**Supplementary material**

**Fig. S1.** a) Distribution of *Euterpe edulis* occurrence records (red points). The Atlantic Forest is show in green. b) Estimates of *E. edulis* population density (black points) and climatic suitability for the species across the Atlantic Forest.

**Fig. S2.** Relationships between environmental suitability and population density in low-versus high-density populations of *Euterpe edulis* in the Brazilian Atlantic Forest for (a) adults, (b) intermediate-class individuals, and (c) seedlings. Density values are represented as ln(individuals/ha). Statistically significant relationships (*P* ≤ 0.05) are highlighted in bold.

**Fig. S3.** Relationships between environmental suitability and population density in populations of *Euterpe edulis* located inside and outside protected areas in the Brazilian Atlantic Forest. Relationships are shown separately for (a) adults, (b) intermediate-class individuals, and (c) and seedlings. Density values are represented as ln(individuals/ha). Statistically significant relationships (*P* ≤ 0.05) are highlighted in bold.

**Table S1**. Statistical results considering environmental suitability estimated from the ecological niche models (ENMs) that included Normalized Difference Vegetation Index (NDVI), in addition to climatic variables and elevation. Mean (± SD) of AUC and TSS for these ENMs were 0.99 (± 0.01) and 0.94 (± 0.05), respectively. The first column (Analysis) shows the linear model applied to the data (dependent variable ~ independent variables). Only the relevant statistics are shown for each model as in the Results section of the main text.

|  |  |  |  |
| --- | --- | --- | --- |
| **Analysis** | ***t*** | ***P*** | **R2** |
| *a) Overall effects of environmental suitability* | | | |
| Population density ~ suitability | 4.24 | **<0.001** | 0.27 |
| Per capita seedling density ~ suitability | 1.95 | **0.05** | 0.08 |
|  |  |  |  |
| *b) Combined effects of environmental suitability and density-dependence* | | | |
| Population density ~ suitability [high-density populations] | 0.15 | 0.88 | - |
| Population density ~ suitability [low-density populations] | 4.90 | **<0.001** | - |
| Per capita seedl. dens. ~ suitability [high-density populations] | -1.22 | 0.23 | - |
| Per capita seedl. dens. ~ suitability [low-density populations] | 9.05 | **0.04** | - |
|  |  |  |  |
| *c) Combined effects of environmental suitability and protection status* | | | |
| Population density ~ suitability \* protection status | - | **-** | 0.35 |
| Per capita seedling density ~ suitability \* protection status | - | **-** | 0.08 |
| Population density ~ suitability [high-density populations] | -0.60 | 0.55 | - |
| Population density ~ suitability [low-density populations] | 3.15 | **0.006** | - |
| Per capita seedl. dens. ~ suitability [high-density populations] | 0.23 | 0.82 | - |
| Per capita seedl. dens. ~ suitability [low-density populations] | 1.34 | 0.19 | - |

**Table S2**. Summary results for linear models considering interactions among explanatory variables. Four models were fitted to the data, relating either population density (a and c) or per capita seedling density (b and d) with either environmental suitability interacting with density class (a and b), or environmental suitability interacting with protection status (c and d). Statistically significant values (*P* ≤ 0.05) are highlighted in bold. The coefficient of determination (*R2*) of each model is also shown. The main focus of these analyses was on the interaction term, to assess whether the effects of environmental suitability on density differed in low- versus high-density populations (or protected versus unprotected populations). The individual effect of the explanatory variable “density class” was not interpreted (NA) because it was obviously statistically significant, as this variable was built directly from the dependent variable (i.e., from the values of density). For the same reason, the *R2* values presented in sections a and b should not be interpreted biologically.

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| --- | --- | --- | --- | --- | --- |
|  | **Df** | **Sum Sq** | **Mean Sq** | **F** | **P** |
| *a) Population density ~ Env. suitability \* Density class (R2 = 0.70)* | | | | | |
| Env. suitability | 1 | 85.83 | 85.83 | 49.56 | **<0.001** |
| Density class | NA | NA | NA | NA | NA |
| Env. suitability : Density class | 1 | 18.19 | 18.19 | 10.50 | **0.002** |
|  |  |  |  |  |  |
| *b)* Per capita *seedling density ~ Env. suitability \* Density class (R2 = 0.55)* | | | | | |
| Env. suitability | 1 | 28.22 | 28.22 | 20.43 | **<0.001** |
| Density class | NA | NA | NA | NA | NA |
| Env. suitability : Density class | 1 | 6.14 | 6.14 | 4.72 | **0.05** |
|  | | | | | |
| *c) Population density ~ Env. suitability \* Protection status (R2 = 0.46)* | | | | | |
| Env. suitability | 1 | 85.83 | 85.83 | 27.70 | **<0.001** |
| Protection status | 1 | 7.64 | 7.64 | 2.47 | 0.12 |
| Env. suitability : Protection status | 1 | 29.91 | 29.91 | 9.65 | **0.003** |
|  |  |  |  |  |  |
| *d)* Per capita *seedling density ~ Env. suitability \* Protection status (R2 = 0.21)* | | | | | |
| Env. suitability | 1 | 28.22 | 28.22 | 11.73 | **0.001** |
| Protection status | 1 | 0.14 | 0.14 | 0.06 | 0.81 |
| Env. suitability : Protection status | 1 | 0.23 | 0.23 | 0.09 | 0.76 |