

ISME J.

**Supplementary information**

**Global distribution and vertical patterns of a  
prymnesiophyte-cyanobacteria obligate symbiosis**

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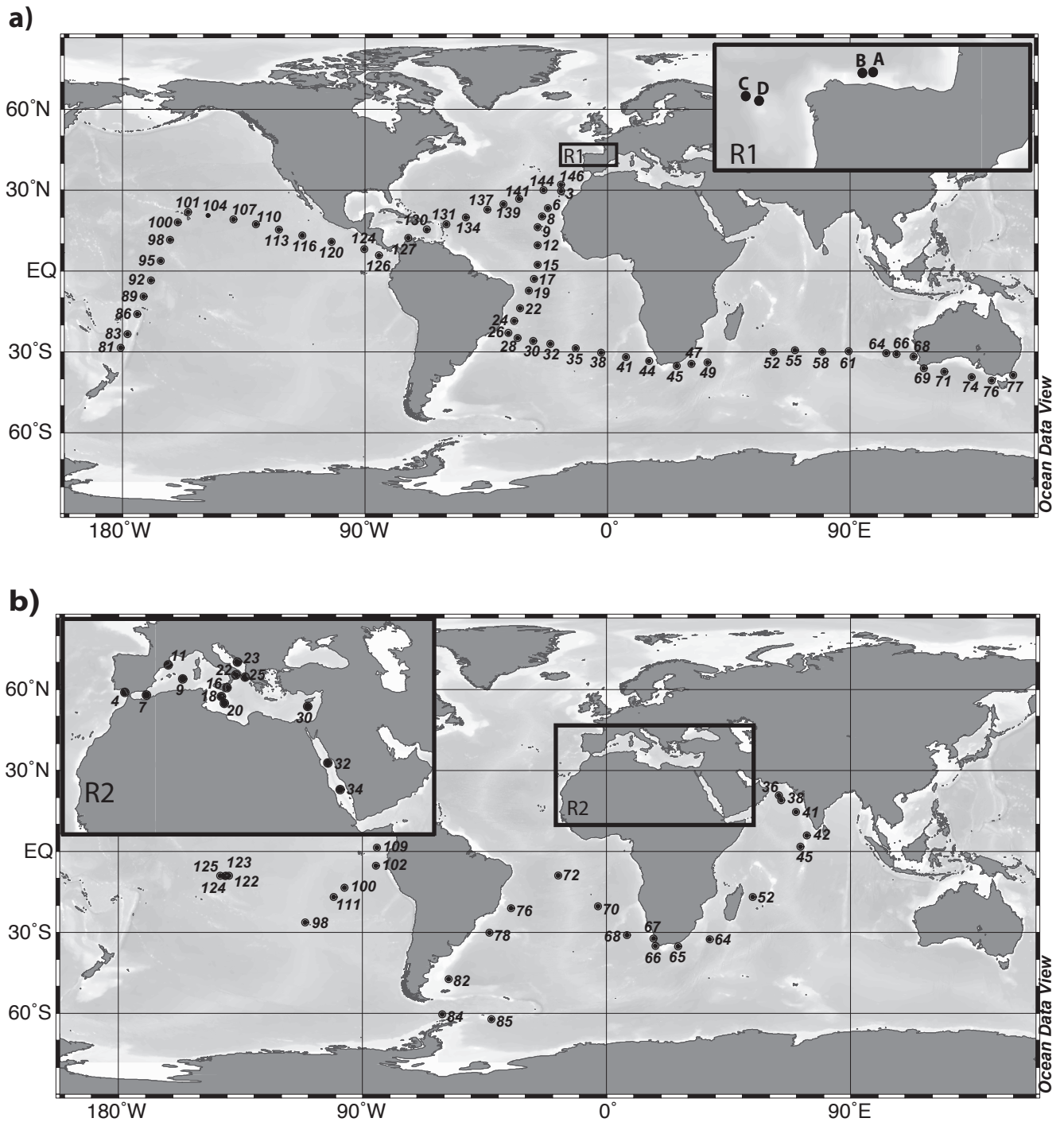
1 Table  
5 Figures

## Supplementary Tables

**Table S1** Averaged abundances (cells ml<sup>-1</sup>) of UPRYM69 labeled hosts carrying UCYN-A symbionts (*Symbiosis*), UPRYM69 labeled cells without symbionts (*Non-associated hosts*) and free UCYN-A cells (*Free symbionts*) in the 47 samples (out of 89) where the symbiosis was detected. Data are summarized in 3 categories: (1) Samples where the symbiosis was accompanied by observations of the two partners alone (non-associated host cells and free UCYN-A cells), (2) samples where the symbiosis was accompanied by the observation of one of the two partners alone, (3) samples where only the symbiosis was observed (n: number of samples per category; SD: standard deviation).

Categories	n	<i>Symbiosis</i>		<i>Non-associated hosts</i>		<i>Free symbionts</i>	
		Average	SD	Average	SD	Average	SD
(1) Symbiosis & two free partners	22	131	141	21	24	21	34
(2) Symbiosis & one free partner	14	32	27	7	5	2	-
(3) Symbiosis & no free partners	11	15	14	-	-	-	-

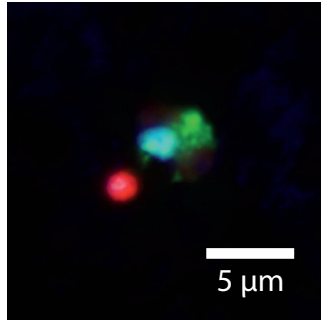
## Supplementary Figures



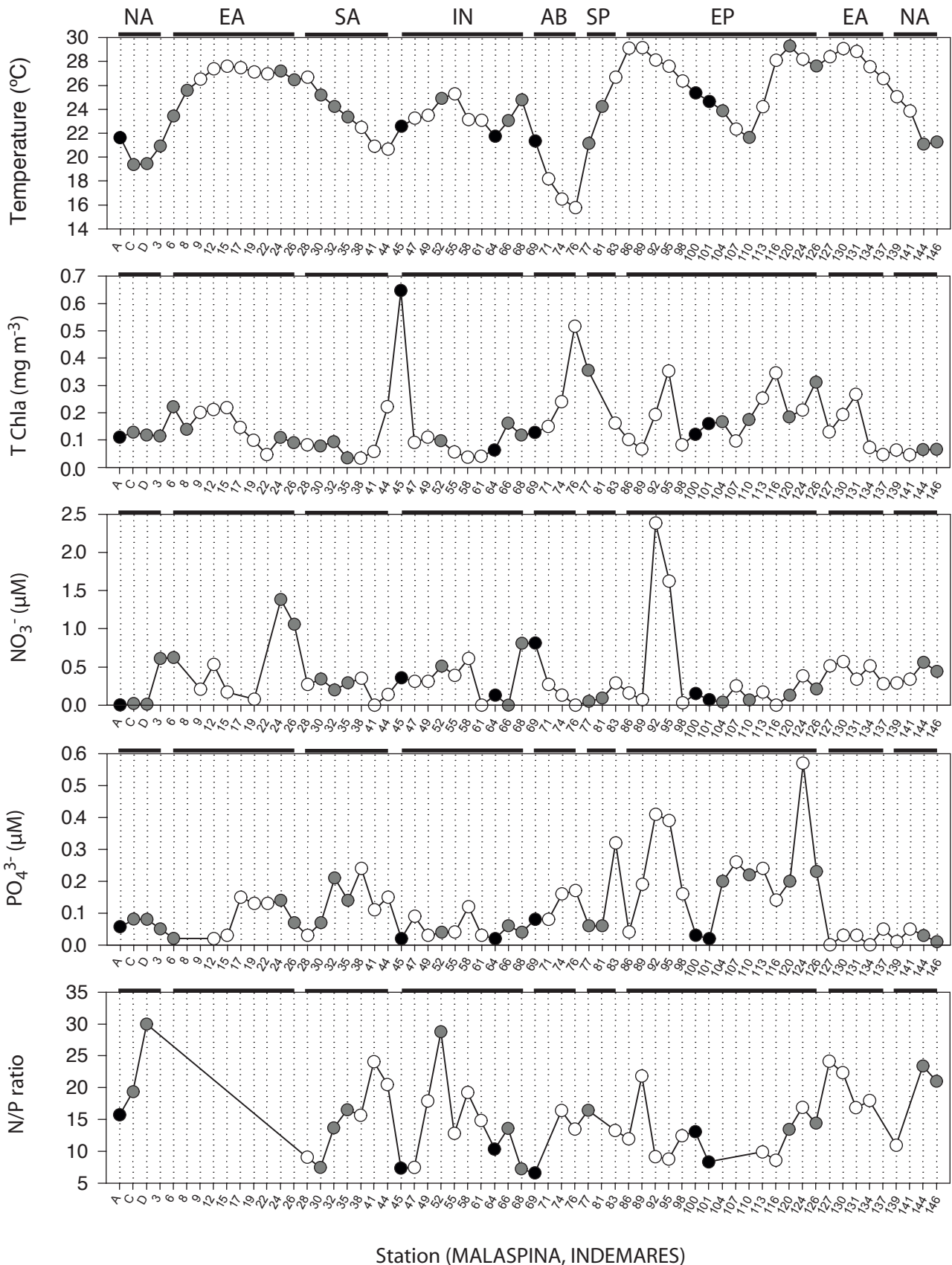
**Figure S1** Map of stations in the MALASPINA (a) and the Tara-Oceans (b) circumnavigation expeditions. The stations in the INDEMARES cruise are shown in the Region 1 (R1) in panel (a).



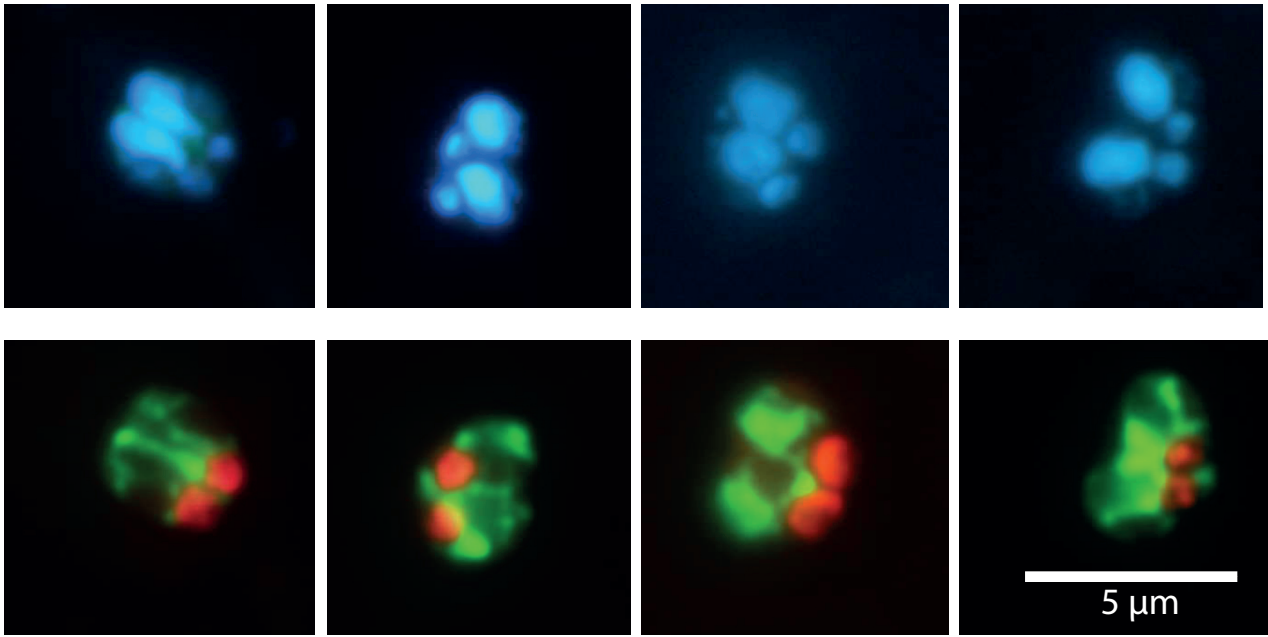
**Figure S2** Epifluorescence microscopy image of a prymnesiophyte-like cell not labeled by the UPRYM69 probe harbouring a labeled UCYN-A cell, co-occurring with a labeled host cell (from MALASPINA station 68). Upper panel correspond to DAPI signal (blue-labeled nucleus) and lower panel corresponds to the combined signal of the UPRYM69 probe (green-labeled host under blue light excitation) and UCYN-A732 probe (red-labeled symbiont under green light excitation).



**Figure S3** Epifluorescence microscopy image of a *B. bigelowii* cell where the UCYN-A symbiont seems to be detached from the host. The image corresponds to the combined signal of the DAPI stain (blue-labeled nucleus), the UBRADO69 probe (green-labeled host under blue light excitation) and UCYN-A732 probe (red-labeled symbiont under green light excitation).



**Figure S4** Temperature, total chlorophyll, nitrate, and phosphate measured at surface, and N/P ratio along the nutrient line, during the MALASPINA and INDEMARES cruises. Grey dots indicate stations where symbiosis was detected, white dots indicate stations where symbiosis was not detected and black dots indicates stations where symbiosis abundances were  $> 100$  cells ml<sup>-1</sup> (hotspots of abundance). The cruises were divided into seven regions: North Atlantic (NA), Equatorial Atlantic (EA), South Atlantic (SA), Indian (IN), Australian Bight (AB), South Pacific (SP), and Equatorial Pacific (EP).



**Figure S5** Epifluorescence microscopy images of different UCYN-A1 hosts harbouring 2 symbionts and details of the cell nucleus (from INDEMARES cruise). Upper panels correspond to DAPI signal (blue-labeled nucleus), and lower panels correspond to the combined signal of the UPRYM69 probe (green-labeled host under blue light excitation) and UCYN-A732 probe (red-labeled symbiont under green light excitation).