Box 1: Schematic flow-chart for 3D model acquisition showing light and confocal microscopy images, and 3D model of the same seven month old Coscinoderma matthewsi/juvenile

Methodology
- **Post-settlement mortality**
  Larvae were settled onto sterile 6-well plates at densities of 0.1, 0.2, 0.5 and 1 larvae cm\(^{-2}\) and maintained in an outdoor raceway with flow-through seawater. Juvenile survival was monitored monthly for seven months (n\(_{\text{larvae}}\) = 50 per treatment).

- **Post-settlement growth and accuracy of 2D measurements**
  Juvenile size (surface area, 2D) at settlement and seven months was measured under light microscopy (n = 6). Juvenile size (volumes, 3D) was also determined using computed tomography of Z slice photos from confocal microscopy (Box 1) (n = 6).

Results
- **Post-settlement mortality**
  Post-settlement mortality was independent of settlement density and ranged between 70 - 88% at seven months (Kaplan-Meier survival analysis: p > 0.05) (Figure 1).

- **Post-settlement growth and accuracy of 2D measurements**
  Growth as measured by changes in surface area (2D) and volume (3D) were both significant at seven months (t-test and Mann-Whitney U test: p < 0.05). Percentage growth obtained using the 2D methods was 85% while the 3D method yielded 190% growth.

Conclusion
- Density independent post-settlement mortality demonstrates that juveniles are not influenced by negative conspecific interactions and are more likely to be affected by inter-specific interactions and environmental factors such as sedimentation.

- High mortality during post-settlement (up to 88%) compared to “at settlement” (2%) supports a proposal that post-settlement processes play a vital role in adult population dynamics.

- Surface area is unsuitable as a proxy of size and growth estimates in sponges with massive morphologies contributing to underestimation of values.

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References