HIGH IN SITU SETTLEMENT RATES AND EARLY SURVIVORSHIP OF HARD CORALS IN A CARIBBEAN REEF

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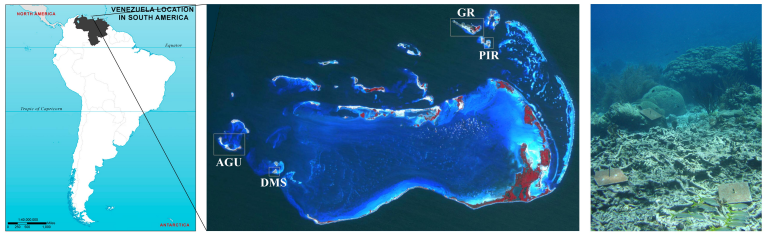
Why: Coral settlement and early survivorship are key ecological processes in reef resilience.

What: In situ coral settlement and post-settlement survivorship in different reefs with high and low coral cover in Los Roques Archipelago, Venezuela.



How: Terracotta tiles (n=15) were deployed at reefs with high (>50%) or low (<15%) hard coral cover, and recruit survivorship was evaluated during their first 4-months of age by monthly examination of tiles. Tiles were deployed in two seasons: months of expected gamete release for broadcasters (S1) and months when larval was expected mainly from brooders (S2).

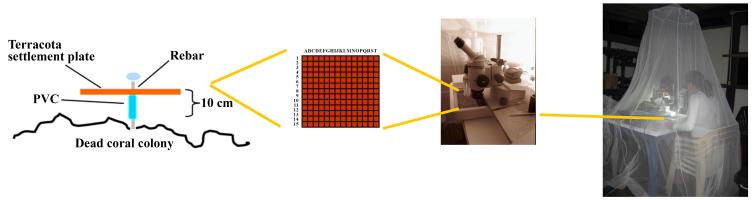


Figure 3: Dissecting microscope photographs of common settlers

Settlement rates

- Varied between reefs from 30 ± 46 to 236 ± 143 individuals m^{-2} $month^{-1}$ (mean ± SD)
- Were similar between seasons (S1 & S2) suggesting that settlement does not increase significantly after a spawning event.
- At specific reefs (Fig 4a), it was up to 7 times higher than for other Caribbean reefs and among higher rates around the globe (Fig 4b).

Survivorship

- Survivorship of settled corals up to 4-months old varied from 22 to 49% between reefs and was higher at reefs with more coral cover (Fig 5).

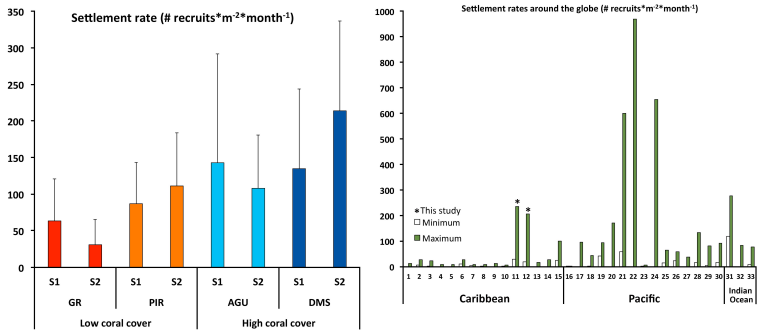


Figure 4: a) Average settlement rates in the reefs with low coral cover (GR and PIR) and high coral cover (DMS and AGU) during broadcast spawning season (S1) and brooding season (S2). Error bars indicate standard deviations.**b)** Comparison of settlement rates around the globe. 1.Hunte and Wittenberg (1992); 2.Tomascik (1991); 3.Smith (1985); 4.Arnold et al. (2010); 5.Mallela and Crabbe (2009); 6.Carlon (2001); 7.Smith (1997); 8.van Woesik et al. (2014); 9.Green and Edmunds (2011); 10.Rodríguez et al. (2008); 11-12.This study; 13. Glassom et al. (2004); 14.Abelson et al. (2005); 15.Field et al. (2007); 16.Medina-Rosas et al. (2005); 17.Maida et al. (2001); 18.Hughes et al. (2000); 19.Babcock (1988); 20.Harriott and Fisk (1987); 21.Fisk and Harriott (1990); 22.Fisk and Harriott (1992); 23.Mundy (2000); 24.Baird and Hughes (2000); 25.Harriott and Banks (1995); 26.Sawall et al. (2013); 27.Soong et al. (2003); 28.Victor (2008); 29.Gleason (1996); 30.Penin and Adjeroud (2013); 31.Chong-Seng et al. (2014); 32.Glassom et al. (2006); 33. Mangubhai and Harrison (2007).

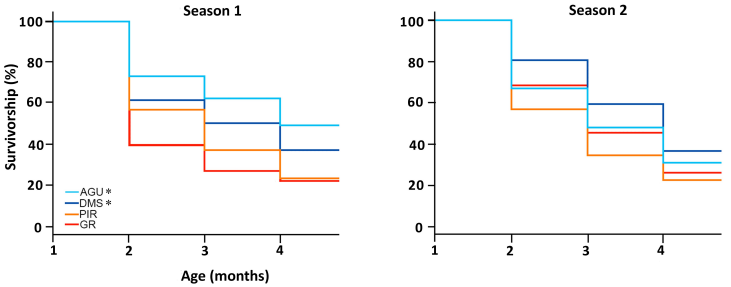


Figure 5: Survivorship of settlers from 4 weeks up to 4 months old through re-examination of plates (* = reefs with high coral cover; >50%)

Conclusion:

- Our results support the theory that preserving reefs with high coral cover (and maintaining the biological and environmental factors that promote this condition) will result in enhanced settlement and survival of coral in its early life-stages, and therefore is a key factor in the conservation of coral reefs.