

Supplementary Information 4

Principle Components Analysis (PCA) for the species prior to SDM parameterisation. For models looking at *Asparagopsis armata* in its natural habitat in Irish waters, the PCA identified eleven environmental variables which were not too collineated and which contribute to the overall environmental variation, to then be used for the SDM modelling of *A.armata*. The following were considered: (1) Nitrate, (2) Phosphate, (3) Dissolved Oxygen, (4) Mean of Diffuse attenuation, (5) Sea surface salinity, (6) Sea surface temperature range, (7) Sea surface temperature Max , (8) pH , (9) distance from shore, (10) Bathymetry and (11) *Ulva lactuca* species distribution.

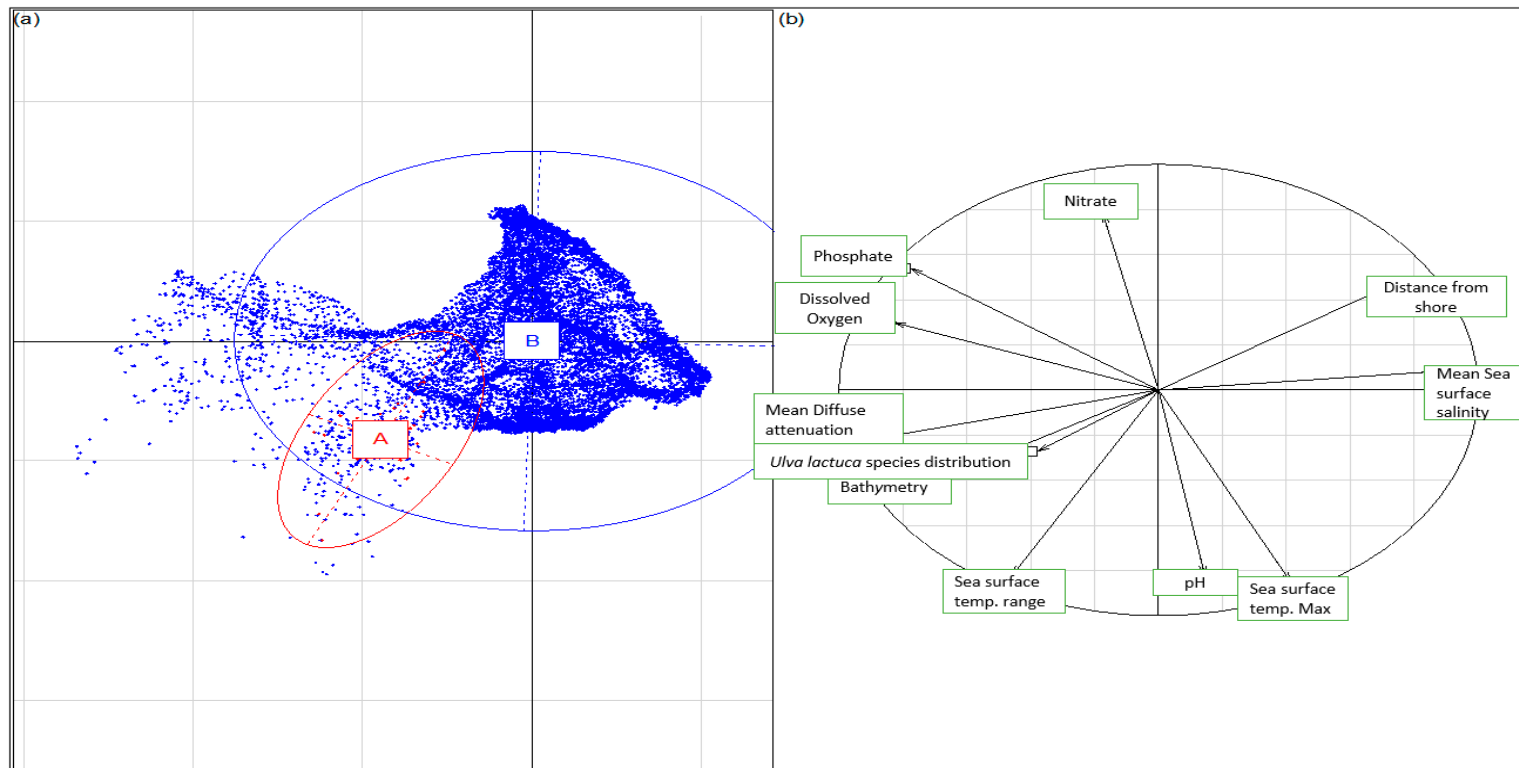


Figure SI4.1 Distribution points of *Asparagopsis armata* (A) in the Irish environmental space defined by the first two PCA axes (a) and correlation circle of the selected environmental variables as a function of the same first two PCA axes (b). (Layer 2= Bathymetry, Layer 4=Diffuse attenuation, Layer 6= Distance from shore, Layer 8= Dissolved oxygen, Layer 10= Nitrate. Layer 12= pH, Layer 14= Phosphate, Layer 16= mean sea surface salinity, Layer 18= maximum sea surface temperature , Layer 20= sea surface temperature range and *Ulva.lactuca*=*Ulva lactuca* species distribution.)

For models looking at the habitat suitability of *A. taxiformis* in its natural habitat, the PCA identified six environmental variables based on, which variables were not too collinear and which contribute to the overall environmental variation, to then be used for the SDM modelling of *A. taxiformis*. The following were considered: (1) Nitrate, (2) Mean of Diffuse attenuation, (3) Sea surface salinity, (4) Sea surface temperature range, (5) Sea surface temperature Max and (6) pH.

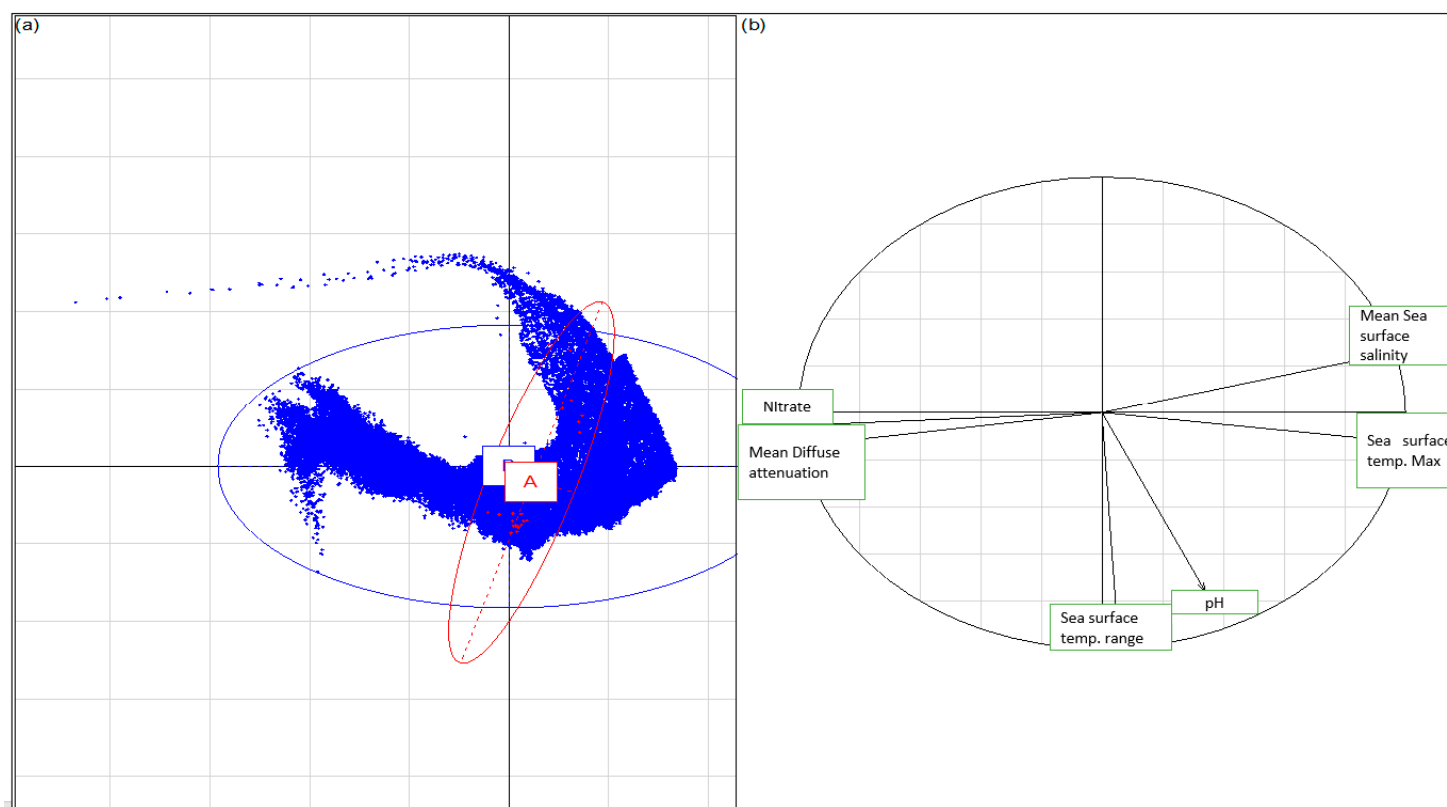


Figure SI4.2 Distribution points of *Asparagopsis taxiformis* (A) in the Portuguese environmental space defined by the first two PCA axes (a) and correlation circle of the selected environmental variables as a function of the same first two PCA axes (b).