indices by site (dune and restinga) in the rainy (May) and dry seasons (November) in Peró Beach, Cabo Frio, RJ.

Site	Sampling season	Total of individuals	Richness	Shannon (H')	Dominance (D)	Equitability (J')
Dune	Rainy (May)	79	16	2.3480	0.1226	0.8468
	Dry (Nov)	92	10	1.9580	0.1685	0.8505
Restinga	Rainy (May)	71	23	2.7940	0.0811	0.8912
	Dry (Nov)	45	19	2.6720	0.0913	0.9076

↑ abundance

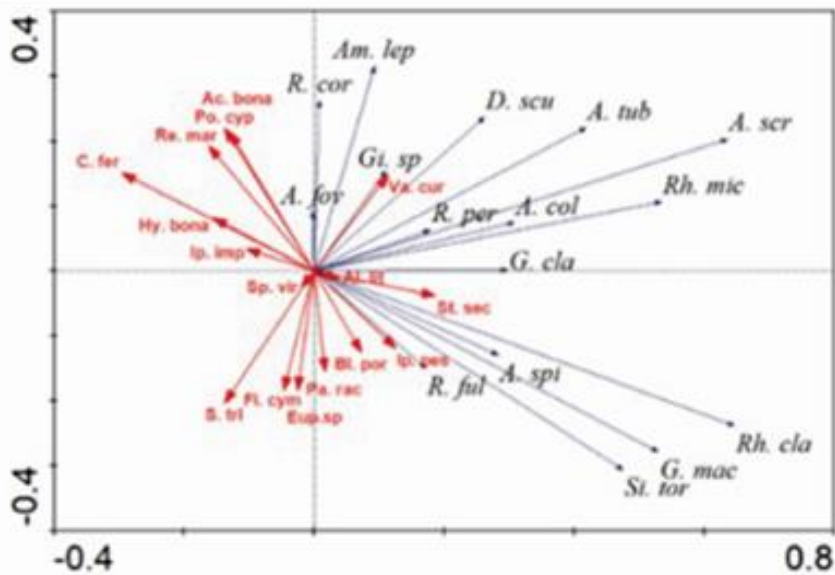
↑ diversity

Results and Discussion

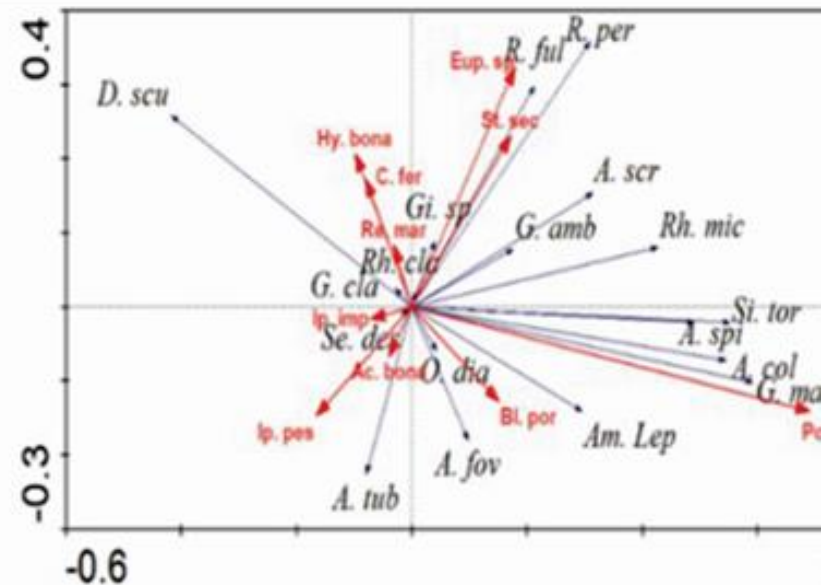
dune

Redundancy analysis (RDA) between the presence and absence of plant species related to the number of glomerospores from each fungal species and soil attributes

Rainy



Dry



Supplementary Materials

Table. Results of the permutation test to compare the mean values of dune (D) and restinga (R) community's richness, dominance, diversity (Shannon) and equitability between rainy (1) and dry (2) seasons

Comparison	Richness	Dominance	Shannon	Equitability
D1:R1	0,061	0,001*	0,003*	0,062
D1:D2	0,008*	0,04*	0,006*	0,918
D1:R2	0,805	0,162	0,172	0,124
R1:D2	0,001*	0,001*	0,001*	0,201
R1:R2	0,56	0,597	0,58	0,631
D2:R2	0,121	0,007*	0,003*	0,307

* significant p-values

Acknowledgments

This research was funded by Coordination of Improvement of Higher Level Personnel (CAPES) and Research Support Foundation of the State of Rio de Janeiro (FAPERJ), grant number E-26/010.001075/2015.

