**The roots of blue carbon: Responses of mangrovestilt roots to variation in soil bulk density.**

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**Supplementary material 1.** Protocol for the preparation of root histologies.

Root cross-sectional slices were fixed in FAA for 48 hours. After fixation, the samples were rinsed in distilled water and dehydrated for one hour each using a series of ethanol (70-90-100-100), followed by two changes of acetone. The samples were then submerged in paraffin wax at 65°C for 1 h and dried for 12 h at 65°C at -60 psi in a vacuum oven. Subsequently, the samples were sectioned (thickness: 12 μm) on a Leica RM 2245 rotary microtome. The resulting slices were stained with 0.05% Fast Green FCF solution (10 min), rinsed with 1% acetic acid (15 s) and stained again in 0.1% Safranin O (5 min) prior being mounted using DPX mounting medium.

**Supplementary material T1.** Composition of the growth substrate (450 ml) for all bulk densities (BD, g cm-3) tested, as well as corresponding penetrometer resistance (kPa) and volumetric water content at saturation (%).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **BD**  **(g cm-3)** | **Peat**  **(g)** | **Perlite (g)** | **Sand**  **(g)** | **Penetrometer**  **resistance ± SE (kPa)** | **Volumetric water content at saturation ± SE (%)** |
| **0.4** | 10.6 | 14.3 | 156.6 | 6.3 ± 0.5 | 51.7 ± 4.6 |
| **0.8** | 10.6 | 7.3 | 345.6 | 10.3 ± 0.7 | 50.6 ± 0.8 |
| **1.2** | 10.6 | 0.4 | 529.2 | 17.9 ± 1.6 | 44.5 ± 2.0 |

**Supplementary material F1** Schematic drawing of the experimental system. Three in-growth-containers were filled with soil BD of either 0.4, 0.8 or 1.2 g cm-3, which were placed under stilt roots from seven experimental trees to assess below-ground root growth of *Rizophora stylosa* stilt roots when they penetrated the soil.

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**Supplementary material F2** Schematic drawing showing the stilt root fractions, below-ground root types, as well as anatomical features of the cross-sectional slices studied.

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