Supplementary information

Amphiphilic hydrolyzable polydimethylsiloxane-*b*-poly(ethyleneglycol methacrylate-*co*-trialkylsilyl methacrylate) block copolymers for marine coatings. II. Antifouling laboratory tests and field trials.

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1. Antiadhesion test with *U. rigida* spores

Thalli were maintained and allowed to grow until use in an outdoor 3000 L seawater tank under semi-natural conditions (light and temperature) to which was added 30 µM $NaNO_3$, 0.6 mM urea, 6 µM $NH_4H_2PO_4$ and 2 µM $FeCl_3$ as final concentrations. To induce sporulation, mature thalli were transferred and maintained in a 10 L seawater tanks with gentle aeration during 24 h in the dark at 25 °C. Seawater was enriched with 191 µM K_2SO_4, 56 µM $NH_4H_2PO_4$, 792 µM urea, 0.57 µM $FeSO_4$ (modified from Jimenez del Rio et al., 1996).

After 24 h, thalli were rinsed three times with fresh seawater, placed in 1 L seawater beaker and hand-pressed to release zoospores. Spores were attracted to a light spot where they were pipetted into ice cold 0.2 µm filtered seawater (FSW, 38 psu). This step was repeated twice to wash and concentrate spores. Spores were verified under a microscope for the presence of four flagella and concentration of spores was determined using a Kova® slide.

2. Evaluation of the antifouling performances in natural seawater

2.1. Assessment of the efficacy parameter N using a standard method

The N values were calculated from assessing the percentage of fouling coverage (Intensity factor, IF) (see Table S1) and the type of fouling (severity factor, SF) (see Table S2).

Table S1. Evaluation of the fouling coverage (IF).

% coverage	**Intensity factor IF**
No fouling	0
$0 \leq \% \leq 10$	1
$10 \leq \% \leq 20$	2
$20 \leq \% \leq 40$	3
$40 \leq \% \leq 60$	4
$60 \leq \% \leq 100$	5

Table S2. Evaluation of the type of fouling (SF).

Fouling type	**Severity factor (SF)**
Biofilm	1
Algae (brown, red, green)	3
Non-encrusting species (hydrozoa, sponges, ascidians …)	4
Encrusting species (barnacles, worm tubes, spirulina, bryozoans, shells…)	6

2.2. Seasonal fouling activity

During the immersion period, new sandblasted PVC panels were immersed every month to evaluate the fouling intensity and the taxa which could colonize any substrates. The majority of the fouling taxa was composed of soft algae and calcareous spirorbid worms. These macroorganisms are relevant colonizers found in Toulon bay. Their intensity varies with the season. The lower intensity values were obtained from December 2017 to February 2018.

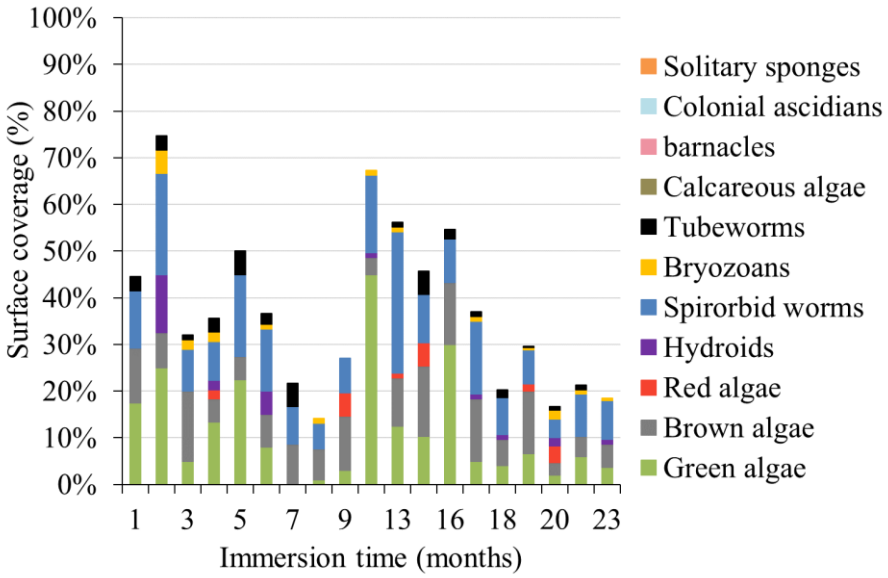


Figure S1. Seasonal fouling activity assessed from sandblasted PVC panels immersed every month during the immersion period (from June 2017 to May 2019).

2.3. Antifouling performances of coatings in field

Figure S2 shows the evolution of the percentage of surface coverage of sandblasted PVC panels by macroorganism taxa as a function of *in situ* immersion time. Spirorbid worms are the main fouling taxa.

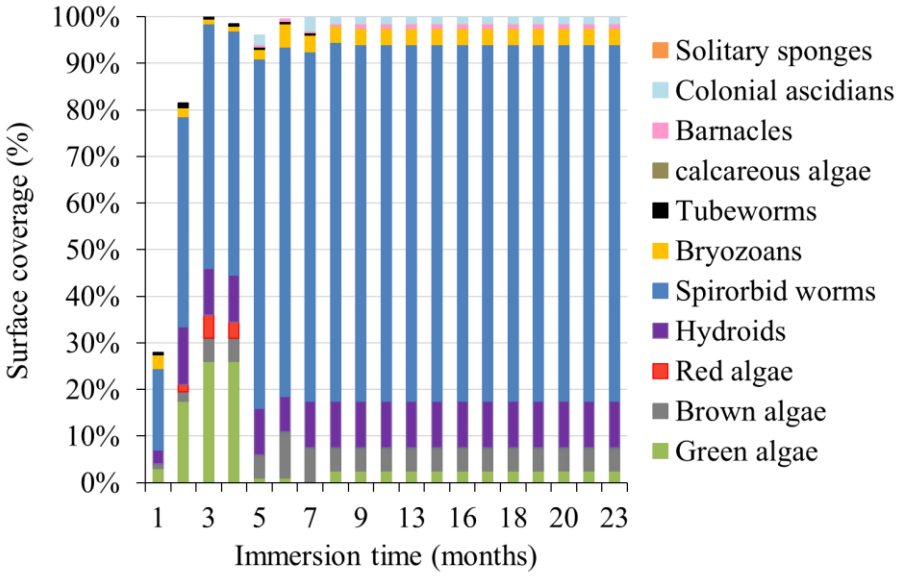


Figure S2. Evolution of the percentage of surface coverage of sandblasted PVC panels by macroorganism taxa as a function of *in situ* immersion time (from June 2017 to May 2019).

Figures S3 to S6 show (a) the evolution of the percentage of surface coverage of X3, PDMS and additive-based PDMS coatings by macroorganism taxa as a function of *in situ* immersion time and (b) the fouling release (FR) properties evaluated at 10 and 23 months of static immersion by cleaning the coating with a wet sponge.

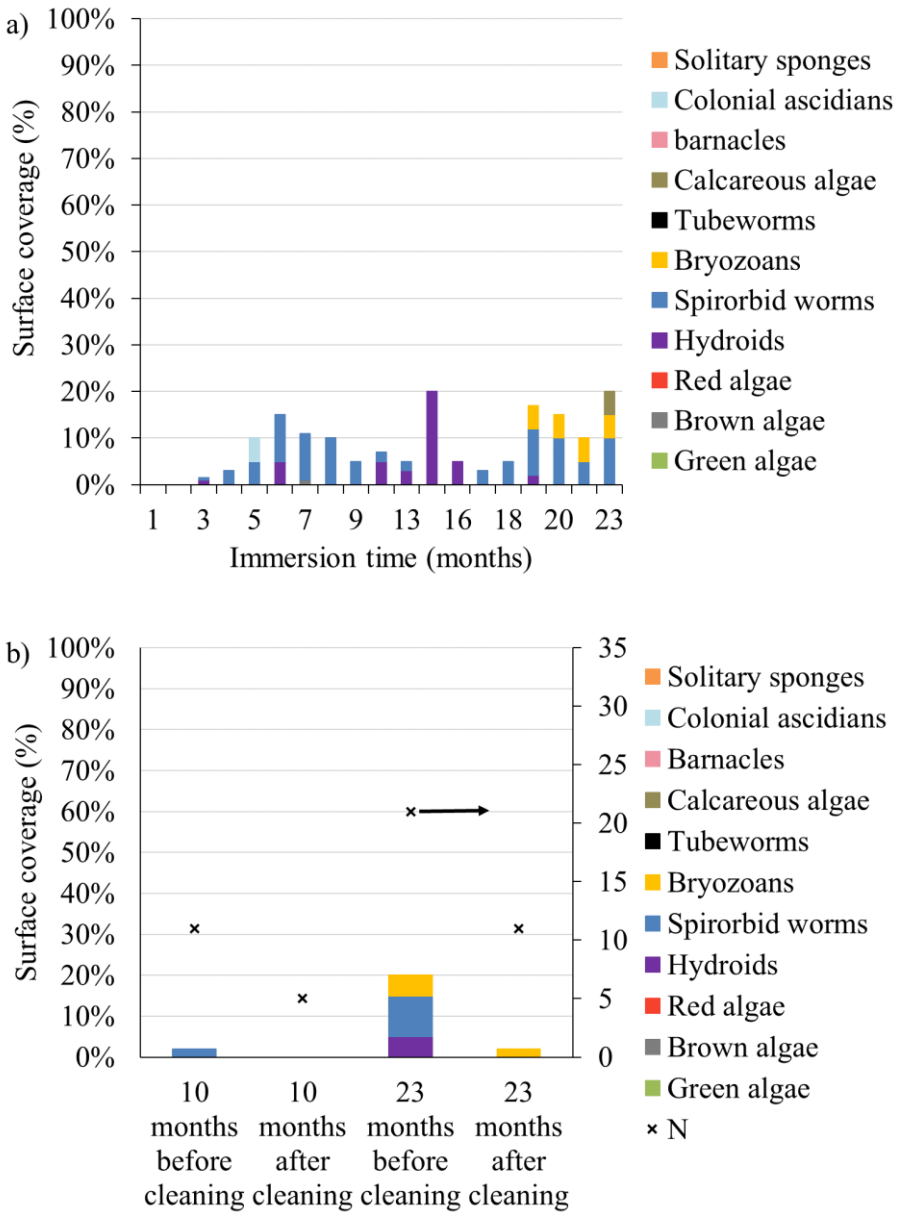


Figure S3. Evolution of (a) the percentage of surface coverage of X3 coated panels by macroorganism taxa as a function of *in situ* immersion time (from June 2017 to May 2019) and (b) the percentage of surface coverage of X3 coated panels by macroorganism taxa at 10 and 23 months of immersion before and after cleaning them with a sponge.

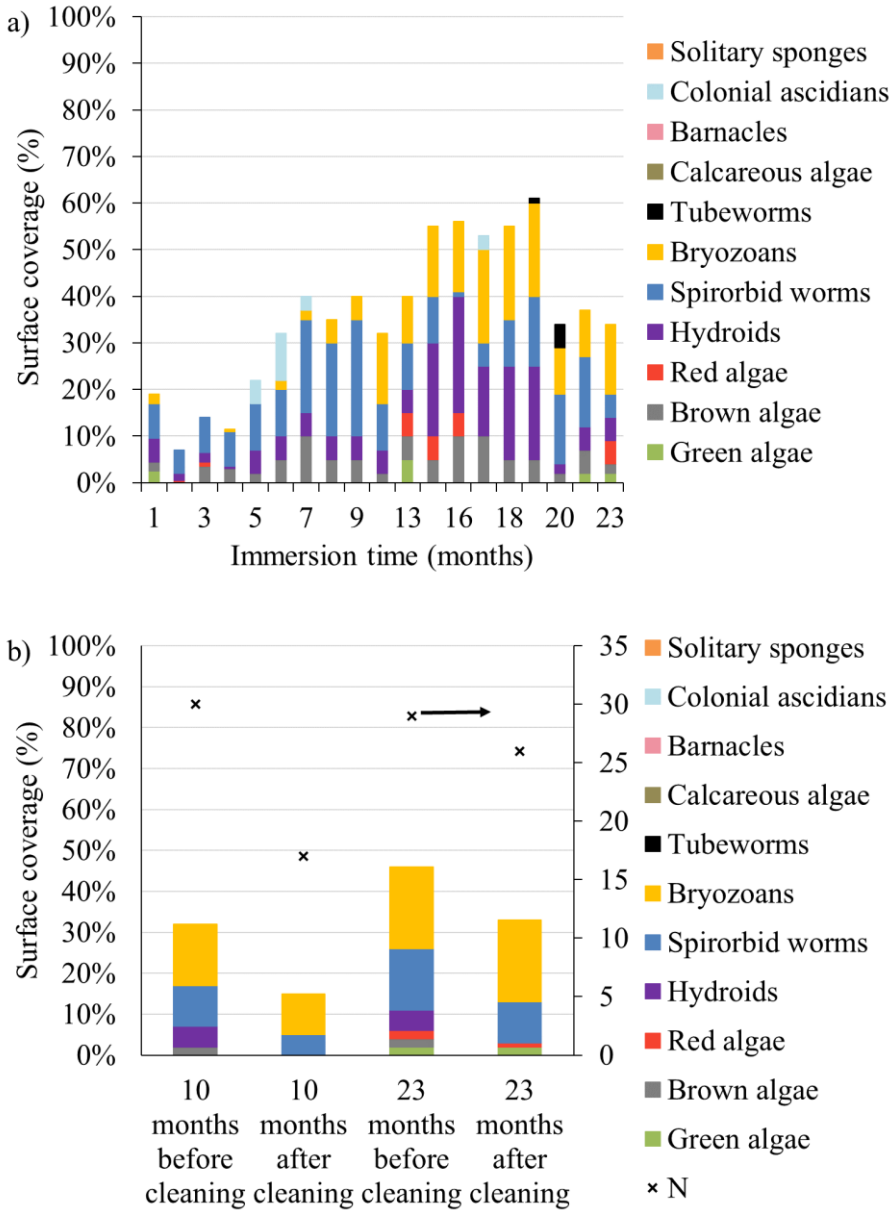
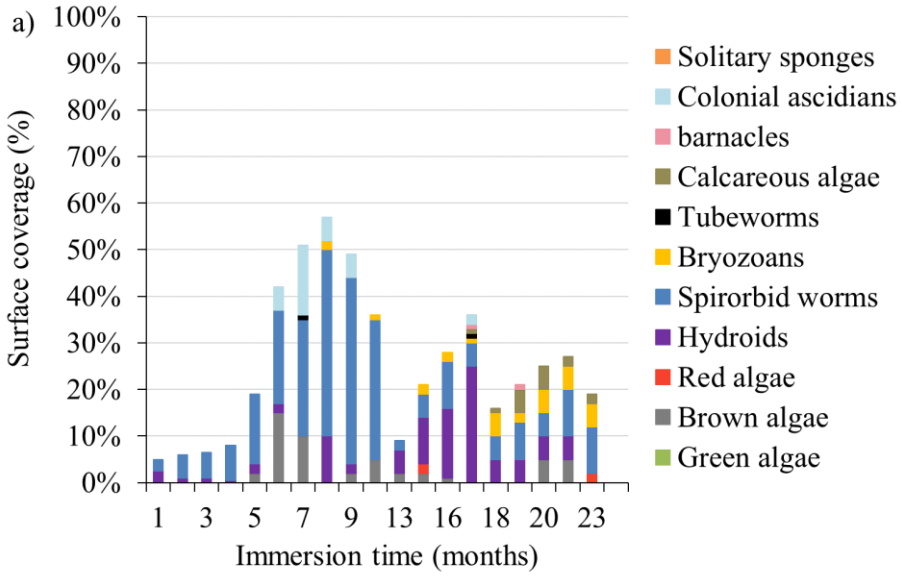
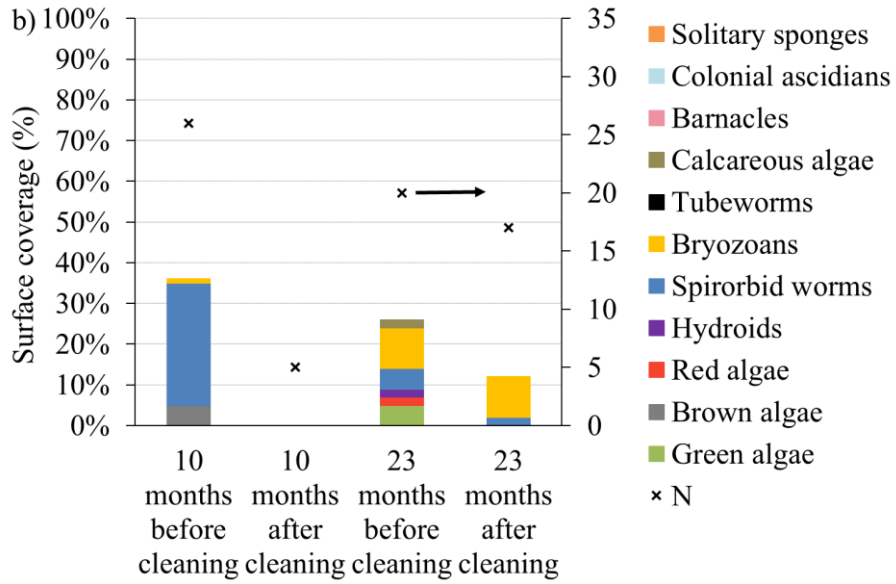
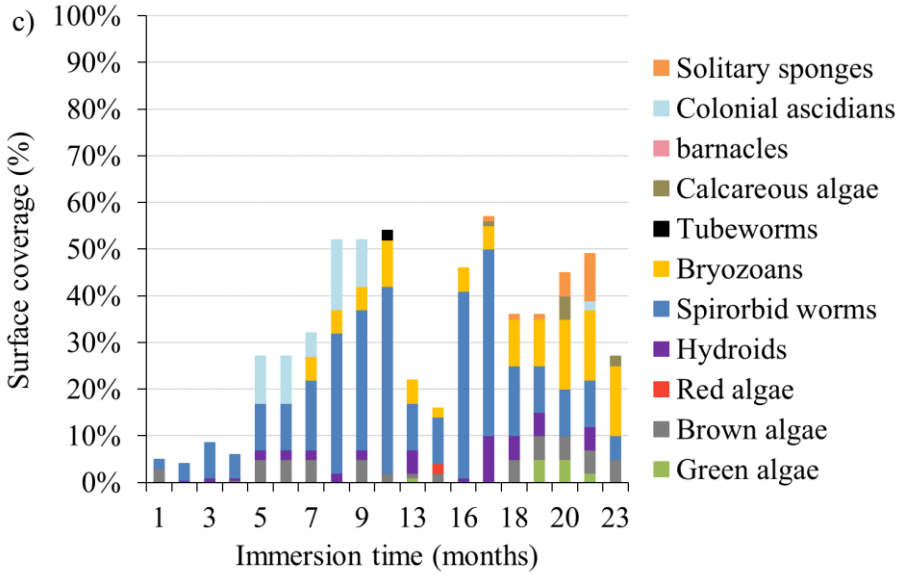


Figure S4. Evolution of (a) the percentage of surface coverage of PDMS coated panels by macroorganism taxa as a function of *in situ* immersion time (from June 2017 to May 2019) and (b) the percentage of surface coverage of PDMS coated panels by macroorganism taxa at 10 and 23 months of immersion before and after cleaning them with a sponge.


a)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Surface coverage (%)
1 3 5 7 9 13 16 18 20 23
Immersion time (months)
Solitary sponges
Colonial ascidians
barnacles
Calcareous algae
Tubeworms
Bryozoans
Spirorbid worms
Hydroids
Red algae
Brown algae
Green algae


b)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Surface coverage (%)
35
30
25
20
15
10
5
0
10 months before cleaning
10 months after cleaning
23 months before cleaning
23 months after cleaning
Solitary sponges
Colonial ascidians
Barnacles
Calcareous algae
Tubeworms
Bryozoans
Spirorbid worms
Hydroids
Red algae
Brown algae
Green algae
N


c)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Surface coverage (%)
1 3 5 7 9 13 16 18 20 23
Immersion time (months)
Solitary sponges
Colonial ascidians
barnacles
Calcareous algae
Tubeworms
Bryozoans
Spirorbid worms
Hydroids
Red algae
Brown algae
Green algae

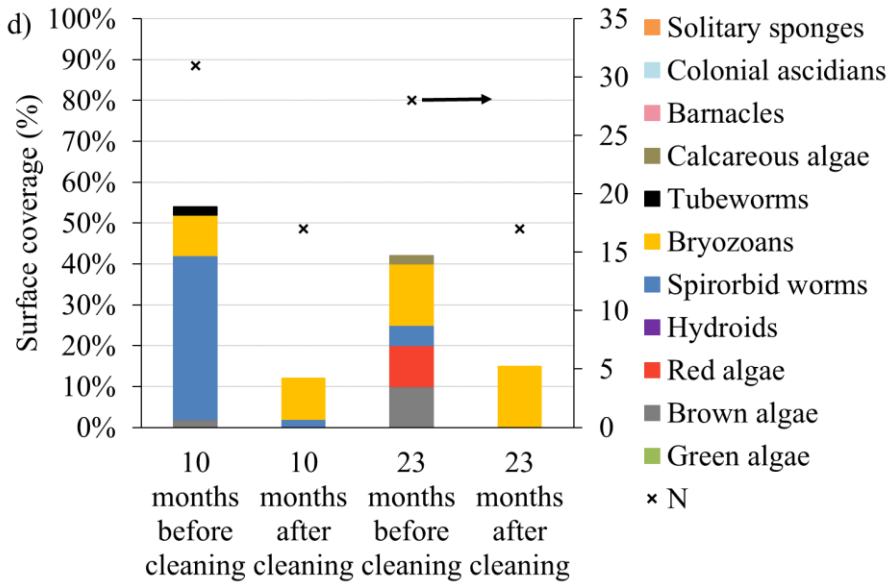
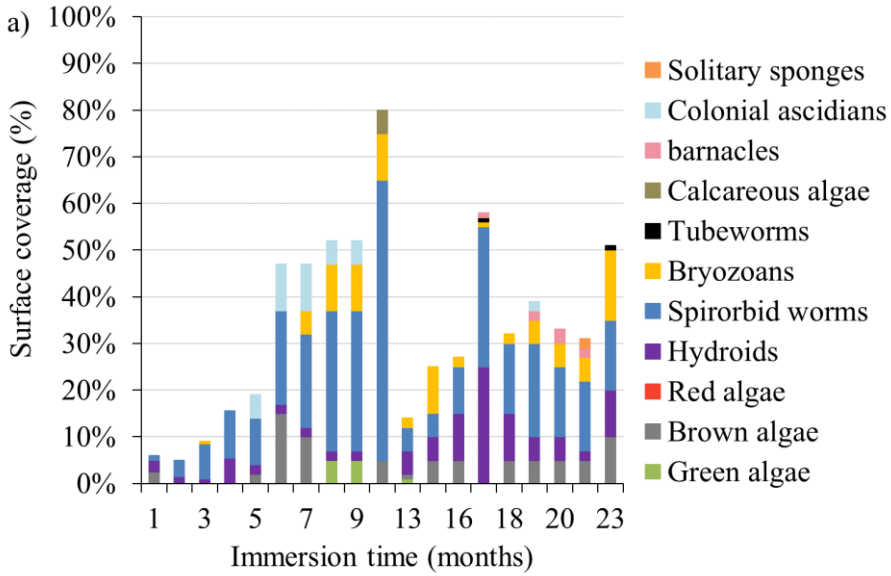
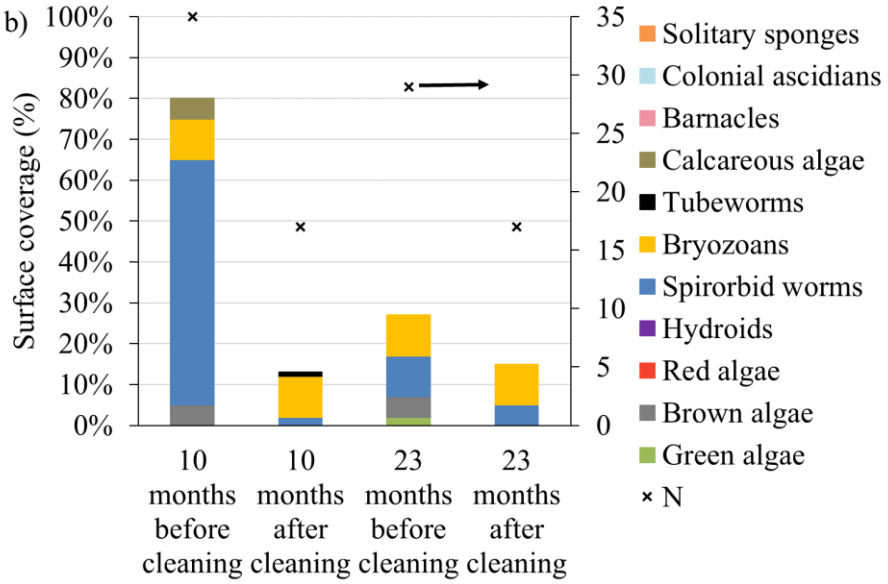
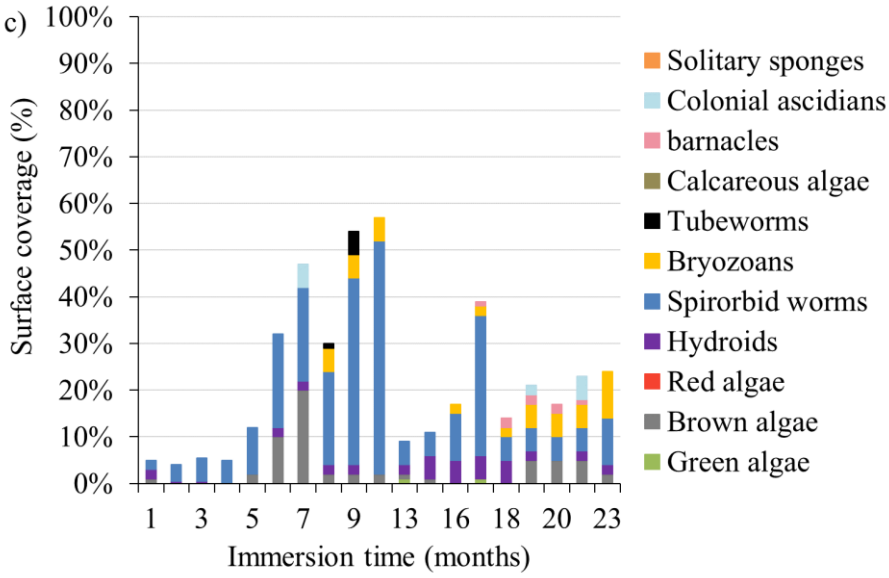
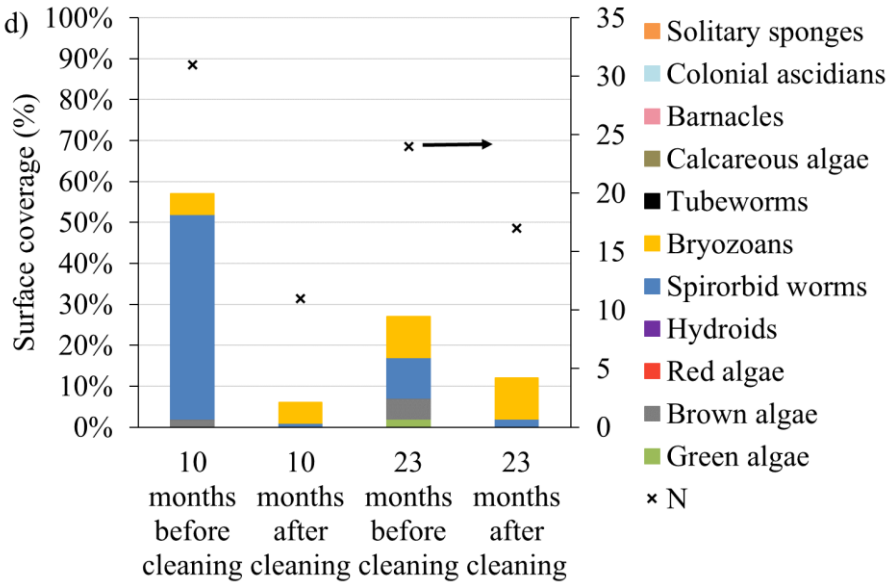


Figure S5. Evolution of the percentage of surface coverage of TBSiMA-based coatings (a) PDMS-*b*-B, (c) PDMS-*b*-(B-*co*-EG6) by macroorganism taxa as a function of *in situ* immersion time (from June 2017 to May 2019), and (b) PDMS-*b*-B, (d) PDMS-*b*-(B-*co*-EG6), the percentage of surface coverage of coated panels by macroorganism taxa at 10 and 23 months of immersion before and after cleaning them with a sponge.




b)
Surface coverage (%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
35
30
25
20
15
10
5
0
10 months before cleaning
10 months after cleaning
23 months before cleaning
23 months after cleaning
Solitary sponges
Colonial ascidians
Barnacles
Calcareous algae
Tubeworms
Bryozoans
Spirorbid worms
Hydroids
Red algae
Brown algae
Green algae
N


c)
Surface coverage (%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1
3
5
7
9
13
16
18
20
23
Immersion time (months)
Solitary sponges
Colonial ascidians
barnacles
Calcareous algae
Tubeworms
Bryozoans
Spirorbid worms
Hydroids
Red algae
Brown algae
Green algae


d)
Surface coverage (%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
35
30
25
20
15
10
5
0
10 months before cleaning
10 months after cleaning
23 months before cleaning
23 months after cleaning
Solitary sponges
Colonial ascidians
Barnacles
Calcareous algae
Tubeworms
Bryozoans
Spirorbid worms
Hydroids
Red algae
Brown algae
Green algae
N

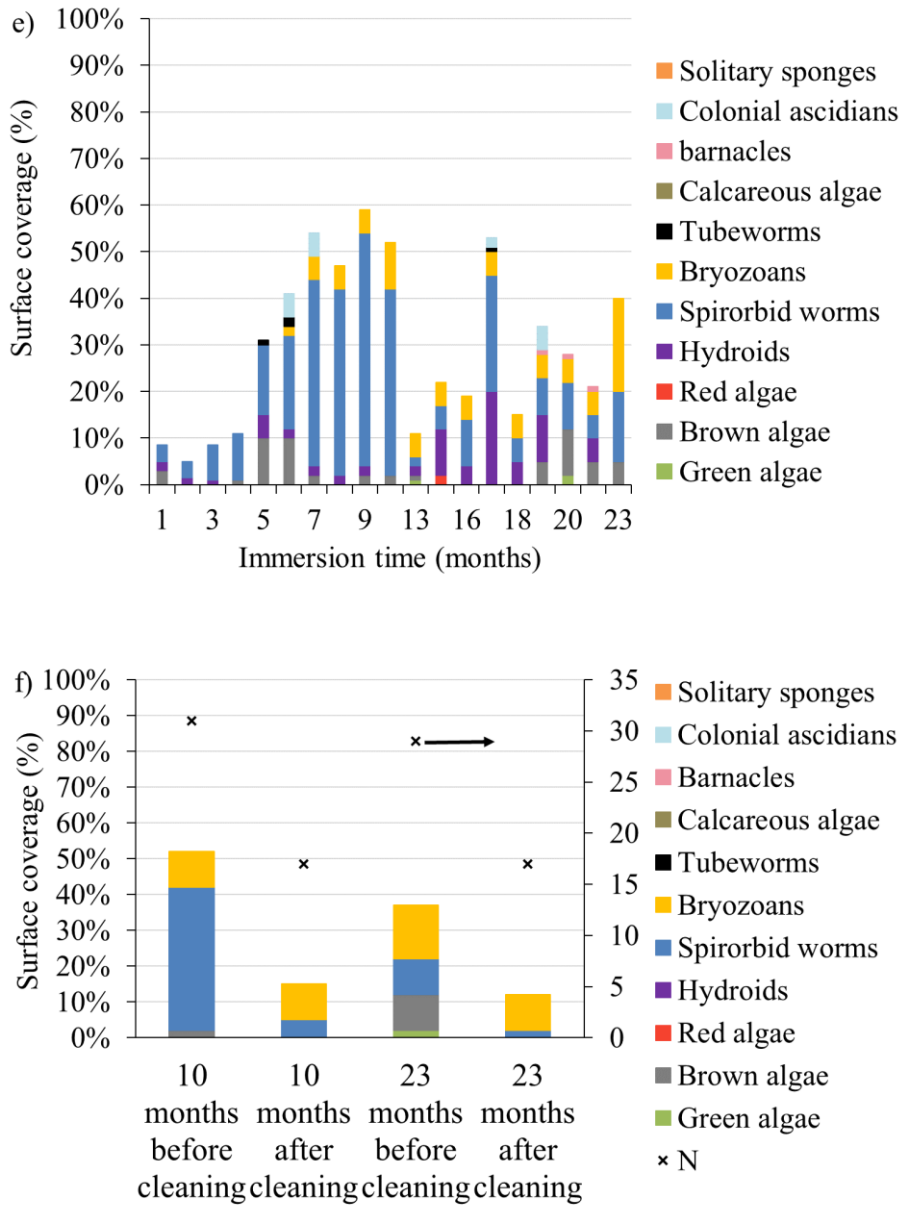


Figure S6. Evolution of the percentage of surface coverage of TiPSiMA-based coatings (a) PDMS-*b*-iP, (c) PDMS-*b*-(iP-*co*-EG11), (e) PDMS-*b*-(iP-*co*-EG22) by macroorganism taxa as a function of *in situ* immersion time (from June 2017 to May 2019) and (b) PDMS-*b*-iP, (d) PDMS-*b*-(iP-*co*-EG11), (f) PDMS-*b*-(iP-*co*-EG22), the percentage of surface coverage of coated panels by macroorganism taxa at 10 and 23 months of immersion before and after cleaning them with a sponge.