

# Sandy Coastal Plain (Restinga): the open non-flooding herbaceous community in the northern Espírito Santo

Oberdan J. Pereira<sup>1</sup>, Juliana da S. Penha<sup>3</sup>, Bruna L. Xavier<sup>3</sup>, Rodrigo T. Valadares<sup>1,3,5</sup>, Valquíria F. Dutra<sup>3,4</sup>, Aline D. Firmino<sup>3,4</sup>, Luana B. Cardoso<sup>2,3</sup>, Mariela M. da Silva<sup>1,3,5</sup>, Diolina M. Silva<sup>1,3,5</sup> & Luis Fernando T. de Menezes<sup>1,2,3</sup>

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<sup>4</sup>Herbário VIES, <sup>5</sup>Núcleo de Estudos da Fotossíntese

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Brazilian coastal plains, known as restinga, are sandy deposits of marine or fluvial-marine origin formed in the Quaternary, in the Holocene, as well as in the Pleistocene and covered by plant formations ranging from the herbaceous, through shrub communities to those with forest physiognomies. Such communities may be subject to the outflow of the water table or not, being characterized as floodable or non-floodable, respectively. Still, they can present open areas, exposing the soil, characterizing the open communities or having the canopy of the plants touching each other, characterizing the closed communities. The herbaceous open non-flooding community occurs along the entire Brazilian coast and is located close to the beach line, above the average level of high tides, and may, in some stretches of the coast, show a zoning of species towards the sea – continent.

The restinga species are constantly subjected to adverse conditions, such as saline spraying from the sea, strong winds, burial by the sands, high luminosity, high temperatures and high concentrations of salt in the air and soil. Such conditions trigger functional responses such as changes in biochemical pathways for efficient use of water and protection against excess light, the synthesis of osmolytes, changes in photosynthetic and respiratory pathways, changes in membrane structure and increased activity of the antioxidant system. In addition such events work as biological filters that prevent the establishment of species that do not have adaptive conditions to survive in this community, such as: creeping, rhizomatous stems, succulent leaves and mechanisms that allow the roots to absorb little salt; maintaining high concentrations of salt in the vacuoles and eliminating salt absorbed by the roots by other plant structures, mainly the leaves. Seasonally this formation is altered where it is closest to the sea by the spring tides or spring storms, occurring the movement of sediments, altering the topographic profile, reaching the vegetation and eradicating species over time are restored.



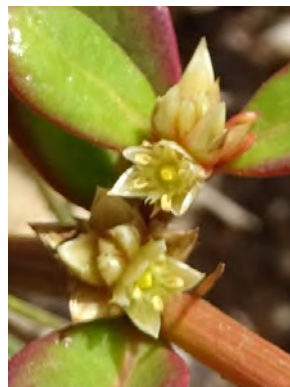
APA de Conceição da Barra, Conceição da Barra, Espírito Santo - The open non-flooding herbaceous community



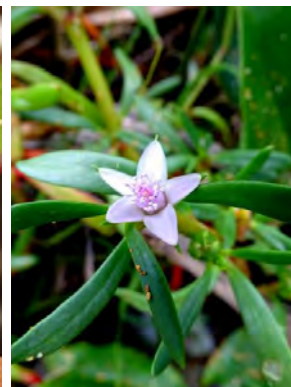
1 *Alternanthera littoralis*  
AMARANTHACEAE



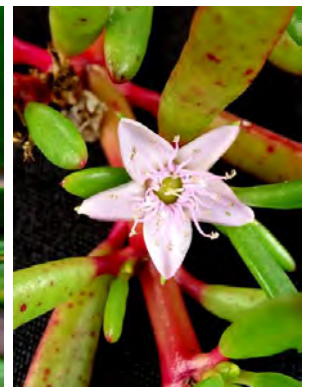
2 *Alternanthera littoralis*  
AMARANTHACEAE



3 *Alternanthera littoralis*  
AMARANTHACEAE



4 *Sesuvium portulacastrum*  
AIZOACEAE



5 *Sesuvium portulacastrum*  
AIZOACEAE

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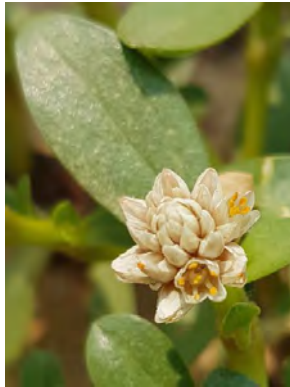
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6 *Blutaparon portulacoides*  
AMARANTHACEAE



7 *Blutaparon portulacoides*  
AMARANTHACEAE



8 *Oxypetalum banksii*  
APOCYNACEAE



9 *Oxypetalum banksii*  
APOCYNACEAE



10 *Oxypetalum banksii*  
APOCYNACEAE



11 *Peplonia asteria*  
APOCYNACEAE



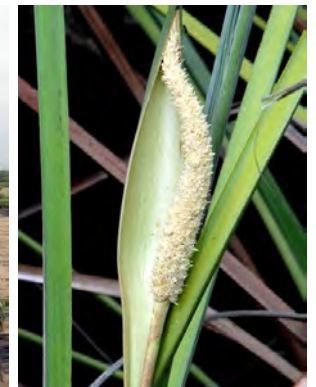
12 *Peplonia asteria*  
APOCYNACEAE



13 *Peplonia asteria*  
APOCYNACEAE



14 *Allagoptera arenaria*  
ARECACEAE



15 *Allagoptera arenaria*  
ARECACEAE



16 *Allagoptera arenaria*  
ARECACEAE



17 *Allagoptera arenaria*  
ARECACEAE



18 *Aspilia floribunda*  
ASTERACEAE



19 *Aspilia floribunda*  
ASTERACEAE



20 *Myriopus membranaceus*  
BORAGINACEAE

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21 *Myriopus membranaceus*  
BORAGINACEAE



22 *Varronia curassavica*  
BORAGINACEAE



23 *Varronia curassavica*  
BORAGINACEAE



24 *Varronia curassavica*  
BORAGINACEAE



25 *Cereus fernambucensis*  
CACTACEAE



26 *Cereus fernambucensis*  
CACTACEAE



27 *Cereus fernambucensis*  
CACTACEAE



28 *Cereus fernambucensis*  
CACTACEAE



29 *Pilosocereus arrabidaei*  
CACTACEAE



30 *Pilosocereus arrabidaei*  
CACTACEAE



31 *Pilosocereus arrabidaei*  
CACTACEAE



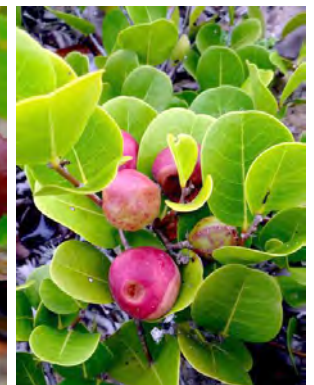
32 *Pilosocereus arrabidaei*  
CACTACEAE



33 *Chrysobalanus icaco*  
CHRYSOBALANACEAE



34 *Chrysobalanus icaco*  
CHRYSOBALANACEAE



35 *Chrysobalanus icaco*  
CHRYSOBALANACEAE

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The open non-flooding herbaceous community  
Barra Nova Sul, São Mateus – Espírito Santo



The open non-flooding herbaceous community  
Reserva Biológica de Comboios, Linhares – Espírito Santo



36 *Ipomoea imperati*  
CONVOLVULACEAE



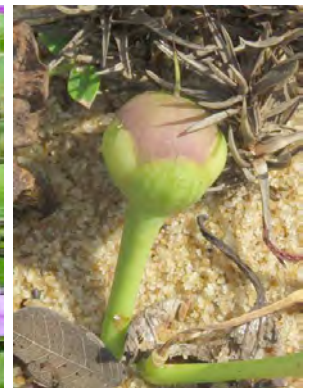
37 *Ipomoea imperati*  
CONVOLVULACEAE



38 *Ipomoea pes-caprae*  
CONVOLVULACEAE



39 *Ipomoea pes-caprae*  
CONVOLVULACEAE



40 *Ipomoea pes-caprae*  
CONVOLVULACEAE



41 *Ipomoea pes-caprae*  
CONVOLVULACEAE



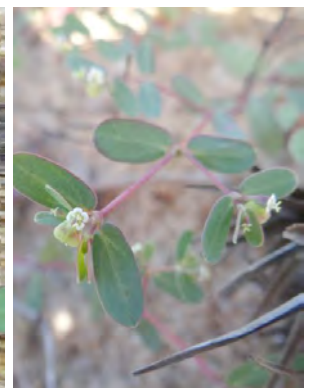
42 *Cyperus pedunculatus*  
CYPERACEAE



43 *Cyperus pedunculatus*  
CYPERACEAE



44 *Euphorbia bahiensis*  
EUPHORBIACEAE



45 *Euphorbia bahiensis*  
EUPHORBIACEAE

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46 *Canavalia rosea*  
FABACEAE



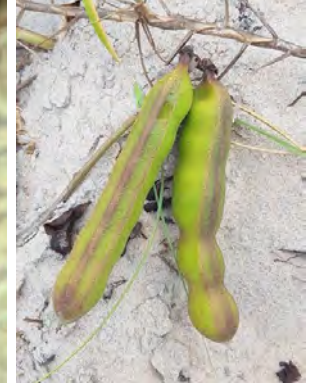
47 *Canavalia rosea*  
FABACEAE



48 *Canavalia rosea*  
FABACEAE



49 *Canavalia rosea*  
FABACEAE



50 *Canavalia rosea*  
FABACEAE



51 *Canavalia rosea*  
FABACEAE



52 *Chamaecrista flexuosa*  
FABACEAE



53 *Chamaecrista flexuosa*  
FABACEAE



54 *Chamaecrista flexuosa*  
FABACEAE



55 *Chamaecrista flexuosa*  
FABACEAE



56 *Chamaecrista ramosa*  
FABACEAE



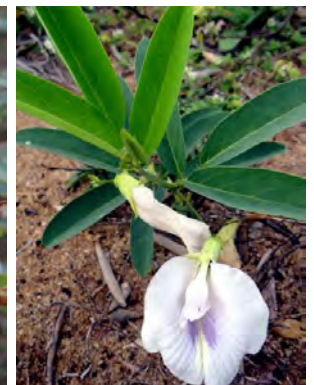
57 *Chamaecrista ramosa*  
FABACEAE



58 *Chamaecrista ramosa*  
FABACEAE



59 *Chamaecrista ramosa*  
FABACEAE



60 *Clitoria laurifolia*  
FABACEAE

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61 *Clitoria laurifolia*  
FABACEAE



62 *Stylosanthes viscosa*  
FABACEAE



63 *Stylosanthes viscosa*  
FABACEAE



64 *Scaevola plumieri*  
GOODENIACEAE



65 *Scaevola plumieri*  
GOODENIACEAE



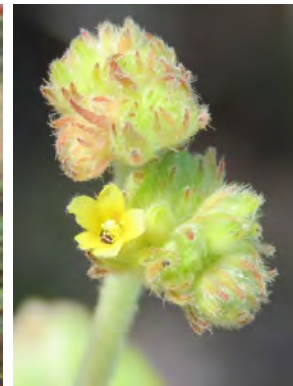
66 *Scaevola plumieri*  
GOODENIACEAE



67 *Scaevola plumieri*  
GOODENIACEAE



68 *Waltheria indica*  
MALVACEAE



69 *Waltheria indica*  
MALVACEAE



70 *Mollugo verticillata*  
MOLLUGINACEAE



71 *Mollugo verticillata*  
MOLLUGINACEAE



72 *Mollugo verticillata*  
MOLLUGINACEAE



73 *Axonopus pressus*  
POACEAE



74 *Axonopus pressus*  
POACEAE



75 *Axonopus pressus*  
POACEAE

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76 *Panicum racemosum*  
POACEAE



77 *Panicum racemosum*  
POACEAE



78 *Paspalum arenarium*  
POACEAE



79 *Paspalum arenarium*  
POACEAE



80 *Paspalum arenarium*  
POACEAE



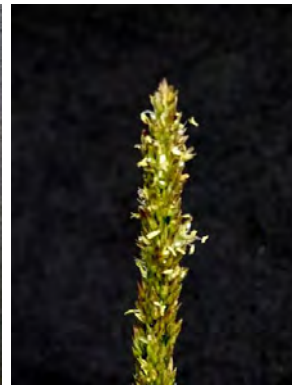
81 *Paspalum vaginatum*  
POACEAE



82 *Paspalum vaginatum*  
POACEAE



83 *Sporobolus virginicus*  
POACEAE



84 *Sporobolus virginicus*  
POACEAE



85 *Stenotaphrum secundatum*  
POACEAE



86 *Stenotaphrum secundatum*  
POACEAE



87 *Polygala cyparissias*  
POLYGALACEAE



88 *Polygala cyparissias*  
POLYGALACEAE



89 *Portulaca mucronata*  
PORTULACACEAE



90 *Portulaca mucronata*  
PORTULACACEAE

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91 *Mitracarpus eichleri*  
RUBIACEAE



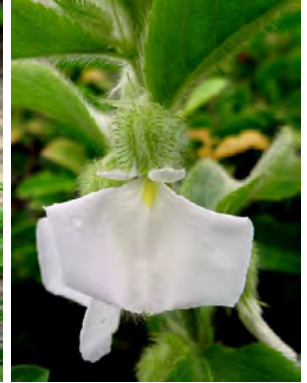
92 *Mitracarpus eichleri*  
RUBIACEAE



93 *Mitracarpus eichleri*  
RUBIACEAE



94 *Pombalia calceolaria*  
VIOLACEAE



95 *Pombalia calceolaria*  
VIOLACEAE



The open non-flooding herbaceous community  
Shifting of beach topographic profile caused by wave action.  
APA Conceição da Barra, Conceição da Barra, Espírito Santo



The open non-flooding herbaceous community  
Natural reestablishment of the topographic profile with replacement of vegetation.  
APA Conceição da Barra, Conceição da Barra, Espírito Santo

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