

# Microfluidic passive samplers for *in situ* collection of live aquatic protists

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†Electronic Supplementary Information (ESI) available:

- 1) Table S1, abundance of protists collected in field trials by deployment date and location
- 2) Table S2, abundance of protists collected in field trials by sampler type
- 3) Table S3, abundance of protists collected in laboratory trial with marine sediment
- 4) Figure S1, *Cyclidium* sp. collected in laboratory trial using different microcosm concentrations
- 5) Figure S2, representative micrographs from fast-acquisition scanning of protists in galleries
- 6) Movie M1, highly concentrated *Cyclidium* sp. in laboratory enrichment study
- 7) Movie M2, protist entering the narrow constriction of a square observation gallery
- 8) Movie M3, multiple protists and a metazoan collected from the field in a heart-shaped observation gallery
- 9) Movie M4, *Paramecium* sp. trapped within a heart-shaped observation gallery
- 10) CAD1, Computer aided design of photolithography masks of passive samplers

TABLE S1. Protist abundance observed in passive microfluidic samplers by during deployment in natural marine sediment experiment.

Day	Baited	Unbaited
1	N/A	19
2	14	4
3	20	23
4	33	17
5	17	34
<b>Average</b>	21.0	19.4
<b>Stdev.</b>	8.4	10.8

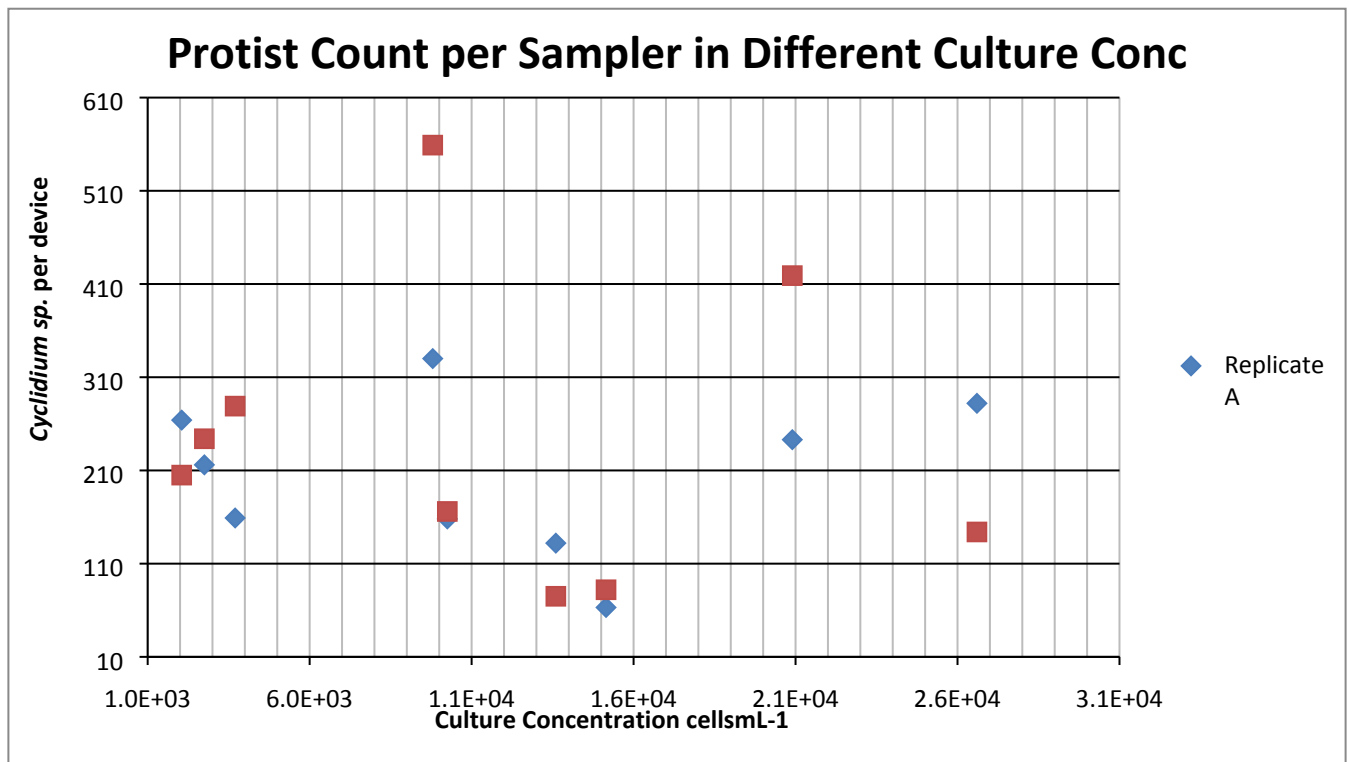
TABLE S2. Protist abundance observed in passive microfluidic samplers by deployment date and site in water column or sediment.

	Deployment 1 8-Nov-11 to 13-Nov-11		Deployment 2 13-Nov-11 to 16-Nov-11		<b>Total</b>
	Water Column	Sediment	Water Column	Sediment	
Site 1	15 (4.0%)	33 (8.8%)	45 (12.0%)	31 (8.2%)	<b>124</b>
Site 2	26 (6.9%)	22 (5.9%)	72 (19.1%)	18 (4.8%)	<b>138</b>
Site 3	37 (9.8%)	28 (7.4%)	22 (5.9%)	27 (7.2%)	<b>114</b>
<b>Total</b>	<b>78</b>	<b>83</b>	<b>139</b>	<b>76</b>	<b>376</b>

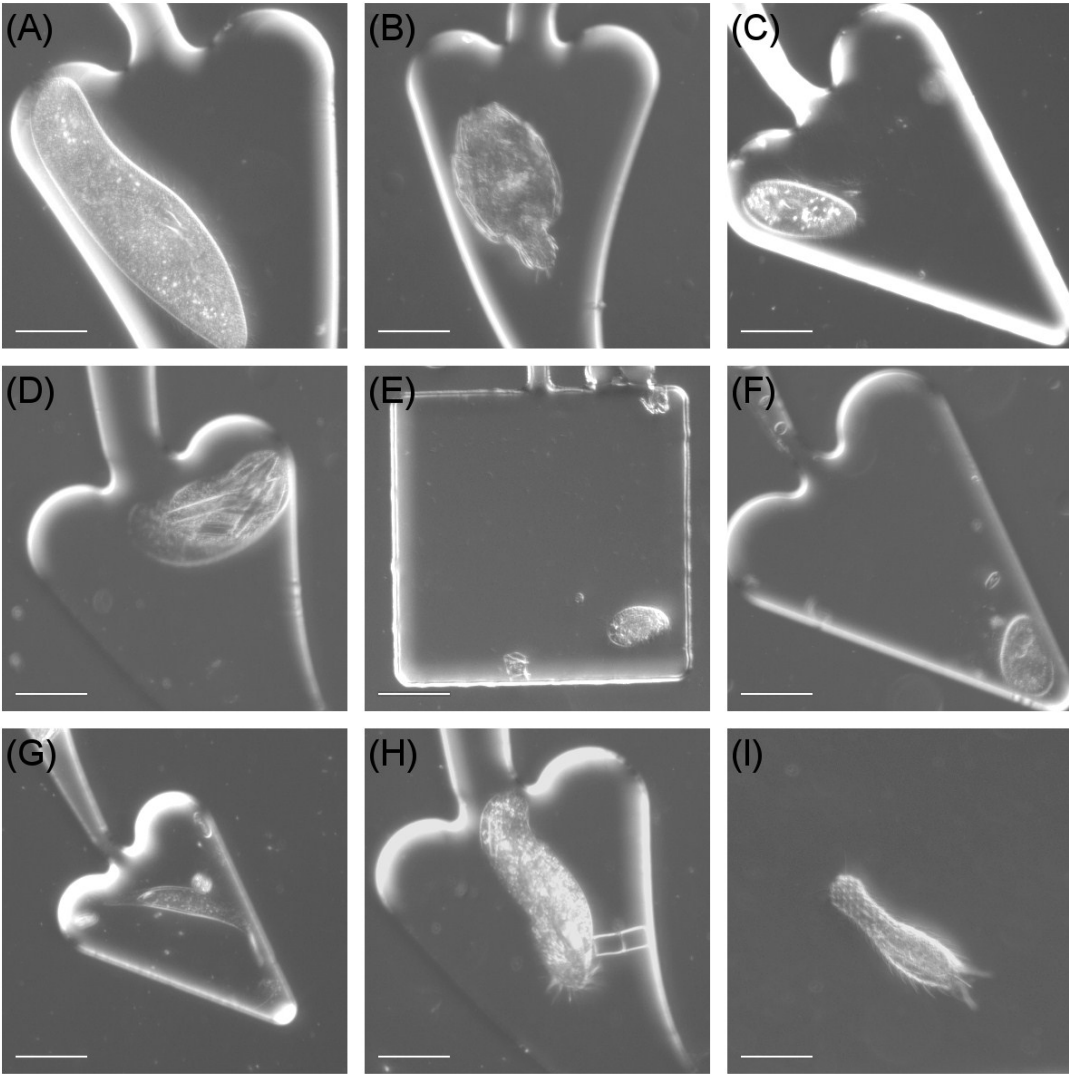
TABLE S3. Protist abundance observed in passive microfluidic samplers by sampler type, also including numbers of samplers deployed and gallery volume per device.

Passive Sampler Type	Total Protists Observed	Gallery Volume per sampler version (nL)	Number Deployed	
			Total	Containing Protists
Secondary in parallel	19	6.4	60	9
Secondary in series	96	390	24	19
Small Tertiary	110	14	24	19
Large Tertiary	151	225	10*	10
<b>Total</b>	<b>376</b>		<b>118</b>	<b>57</b>

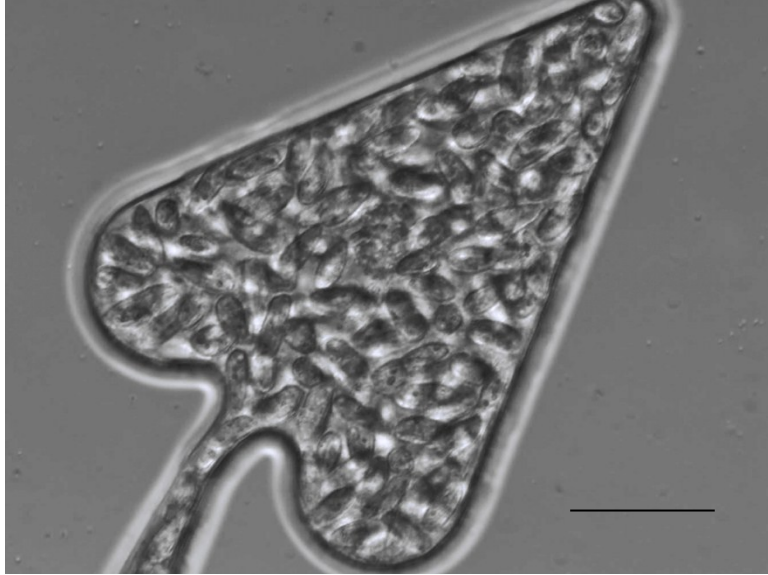
\*2 out of the 12 large curly devices were unusable.



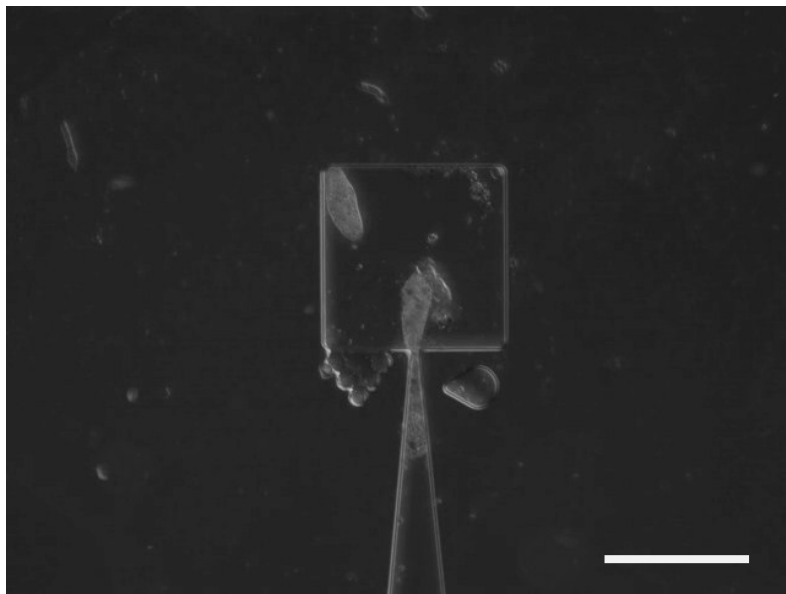
**Fig. S1** Protists captured per device showing no correlation to the culture concentrations that the devices were deployed in. This might be due to the samplers “capture capacity” or flux restricted by the size of the entrance from the environment.



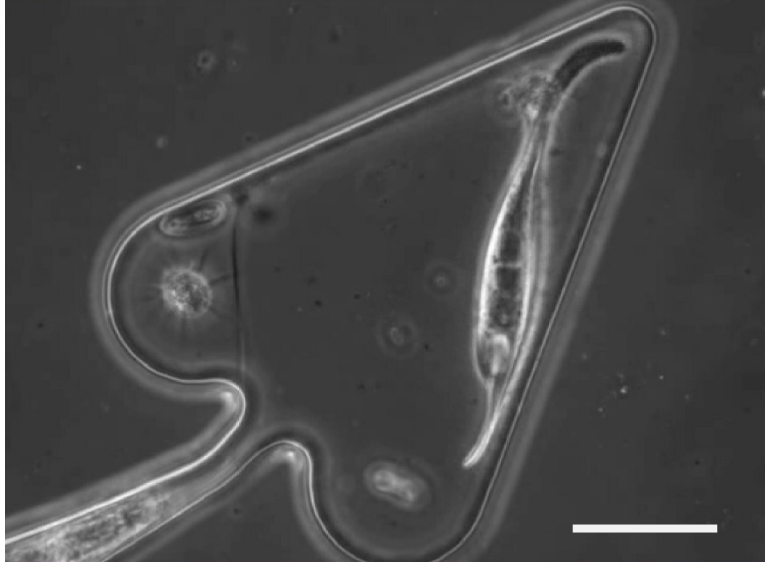
**Fig. S2.** Representative frames taken from a low-resolution movie recorded at 15 frames per second while scanning a microfluidic passive sampler on a motorized stage (phase contrast, plan-apochromat10 $\times$ /.45 M27 objective). Scale bars are 50  $\mu$ m. Details recorded for each organism are major  $\times$  minor axis, location and device type: (A) 254  $\times$  74  $\mu$ m, Site 3 Water Column, Large Tertiary (B) 126  $\times$  63  $\mu$ m, Site 2 Sediment, Large Tertiary (C) 91  $\times$  40  $\mu$ m, Site 1 Water Column, Large Tertiary (D) 129  $\times$  63  $\mu$ m, Site 2 Sediment, Large Tertiary (E) 49  $\times$  29  $\mu$ m, Site 2 Sediment, Secondary in parallel (F) 63  $\times$  40  $\mu$ m, Site 2 Sediment, Large Tertiary (G) 149  $\times$  20  $\mu$ m, Site 1 Water Column, Large Tertiary (H) 166  $\times$  51  $\mu$ m, Site 1 Water Column, Large Tertiary (I) *Chaetonotus* sp. 148  $\times$  39  $\mu$ m, Site 1 Water Column, Secondary in series.



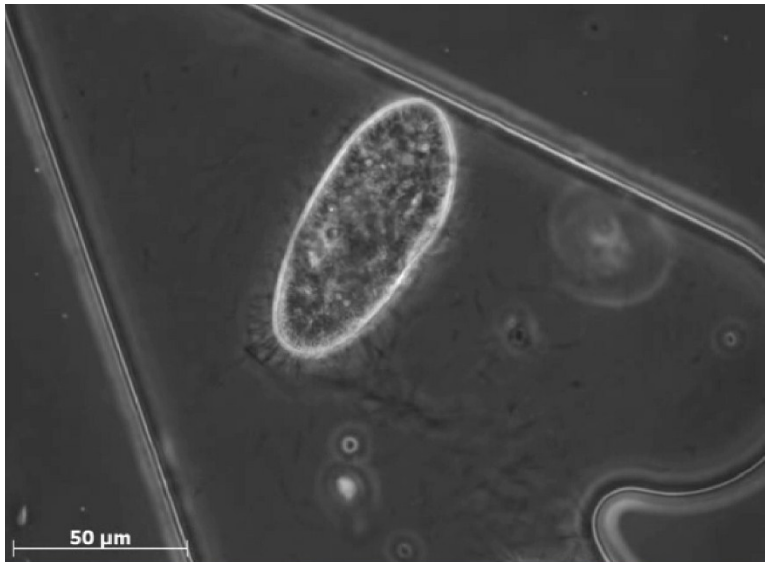
**Movie M1**, highly concentrated *Cyclidium* sp. in laboratory enrichment study, scale 50  $\mu\text{m}$ .



**Movie M2**, protist entering the narrow constriction of a square observation gallery, scale 50  $\mu\text{m}$ .



**Movie M3**, multiple protists and a metazoan collected from the field in a heart-shaped observation gallery, Scale 50  $\mu\text{m}$ .



**Movie M4**, *Paramecium* sp. trapped within a heart-shaped observation gallery, Scale 50  $\mu\text{m}$ .

