**Paper title:** Effects of climatic variability and local environment patterns on the ecology and population structure of the multipurpose plant species, Vitex doniana Sweet (Lamiaceae) in Benin

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**Table S1.** Pairwise Jaccard’s similarity index according to climatic zones.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Guinean** | **Sudano-Guinean** | **Sudanian** |
| **Guinean** | 1 |  |  |
| **Sudano-Guinean** | 0.41 | 1 |  |
| **Sudanian** | 0.33 | 0.44 | 1 |

**Note:** Jaccard’s similarity index < 0.5 indicates dissimilarity among the communities

**Table S2.** Pairwise Jaccard’s similarity index according to climatic zones and land cover types. G- = Guinean; S- = Sudanian; SG- = Sudano-Guinean; MCF= Mosaics of croplands and fallows; OFW = Open forests and woodlands; Plt = Plantation; RF = Riparian forests; TSS = Tree and shrub savannahs.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **G-MCF** | **G-OFW** | **G-Plt** | **G-TSS** | **S-MCF** | **S-OFW** | **S-RF** | **S-TSS** | **SG-MCF** | **SG-OFW** | **SG-Plt** | **SG-RF** |
| **G-OFW** | 0.13 | 1 |  |  |  |  |  |  |  |  |  |  |
| **G-Plt** | 0.05 | 0 | 1 |  |  |  |  |  |  |  |  |  |
| **G-TSS** | 0.3 | 0.06 | 0.08 | 1 |  |  |  |  |  |  |  |  |
| **S-MCF** | 0.27 | 0.09 | 0.05 | 0.25 | 1 |  |  |  |  |  |  |  |
| **S-OFW** | 0.16 | 0.2 | 0 | 0.31 | 0.25 | 1 |  |  |  |  |  |  |
| **S-RF** | 0.13 | 0.08 | 0 | 0.27 | 0.13 | 0.17 | 1 |  |  |  |  |  |
| **S-TSS** | 0.29 | 0.1 | 0.04 | 0.19 | 0.55 | 0.19 | 0.21 | 1 |  |  |  |  |
| **SG-MCF** | 0.28 | 0.1 | 0.04 | 0.15 | 0.28 | 0.18 | 0.25 | 0.33 | 1 |  |  |  |
| **SG-OFW** | 0.3 | 0.14 | 0 | 0.3 | 0.36 | 0.32 | 0.35 | 0.45 | 0.48 | 1 |  |  |
| **SG-Plt** | 0.24 | 0.13 | 0 | 0.15 | 0.3 | 0.24 | 0.22 | 0.39 | 0.42 | 0.63 | 1 |  |
| **SG-RF** | 0.23 | 0.15 | 0.06 | 0.17 | 0.33 | 0.21 | 0.19 | 0.34 | 0.42 | 0.38 | 0.48 | 1 |
| **SG-TSS** | 0.4 | 0.14 | 0.06 | 0.24 | 0.31 | 0.17 | 0.19 | 0.41 | 0.47 | 0.53 | 0.44 | 0.33 |

**Table S3.** Pairwise Jaccard’s similarity index according to climatic zones and distance to the closest river. G- = Guinean; S- = Sudanian; SG- = Sudano-Guinean; Class1= less than 500m; Class2 = between 500 and 1000m; Class3 = between 1000 and 1500m; Class4 = more than 1500m.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **G-class1** | **G-class2** | **G-class3** | **G-class4** | **S-class1** | **S-class2** | **S-class3** | **S-class4** | **SG-class1** |
| **G-class2** | 0.61 | 1 |  |  |  |  |  |  |  |
| **G-class3** | 0.17 | 0.35 | 1 |  |  |  |  |  |  |
| **G-class4** | 0.24 | 0.32 | 0.5 | 1 |  |  |  |  |  |
| **S-class1** | 0.33 | 0.24 | 0.06 | 0.05 | 1 |  |  |  |  |
| **S-class2** | 0.23 | 0.2 | 0.04 | 0.07 | 0.41 | 1 |  |  |  |
| **S-class3** | 0.19 | 0.19 | 0.17 | 0.17 | 0.32 | 0.33 | 1 |  |  |
| **S-class4** | 0.15 | 0.19 | 0.07 | 0.05 | 0.24 | 0.29 | 0.29 | 1 |  |
| **SG-class1** | 0.38 | 0.37 | 0.15 | 0.18 | 0.43 | 0.2 | 0.21 | 0.13 | 1 |
| **SG-class2** | 0.35 | 0.26 | 0.03 | 0.06 | 0.47 | 0.27 | 0.21 | 0.22 | 0.49 |

**Table S4.** Structural parameters of *V. doniana* (dbh ≥ 5 cm) according to climatic zones and distance to the closest river. Values are mean ± 1 SD. *P* values computed from log-transformed data (y = log(x)) for Dg, Ba and HL for the comparison of the 3 climatic zones (last column) and classes of distance to the closest river (lines). On lines, values followed by the same letters are not statistically different at *P* < 0.05. Classes of distance to the closest river: class1= < 500 m; class2 = 500–1000 m; class3 = 1000–1500 m; class4 = > 1500 m.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Distance to the closest river | Guinean | Sudano-Guinean | Sudanian | *P* |
| Density (N, stems ha−1) | | | | |
| class1 | 16.74±10.40 | 17.38±11.08 | 15.43±8.86 | 0.575 |
| class2 | 14.00±8.28 | 14.00±5.48 | 16.47±11.69 | 0.641 |
| class3 | 15.00±7.30 | - | 18.33±7.53 | 0.316 |
| class4 | 17.65±16.78 | - | 25.71±15.12 | 0.195 |
| *P* | 0.597 | 0.412 | 0.089 |  |
| Density of regeneration (Nreg, plants ha−1) | | | | |
| class1 | 3.86±6.93 | 5.94±7.63 | 4.06±8.08 | 0.533 |
| class2 | 6.53±7.84 | 5.60±6.54 | 4.12±4.72 | 0.706 |
| class3 | 8.00±a7.66 | - | 2.00±b3.10 | 0.048 |
| class4 | 6.35±4.54 | - | 9.71±11.91 | 0.397 |
| *P* | 0.40 | 0.946 | 0.561 |  |
| Mean diameter (Dg, cm) | | | | |
| class1 | 21.63±10.71a | 23.56±20.22a | 39.77±25.62b | 0.000 |
| class2 | 21.52±14.90 | 16.44±11.10 | 30.92±19.03 | 0.108 |
| class3 | 25.85±11.18a | - | 57.36±22.37b | 0.004 |
| class4 | 19.39±13.80a | - | 30.76±7.16b | 0.014 |
| *P* | 0.364 | 0.494 | 0.161 |  |
| Basal area (Ba, m2 ha−1) | | | | |
| class1 | 0.65±0.57a | 1.20±2.07a | 2.51±2.88b | 0.002 |
| class2 | 0.62±0.77 | 0.47±0.65 | 1.56±2.42 | 0.085 |
| class3 | 0.94±0.78a | - | 4.47±2.74b | 0.003 |
| class4 | 0.57±0.73a | - | 1.81±1.09b | 0.004 |
| *P* | 0.363 | 0.376 | 0.08 |  |
| Contribution to stand basal area (Cs, %) | | | | |
| class1 | 30.94±25.12 | 23.68±21.00 | 33.54±31.79 | 0.129 |
| class2 | 51.90±31.99a | 8.18±6.84b | 27.10±21.01b | 0.003 |
| class3 | 61.46±29.12 | - | 52.44±30.73 | 0.531 |
| class4 | 37.08±27.88 | - | 43.37±17.39 | 0.588 |
| *P* | 0.001 | 0.107 | 0.234 |  |
| Mean height of Lorey (HL, m) | | | | |
| class1 | 6.46±3.42 | 8.07±5.58 | 8.68±3.60 | 0.08 |
| class2 | 6.90±3.07 | 7.09±3.08 | 7.60±3.79 | 0.944 |
| class3 | 8.92±3.06 | - | 7.66±1.51 | 0.665 |
| class4 | 6.71±3.52 | - | 7.20±1.01 | 0.364 |
| *P* | 0.10 | 0.941 | 0.735 |  |