

Supplementary Material:

Table S1: Osmocote® Fertiliser composition

Coated Micronutrient	Amount
Ammoniacal Nitrogen*	8 %
Nitrate*	7 %
Phosphate (P ₂ O ₅)*	9 %
Soluble Potash (K ₂ O)*	12 %
Magnesium*	1.3 %
Sulfur*	5.9 %
Boron	0.02 %
Copper	0.05 %
Iron*	0.46 %
Manganese*	0.06 %
Molybdenum*	0.02 %
Zinc	0.05 %

* = micronutrients have been coated to provide 14.77 % coated slow-release nitrogen, 8.86 % coated slow-release available phosphate (P₂O₅), 11.81 % coated slow-release soluble potash (K₂O), 1.27 % coated slow-release magnesium, 5.85 % coated slow-release sulphur, 0.45 % coated slow-release iron, 0.059 % coated slow-release manganese, and 0.019 % coated slow-release molybdenum.

Table S2: In situ temperature (mean of hourly measured temperature one day before, on and one day after nutrient collection) and nutrients (NO₂ = nitrite, PO₄ = phosphate, NO₃ = nitrate, NH₄ = ammonium, DIN = NO₂ + NO₃ + NH₄) released by the Osmocote® fertiliser bags around manipulated reef communities at different distances: Fertiliser = directly at the pin, Centre = 25 cm towards the communities, Background = more than 200 cm away from the communities. Time refers to weeks after in situ manipulation was initiated.

Location	Time	Water temperature [°C]	Distance from fertiliser [cm]	NO ₂ [µM]	PO ₄ [µM]	NO ₃ [µM]	NH ₄ [µM]	DIN [µM N]
Background*	Start	24.90	---	0.04	0.06	0.34	0.13	0.51
Centre	2 weeks	26.27	25	0.02	0.06	0.91	0.20	1.14
Fertiliser	2 weeks		0	0.03	0.44	5.68	1.34	7.06
Background	2 weeks		200	0.01	0.09	0.27	0.05	0.33
Centre	4 weeks	26.48	25	0.06	0.12	1.07	0.24	1.37
Fertiliser	4 weeks		0	0.06	0.57	5.52	1.66	7.24
Background	4 weeks		200	0.07	0.15	0.33	0.09	0.49
Centre	6.5 weeks	27.34	25	0.03	0.14	1.16	0.21	1.41
Fertiliser	6.5 weeks		0	0.05	0.30	5.04	1.49	6.59
Background	6.5 weeks		200	0.03	0.06	0.09	0.09	0.20
Background*	8 weeks	28.04	---	0.05	0.07	0.36	0.16	0.56

* indicates measurements from the reef water column

Table S3: Differences (given as p-values) in gross primary production (P_{gross}), N_2 -fixation and denitrification between functional groups of control and eutrophied communities, obtained via two-way permutational multivariate analysis of variance (PERMANOVA) with the factors “functional group” and “community” (i.e., control and eutrophied communities).

	P_{gross}	N_2 -Fixation	Denitrification
Reef Sediment	0.002	0.001	0.081
Turf Algae	0.163	0.095	0.003
<i>P. verrucosa</i>	0.636	0.338	0.140

Table S4: Results (p-values) of permutational multivariate analysis of variance (PERMANOVA) pair-wise tests for N₂-fixation (N₂-Fix) and denitrification (DENI) in all functional groups of control (Ctrl., blue) and eutrophied (Eutr, green) communities. Significant p-values in bold.

		Ctrl		Eutr			
		Turf Algae	<i>P. verrucosa</i>	Reef sediment	Turf Algae	<i>P. verrucosa</i>	
Ctrl	Reef Sediment	0.001	0.001	0.001	0.001	0.004	N ₂ -Fix
	Turf Algae		0.001	0.019	0.095	0.001	
	<i>P. verrucosa</i>			0.001	0.001	0.338	
Eutr	Reef Sediment				0.017	0.001	N ₂ -Fix
	Turf Algae					0.001	
Ctrl	Reef Sediment	0.536	0.170	0.081	0.068	0.923	DENI
	Turf Algae		0.103	0.017	0.003	0.473	
	<i>P. verrucosa</i>			0.006	0.001	0.140	
Eutr	Reef Sediment				0.587	0.122	DENI
	Turf Algae					0.098	

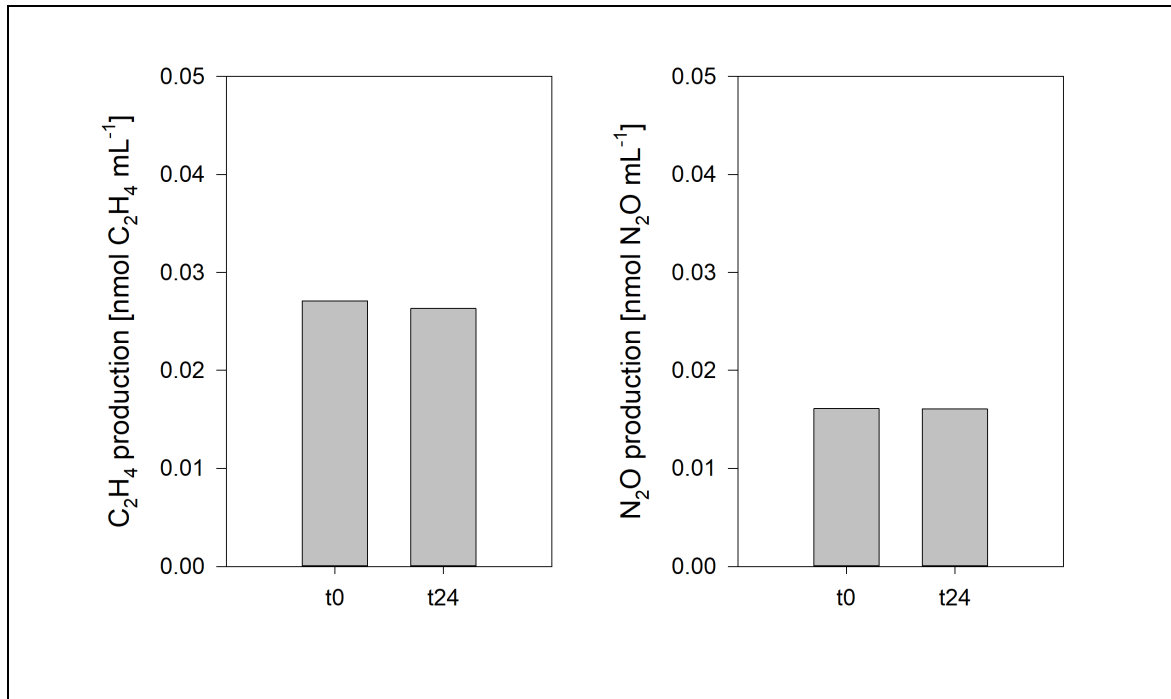


Figure S1: Ethylene (C_2H_4 ; left) and nitrous oxide (N_2O ; right) production in control incubation chambers ($n = 2$; with $5\ \mu M$ nitrate addition) over the whole incubation time of 24 h with samplings at the beginning (t_0) and the end (t_{24}) of incubations.