The following supplement accompanies the article

Incorporating herbivorous sea urchins in ramet culture of staghorn coral *Acropora cervicornis*

J. E. Serafy[1,2,*], P. Gillette[2], M. W. Miller[1], D. Lirman[2], T. R. Capo[2]

[1]National Marine Fisheries Service, Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, Florida 33149, USA
[2]University of Miami, Rosenstiel School of Marine and Atmospheric Science, 4600 Rickenbacker Causeway, Miami, Florida 33149, USA

*Email: joe.serafy@noaa.gov

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Supplement. Cost estimates associated with using urchins versus human labor to control algal overgrowth at different levels of staghorn coral ramet production.

Cost comparison: urchins versus scraping

To quantify the potential trade-offs associated with and without incorporating urchins into coral ramet production, we performed a simple cost comparison for a range of hypothetical operations producing from 100 to 2000 ramet units in a production cycle. In this exercise, the target unit was a 500 mm^2 coral ramet, which our growth rates indicated could be produced in 23 and 38 wk, respectively, with manual scraping versus urchin addition (Table S1A). We estimated that the scraping effort required per ramet per week was 1.2 min (0.02 h) and assumed that urchin production and maintenance costs were fixed, requiring a total of 10 h of labor for 3000 urchins. As was the case in our experiment, we assumed 1.33 urchins $ramet^{-1}$ and that excess urchins would be held in reserve in the case of urchin mortality. Facility rental and operation costs were assumed to be fixed at \$250 wk^{-1}, and the hourly labor rate, for either scraping or urchin culture, was set at \$12. Results of this cost comparison (Table S1B) suggest that incorporating urchins is likely not cost-effective when producing batches of <700 ramets (Fig. S1), but could be substantial in operations producing 1000 or more ramets.

Table S1. Effort and fixed costs (S1A) and expected total costs (S1B) at increasing levels of staghorn coral ramet production

(A) Data for cost comparisons					
	Urchin production & maintenance (total h)	Scraping effort (h $ramet^{-1}$)	Production cycle duration (wk)	Labor cost (h^{-1})	Facility rental & operation cost (wk^{-1})
Urchin grazing	10	0	38	\$12	\$250
Manual scraping	0	0.02	23	\$12	\$250
(B) Costs according to no. of ramets produced					
	100	500	1000	1500	2000
Urchin grazing	\$9620	\$9620	\$9620	\$9620	\$9620
Manual scraping	\$6302	\$8510	\$11270	\$14030	\$16790

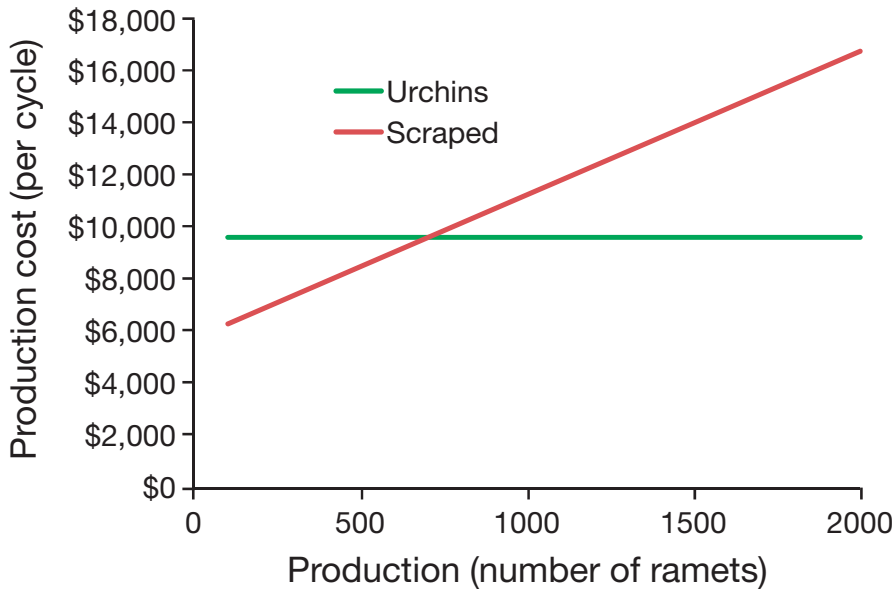

Fig. S1. Comparison of costs associated with algal overgrowth control using urchins versus human labor at different levels of staghorn coral ramet production